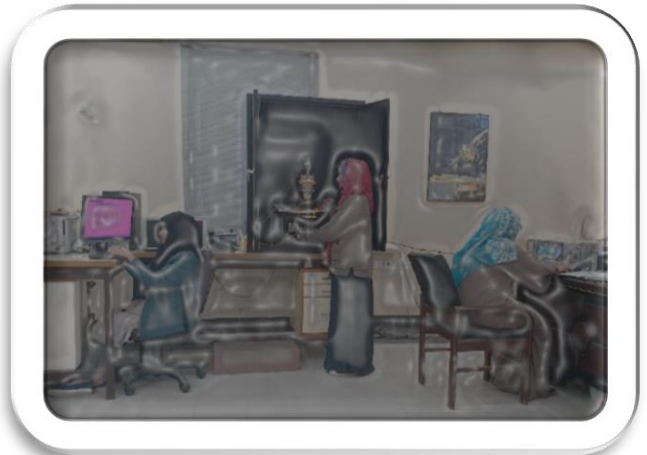
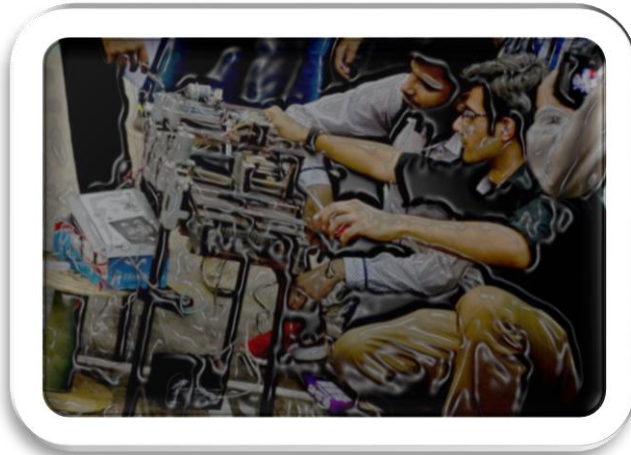


NED University of Engineering & Technology

ACADEMIA INDUSTRY LINKAGE INITIATIVE



A working paper for promoting mutually beneficial relationship between the University and Industry in the domains of faculty exposure, cooperation education, endowed chairs and Technology Park

September 2020



Index

S. No	Table of Content	Page
1.	Introduction	04
2.	Industrial Training of Faculty	06
3.	Cooperative Education	09
4.	Establishing New Endowed Chairs	16
5.	Setting up an Interregional Technology Park	21

INTRODUCTION

Rapid technological development in recent past has been reshaping the modern world by revolutionizing the industrial practices. To bridge the gap between academic knowledge and industrial practices, it is critically important to strengthen the linkage between academia and industry. Strong Academia-Industry linkages not only benefit the students but also stimulate new scientific and technological research activities when mutual bonding between the two becomes stronger. With industry support, universities can serve as an active platform to strengthen the research by developing new solutions of industrial and social importance.

From industry perspective, University-Industry Linkage (UIL) is effective in terms of having technological development at lower cost of research by virtue of availability of low-cost workforce as students and faculty of University are at one place. From university perspective, academicians get to know the latest demand of the local, national and international



Dr. Muhammad Khurram, Associate Professor, Department of Computer Information System Engineering, Working in Agriculture Field to Devise Application for Effective Use of Water

markets. According to which they grab and improve the knowledge and transfer it to the students through improved pedagogy. Other benefits universities can attain are; the research and development funding from public and private institutions, new income through patenting and licensing, etc. Thus UIL bears mutual benefits for universities as well as industries.

With around 100 year's old legacy, NED University is thriving hard to produce highly skilled manpower to meet the industrial demands for national as well as international markets. NED University always tries to attract the highly qualified and accomplished faculty members to undertake research in specialized areas targeted towards current and futuristic social and industrial needs. However, rapid changes in the industrial practices caused by the emerging advanced technologies have created a gap between academic-knowledge and industrial practices.

Recognizing this university-industry gap, NED University has developed multiple proposals to bridge this gap targeting stronger UIL. The proposals relate to different aspects of UIL ranging from capacity building in form of student and faculty trainings to active research collaboration between industry and University. Following are the highlights of proposed initiatives by NED University:



Professionals from Construction Industry Attending Course on Pressure Vessels at NED Academy, NED UET Karachi

1. **Industrial Training of Faculty:** A short-term training of University faculty at relevant industry would not only help in strengthening the UIL but also facilitate the University faculty to orient their students towards best industrial practices
2. **Cooperative Education Program:** Cooperative education is a structured method of integrating classroom-based education with practical work experience in partner industry providing students industrial experience alongside their academic proficiency
3. **Establishment of Endowment Chairs:** To strengthen university-industry linkage through active research collaboration, NED University is willing to establish endowment professional chairs at the University using financial endowment from external bodies/industries
4. **Interregional Technology Park (ITP):** NED University Interregional Technology Park (ITP) will be the first fully-integrated Science and Technology Park of the country to be established within the premises of NED University under Public Private Partnership model

The subsequent topics will provide detail on the above mentioned initiatives.

INDUSTRIAL TRAINING OF FACULTY

Preamble

The emerging socio-economic changes due to the rapid technological development have been motivating the academic institutes to inculcate the industrial practices in their academic



Members of Construction Industry visit Virtual Reality Center at NED UET Karachi

programs to orient their students regarding industrial needs of the day. Universities across Pakistan are encouraging better industrial-liaison to meet this requirement.

