

## Strategic Higher Education Plan for Pakistan

**Mission:** Ministry of Education should identify and offer competitive, creative opportunities for higher education, whilst supporting teaching and research developments through partnerships.

Promote and support a Higher Education System capable of addressing national needs at all levels by promoting teaching and research of an applied and interdisciplinary nature, ultimately acting as a vehicle to improve the economic competitiveness of Pakistan and the quality of life of the nation.

**Vision:** Develop and implement excellent governance and management processes that are recognised nationally and globally for excellence, innovation, enterprise, a diverse scholarly experience and public engagement, providing a strong foundation for academic excellence.

Develop a system that is listening, acting and delivering partnerships with the higher education institutions, aiming to provide quality control to their processes of management and governance structure, financial sustainability and quality assurance to their outputs.

Develop national research infrastructure that fulfils **national needs** by acting as a guardian of Pakistani research and supporting the resources that institutions may require.

Develop and sustain a skill base for businesses, industry, institutions, society and the future economy of Pakistan.

### **1. Executive Summary:**

Pakistan Higher Education plan shall focus on growing interdisciplinary research and teaching in all national higher education institutions. There is a need to develop a strong bridge between universities and industries, which will ultimately drive the economy of Pakistan. This should be a high priority, as it will improve the quality of life of our nation at all levels.

I have followed the progress of the Higher Education Commission since its establishment and there is a dire need to significantly uplift its performance. The Ministry of Planning Development and Reforms webpage states that "in the last 5 years HEC funding is increased more than 100%", however, my analysis shows that the overall output has plateaued and in some cases the quality of some institutions outputs have deteriorated. Thus, the HEC requires a radical targeted approach to create robust structures that are "fit for purpose" and that can deliver the growth in the quality and quantity in higher education that Pakistan needs.

Ministry of Education should not only establish but also monitor and deliver large impactful research and teaching programmes and revitalise Pakistan's Higher Education System through improved HEC governance and using innovative concepts based on excellence and accountability. We should develop Higher Education in Pakistan that interacts at the grassroots levels by developing "***connecting research led curricula***" at all levels and it works for the National interests by developing a system that is "fit for purpose". Implementation of the "***continuous improvement cycle***" at all levels shall be the key. Our youngster should work in partnership with all stakeholders to connect, discover, research and innovate for the common goals of Pakistan. Our Higher Education system should align to sustainable national development goals, e.g. affordable and excellent healthcare, energy crisis, clean water, etc.

We are blessed with intelligent youth that can write new history of Pakistan if we offer them the right opportunities, environment and appropriate guidance in a timely manner and provide them a platform by giving them a creative environment that inspires the future generation. Barriers and bureaucratic processes have to be removed and transparent higher education institutions, which is approachable and works for the stronger and developed Pakistan. Only good governance and creating a research culture can benefit a nation.

This document outlines some aims and how we should implement them and above all, how it will benefit Pakistan. Only by working together in partnership, we will build a Pakistan higher education system that can be the envy of all developing nations.

**Aims:**

- Set up National leading activities in higher education (**Institute of Advanced Studies, Islamabad National University – it is a timely initiative**), which integrates research, teaching, innovation and enterprise, contributing to the renewal and growth of Pakistan. This should include the enhancement of cultural assets, physical infrastructure, health and economic development.
- Bring together scientists from a wide variety of scientific backgrounds towards overcoming key scientific challenges and addressing Pakistani/global priorities (Industrial strategy challenge, UN sustainable development goals), ultimately transforming the lives of people in Pakistan.
- Encourage and establish new teaching and research collaboration by bringing together academics across disciplines/institutions in order to develop interdisciplinary teaching and research.
- Enable wider access to specialist facilities and develop a national focus that significantly adorn the economy of Pakistan.
- Embed innovation, enterprise and quality control and assurance at all levels - innovation, expansion, governance and continuous improvement should be key.
- Promulgate the future research of applied nature in energy and the environment, biotechnology and biological sciences, health sciences, engineering, physical sciences, science and technology, arts and humanities, economic and social sciences and agriculture with the aim of contributing to the higher education strategy across the universities.
- Link technology-led institutions to develop a manufacturing base in partnership with industry.
- Develop Research Excellence Framework (REF) and Teaching Excellence Framework (TEF) systems for the assessment of the quality of research and teaching in Pakistan universities and higher education colleges / institutions.

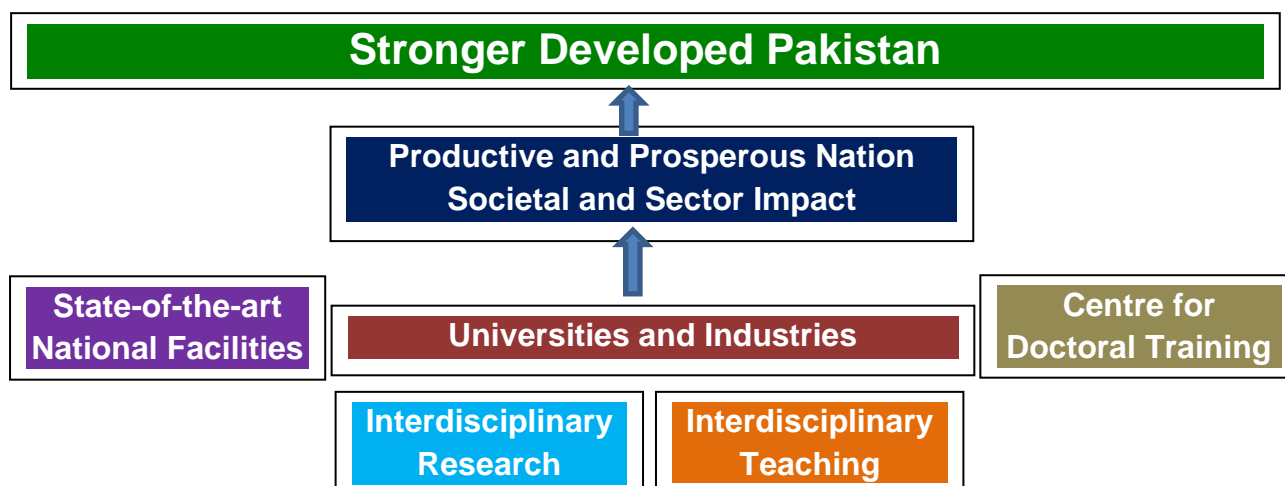
In particular, prioritise the following key strategies:

**2. Governance:**

The world's strongest economies all invest heavily in research, discovery and innovation, and in particular in the engineering and physical sciences. It is responsibility of the government to recognise the link between science and national prosperity, identifying 'high-quality science and innovation, spreading fast, as one of the foundations of productivity growth. Productivity at all levels should be the ultimate goal of HEC and the future competitiveness and creativity of Pakistan' economy requires the successful development of products, processes and technology based on the discovery and innovation in the mathematical and physical sciences, information and computing technologies, and engineering achieved in our universities, colleges, institutions working in partnership with industry. The essential ingredients of the existing operational parameters will remain in place and our aim should be to make it accountable at all levels.

Equality and diversity shall be the key element of our governance plan and we should strive to develop a work environment where we treat all employees as individuals, fairly and in a consistent way.

The main delivery plan should aim at establishing research of applied nature and enhancing research and skill base of the nation to derive the economy of the country. The way our vision and governance should shape is outlined in this flowchart diagram:



I strongly believe that the higher education system should deliver a stronger, more developed Pakistan and that this can only be achieved by mutual cooperation at all levels in pursuit of a common goal: the deliverance of education and research in partnership with industries by providing state-of-the-art facilities and excellent training systems to produce a diverse, competent skill set. This will produce a productive and prosperous nation.

### **3. Top Ten Key Strategies that will develop leading capabilities:**

- KS1 Collaborative Research and Partnership**
- KS2 Establishing State-of-the-art National Facilities**
- KS3 Connective Learning and Teaching at all Levels**
- KS4 Innovation and Enterprise and Centres for Doctoral Training (CDTs)**
- KS5 Interdisciplinary Research Centres (IRCs) – A national competition**
- KS6 National Competition for Synopsis Writing – highlighting the national needs**
- KS7 Establish National Student Survey (a centralise database)**
- KS8 Accountability Survey of HEC (public Accountability)**
- KS9 Industrial Advisory board**
- Ks10 Research Advisory board**

Details for the above are given below;

#### **KS1 Collaborative Research and Partnership:**

Our overall goal should be to set up leading activities that integrate research, teaching, innovation and enterprise, whilst fostering strong collaboration between the institutions and identify research themes of National importance. Thus, one of our first tasks should be to undertake a detailed consultation with all stakeholders in order to map out the existing strengths and weaknesses from which we should finalise a plan. This should be formed around a number of strategic research themes that will advance multidisciplinary and interdisciplinary research. In many cases, the research shall also be aligned to multidisciplinary research that aligns with the priorities of Pakistan, developing universities and industry strategy themes.

Discussion with stakeholders shall be the key for an effective impact on research, in order to play a pivotal role in closing the gap between researchers and society, each influencing the other, making it possible for the nation to benefit from the newly acquired knowledge and developed technology. The creative, multidisciplinary approaches that will emerge from this partnership will provide a competitive edge to businesses. The HEC should play a key role in brokering knowledge exchange between the Pakistani research knowledge base and user communities. Through targeted relationships with key organisations across business, the public, charity and voluntary sectors, the HEC will continue to improve links and access

to top quality research and people, seeking new partnerships and cofounding that is essential to maximise impact. Some of the relevant themes include (i) bioscience and biotechnology, (ii) leading edge healthcare and medicine, (iii) manufacturing processes and materials of the future and (iv) robotics and artificial intelligence.

**In order to deliver our research strategy, we should implement the following activities:**

- Establish an interdisciplinary network, which will form a core grouping of academics in a range of sub-groups. These research groupings would then cross-fertilise ideas through regular and focussed networking events organised by the HEC funding calls. One of our highest priorities should be to foster strong collaboration across the institutions.
- Increase engagement in applied research amongst academics in universities and improve the quality of research outputs; strategically building the strength and capacity of the research cluster created across the disciplines and institutions. Achieving this will require a significant increase in collaboration among universities and industries.
- Growing multidisciplinary collaborative links with other universities and industries will be crucial. We should achieve this by creating a framework to support key research specialisms and by giving strategic direction to research, cultivating a togetherness that can be built up into research teams and programmes.
- Establish international links with those intuitions, who will work in partnerships in strengthening capacity for research and innovation in Pakistan and work on projects that can be implemented in Pakistan.

## **KS2 Establishing State-of-the-art National Facilities**

Multiple users will use these facilities and multiple collaborative research projects will be implemented providing opportunities to share complementary expertise and facilities resulting into new challenges, social and economic impact. Through the HEC, we should ensure that policy makers recognise the importance of science and innovation investments in driving productivity and economy. Creating active partnerships with universities through these facilities shall be a major drive of the HEC.

- Pakistan urgently needs a national facility that is internationally excellent, enabling essential research and development for industry and the universities of Pakistan. This will be a vehicle to drive economy of Pakistan. *We must stop doing research for the sake of research.* The time for re-inventing wheels should be over and we need to concentrate on projects of national interest. Our aim should be to maximise the scientific, economic and social impact, to encourage society and to inspire the youth through promoting an understanding and enthusiasm for a knowledge-led, market based economy. This will bring institutions together, form partnerships and surely, we will achieve more together than in isolation in working towards a targeted goal. This national facility will offers scientists access to institutions in Pakistan and to expertise that enables them to carry out experiments in specific labs and provide highly specialised technologies.
- Working together in partnerships is fundamental to research in order to drive science further, delivering more breakthroughs influencing our lives, ranging from the social sciences and health to technology and the environment.
- In addition to national facilities, facilities in all provinces (according to the specialisms and needs of the area) will be established. All of these facilities will be linked together for a common goal, collaborating with each other and addressing regional and national research priorities, driving innovation and enterprise.
- This will embed collaboration and bring a stepwise change in national cooperation and shall be achieved through a common sustainable strategy developed in consultation with all stakeholders, including national policy makers, and the Planning Commission of Pakistan.

## **KS3 Connective Learning and Teaching at all Levels:**

The connection of teaching to research will be fundamental to building a critical mass of our National Skill Base (NSB). Through the HEC, we should implement a policy across all universities of research-led teaching, incorporating a connected curriculum at all levels. We should ensure that research and scholarship, including

original research, underpin high quality teaching and learning ultimately enhancing the student experience across the disciplines.

Our aim shall be to connect the curriculum at all levels, with an interdisciplinary approach. Universities should establish research led teaching by designing curriculum and policies to support development of researchers, as development of students as active researchers is of great value. All students in all higher education institutions should experience learning through research and inquiry.

The HEC should define and implement such policies, where students obtain a deeper understanding of the knowledge bases of the disciplines and professions which they are studying, including research methods, and the research challenges and issues these disciplines and professions currently face. Development of intellectual capabilities, enhancement of their skills for employment, and expansion of their capacity for lifelong learning should be the key policy elements embedded in every HE sector institution and the HEC should ensure that these policies are adhered to. Pakistan is a developing country with enormous potential. We need to shape our future and the HEC is a vehicle to achieve this important goal by ensuring that HE-level study represents more than just a path to a qualification. Experiences along the way shape future interests, employment options and desire for further learning which shall equip students to become creative and critical thinkers with the capacity to learn both independently and collaboratively.

All HE institution should develop their curriculum, which allow students to explore, execute and evaluate. Establishing multidisciplinary activities to enhance the existing curricula and programmes. i.e. blending industrial secondments with masters is one of many possible ways to achieve the above. Exploring innovative teaching methodologies and curricula, such as, problem based learning, case studies, innovation and continuous improvement shall be a significant component of operational structure.

The HEC should perform regular evaluation of the teaching programmes, which will help in strengthening teaching quality, resulting in an enhanced learning experience for students. We should ensure the creation of a Teaching Excellence Framework (see later) which shall be implemented across all universities – making sure that we are producing graduates for the future of Pakistan. Our national interests should come first at all levels.

*“Once you have learnt how to ask questions – relevant and appropriate and substantial questions – you have learnt how to learn and no one can keep you from learning whatever you want or need to know.”*  
(Postman & Weingartner, 1971, p. 23)

#### **KS4 Innovation and Enterprise and Centres for Doctoral Training (CDTs) – A long-term goal:**

I have acted as PhD evaluator/examiner for a number of universities in Pakistan and sadly, our standard of PhD is well below par and needs to be uplifted. This is crucial for our universities and industries. If we keep on producing PhD projects, which have no national importance and the research has no cutting edge, then I am afraid we will remain stagnant and keep on producing PhD scholars who have gained no critical thinking, process management and diverse scholarly approach. Our aim shall be to set up Centres for Doctoral Training (CDTs) governed by industries and universities.

*“CDTs bring together diverse areas of expertise to train engineers and scientists with the skills, knowledge and confidence to tackle today's evolving issues, and future challenges. They also provide a supportive and exciting environment for students, create new working cultures, build relationships between teams in universities and forge lasting links with industry”.* EPSRC, UK

HEC should seek specific budget from the Government of Pakistan to set up these centres. In the governance of the HEC, the Science and Innovation budget must be the most powerful policy-making and innovation tool to help the government deliver on economy. Industrial and university partnerships will create efficiencies in government and create a social and economic impact with increasing effectiveness and proficiency.

In the first phase, 5 CDTs with different subject areas shall be set up, within the **Institute of Advanced Studies, Islamabad National University**. A national competition shall be held and 100 PhD students per centres shall be admitted at the first phase. Students shall be funded for four years and will include technical and transferrable skills training as well as an element of research.



These centres shall be linked with world top universities in the related subject area and we should start with a split PhD programme, where students shall spend 2 years in the centre and 2 years abroad. During the PhD training, they will also establish their research in Pakistan and when they will finish, they will start working in their specialised area immediately thereafter. To diversify, specialist clusters shall be created within the CDTs to ensure that fixing priority areas are not limiting the flexibility of a CDT to the dynamic research landscape.

### **KS5 Interdisciplinary Research Centres (IRCs) – A national competition**

Creating Interdisciplinary Research Centres, should be the main priority, and a plan that produces a skill set for the future of Pakistan and contribute internationally.

Unfortunately, we are already behind on many fronts and we need to catch up by Interdisciplinary and multidisciplinary approach at all levels. Our plan should include setting up IRCs in specific subject areas with the focus of National challenges.

These IRCs may have a similar model that has been implemented at the IRC in Biomedical Materials, CUI, Lahore Campus. I established this centre with a primary focus on **materials from lab to patients to produce “Affordable Healthcare”**.

HEC plan should be to seek funds from the Govt and immediately initiate the process of setting up IRCs in specific subject areas. Special funding calls to setup Five IRCs to start with and setting up research that can create new technology platforms. Multidisciplinary approach with interdisciplinary delivery plan will be required.

Once the funds are allocated, proposals shall be invited for large-scale, interdisciplinary research collaborations (IRCs) to address research challenges across the disciplines with industrial collaboration as an integral part. Each bid shall be expected to consist of one lead institution, with a small number of collaborative institutions that bring together world leading research expertise in the disciplines required to deliver the breadth of research proposed.

### **KS6 National Competition for Synopsis Writing – highlighting the national needs**

I have major concerns the way our PhD scholarships are given to applicants. The system requires a radical change. We are giving scholarships to our top students (cream of our nation) and they go to international universities, very often doing a project of the interest of allocated supervisor and benefiting the country of university. We spent Pakistan’s taxpayers money to solve others problems. In return, the student comes back with a degree and then struggles to find use of that research he/she has carried out. Yes, the skill set of critical thinking and analytical analysis is achieved, but most of the time the use of that research becomes redundant after a couple of years. *I have been advocating this for a number of years and it is timely to overhaul this system of 50s and implement a system that is fit for purpose.*

HEC, should set up a national synopsis writing competition and then inviting the best researcher/academics in their fields form national and international pool and identify the best applicants who have addressed the National Challenges. The HEC shall arrange a workshop and ask each applicant to present their project to the panel of experts. This MUST be a transparent process and the HEC shall ensure to arrange to televise the entire process or the selected finalists to present their ideas to National audience.

Once a pool of students are identified, then the HEC shall approach the universities/supervisors in top institutions and do the research project as part of the PhD tackling Pakistan’s challenges. During the PhD the HEC shall remain engaged with the scholar, identify the needs (i.e., required infrastructure), and ensure to provide at the time scholar returns backs to Pakistan after completing PhD. Within a few years, the changes will be visible at all levels. *I strongly believe that this will be a real game changer and revolutionise the HE system in Pakistan.*

Involvement of industry will remain crucial as commercial exploitation and the development of new technologies, products and processes that may sprout spinouts resulting into growth of new industry based on the development of new/disruptive technologies.

### **KS7 Establish National Students Survey (a centralise database)**

To my knowledge, I have not come across any initiative of the HEC or any other Govt body that provides students with a voice. The HEC should be student centric and the voice of students should be heard, as they are our immediate customers and future of Pakistan. National Students Survey (NSS) should play a pivotal role in University ranking system of Pakistan. In addition, it shall provide a central database of how our HE institutions are performing – A league table shall be created by the HEC based on identifiable measurable.

Data collected from institutional or national student surveys will provide a major source of information on students' perceptions of their learning experience at their respective institutions. This is of not only interest to potential students but also to the HEC and universities, as it will be crucial in improving processes and enhance activities that benefit students' learning experiences.

The quality of teaching in HE is very important. National student survey will raise the profile of teaching, promote and enhance reputation for teaching excellence. The HEC shall run a central database and carry our NSS once per year and findings deliberated with the HE institutions. The HEC shall work in partnership to promote teaching excellence in all universities and deliver effective change that in turn positively influences core metrics and key performance indicators. Enhancing the standard of education and enriching the student satisfaction shall be immediate goal to be implemented by the HEC.

### **KS8 Accountability Survey of HEC (public Accountability)**

The HEC should be made accountable to public and all the stakeholders, including, universities, HE providing institutions, governing bodies and the industry sector. An annual survey shall be conducted to study the interactions between the HEC and universities and industries with the view of capturing the key outputs of the interactions that were created to enhance the knowledge base. This will provide a quantifiable baseline for all the initiative and activities developed by the HEC during the previous year and the obtained data shall be used to reposition itself for the identified new challenges. This will help in improving the quality processes and make improvements in performance indicators.

### **KS9 Industrial Advisory Board (IAB)**

I have been advocating for years that there is a need to have a strong bridge between universities and industries and sadly, the gulf between these two important pillars of economy remains miles apart. This shall be one of the top priorities to establish interactions with the industry sector. It will be achieved by inviting industrialists to the HEC frame and ask them – what they would like from the HE sector...? The Industrial Advisory board shall comprise of external representatives from the industrial community who provide a strategic view of the HEC direction and performance. Chamber of commerce will play a critical role here. The HEC should facilitate a strong interaction between the universities and industries. The board shall provide strategic advice and seek ways to help and improve performance and reputation of the HEC. Board members shall act as ambassadors and raise the HEC and universities profile with national and international bodies. The Board will provide guidelines to the HEC and reviews the requirements of both industry and universities, helping the HEC to refine teaching and research strategies. Furthermore, the IAB shall help to produce graduates for the future and increase employability. Our degree programmes should be fit for purpose and of applied nature.

The HEC should organise regular industry liaison events, including guest lectures, presentations and workshops, industry-focussed group projects, company-sponsored research enabling universities to develop contacts with companies and hence improving employment.

### **Ks10 Research Advisory Board:**

Research Advisory Board (RAB) should have members from national and international eminent scholars, academics, industrialists and venture capitalists, who shall help in making the policies of the HEC. Members of the board shall meet annually, review the progress of the HEC, and give directions solely on Research Impact. The board shall help in defining the agenda for the next year and advising on funding to be sought from the Govt of Pakistan in light of key research directions of National interest.

There is a need to have a focused group addressing Interdisciplinary research in Pakistan. I propose to establish the aforementioned “Key Strategies”, with the aim of strengthening understanding of applied research by both staff and students across the discipline. This will act as a focal point, facilitating exchange of information and ideas across the boundaries of traditional disciplines as a platform for technologically enhanced education.

On the direction of the RAB, HEC should set goals/targets that are assessed at regular intervals, allowing quality control, identifying the non-conformities, putting a corrective and preventive action plan in place, if and whenever required. This shall help to continuously improve the strategic plan, monitor our successes and draw attention to areas that need more attention, resources or rectifications. In addition, regular assessments will help to facilitate the timely implementation of the strategic plan, obtain feedback and most importantly, identify new opportunities across the disciplines.

### **3. Summary:**

We should strengthen educational opportunities through research and teaching by developing new partnerships that bridge disciplines – Education and research of translational nature is the key. One way of achieving this is through new proposed initiative of establishing Islamabad National University. HEC should encourage partnerships that facilitate the exchange of information, technologies and ideas with public and private institutions operating in a variety of arenas, including health, business management, basic sciences and industry. Societal and sector challenges need to be addressed to create transformational change in the areas of social sciences, digital economy, creative industries, regenerative medicine, environmental impact, sustainable agriculture and food and energy technologies. This collaboration will align industry and academic support, promote growth and develop a strong global position for Pakistan – *A true Niya Pakistan*.