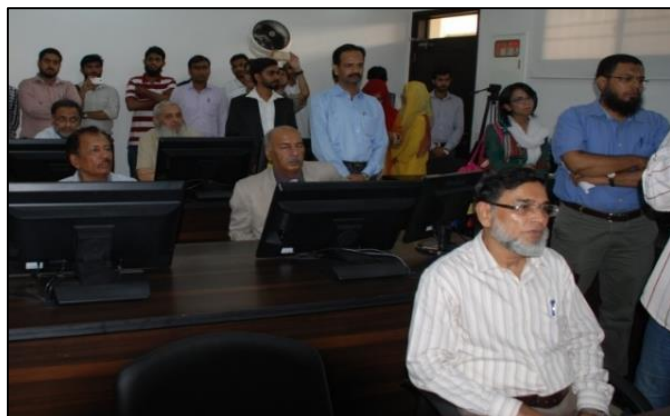
Moving a step forward, NED University is proposing to arrange industrial trainings for University's faculty in

order to provide direct exposure to the industrial practices. Faculty having better industrial exposure would be able to enhance the students' capabilities towards the industrial practices. Such trainings would not only be beneficial for the teacher but also help many students attaining the required skills for better placement in industry. The professional capacity development through industrial trainings would help improving the academic standards at the University.

Benefits of the Program

There are several benefits associated with teachers' industrial training initiative which include:

- Better industrial liaison
- Direct exposure of teachers to industrial practices
- Indirect exposure of students to industrial practices
- Opportunity to mold curricula to



Training of Faculty Members and Staff of Construction Industry on Building Information Modeling at NED UET Karachi

meet industrial needs

- Improvement in teaching practices
- Industrial Corporate Social Responsibility (CSR)

Industrial Corporate Social Responsibility (CSR)



Mr. Ali Zulqarnain, the then Director Directorate of Industrial Liason Signing MoU with Pakistan Association of Automotive Parts & Accessories Manufacturers for Mutual Cooperation under Various Projects

Apart from having several benefits for teachers and students, this program can also be viewed as part of industry’s Corporate Social Responsibility (CSR) in which participating industry would help the University in capacity building and align its academic program with the national and international needs. As these trainings require supervised learning by experts from the partner industry, the value of time of personnel involved in the program as well as other related expenses

may be counted towards CSR of the participating industry.

Implementation

Following are the proposed implementation guidelines:

- Liaison with partner industry to set schedule for trainings
- Typical duration of each training is proposed to be 4-12 weeks
- Partner industry will be required to assign a focal person to supervise the trainings for better learning experience.
- The partner industry and the University will jointly select the



Faculty Members from Department of Mechanical Engineering visit Port Qasim for Solar Panel Testing

teachers for the trainings

- The partner industry and the University will collect the feedback on the trainings to assess and improve its effectiveness

Responsibilities and Liabilities

- Responsibilities and Liabilities on the University
 - Salary of the teacher will be paid by the University
 - The University will relieve the teacher from other responsibilities for the duration of the training
 - The University is required to maintain strong coordination with the partner industry to ensure effectiveness of the program
- Responsibilities and Liabilities on Industry
 - There will be no financial liability on the partner industry. The partner industry is not required to pay any salary to the trainee. However, the industry would be encouraged to provide other benefits (such as transportation, food etc.) as per their general practice
 - Partner industry would be required to maintain liaison with the University and facilitate



Dr. Rashid Jooma, Consultant Neurosurgeon & Professor Section of Neurosurgery, Aga Khan Hospital, Visited Neurocomputation Lab at NED UET Karachi for Mutual Cooperation



Training Session at NESTLE Pakistan Arranged by Instrumentation Center, NED UET Karachi

in the process of selection of the teacher and collecting the feedback at the end of the training

○ Partner industry is required to assign a training supervisor for better learning experience. The value of time of personnel involved in the program may be counted towards CSR of the participating industry

- A certificate of completion may be

issued to the respective teacher.

COOPERATIVE EDUCATION

Preamble



Students from Department of Electronics Engineering Gaining Hand-on Experience on Oscilloscope and Instrument Tester

Cooperative education is a structured method of combining classroom-based education with practical work experience. A cooperative education experience, commonly known as a "co-op", provides academic credit for structured job experience gained during the studies. Cooperative education has been taking on importance in helping young people to make smoother school-to-work transition.

Cooperative learning falls under the umbrella of work-integrated learning (alongside internships, service learning, and clinical placements) but is distinct as it alternates a school term with a work term in a structured manner, involving a partnership between the academic institution and the employer. Generally, it is both paid and intended to advance the education of the students.

Some Examples from International Universities

- The University of Waterloo has a co-operative education program with more than 19,000 students enrolled in co-op programs and more than 5,200 active co-op employers.
- Since its inception in 1975, the co-operative education program at Simon Fraser University (SFU) has grown to more than 8,400 students seeking paid work experiences across the globe.



Students from Department of Civil Engineering Gaining Hand-on Experience in Water Resource Laboratory

- The University of British Columbia's co-operative education program includes over three thousand students from the faculties of Arts, Commerce, Engineering, Forestry, Kinesiology, and Science.
- The Florida Institute of Technology has a condensed cooperative education program allowing students to graduate in four years with three-semester work terms.

Benefits of Co-op

The major challenge in the conventional education system is the lack of correlation between the academic curricula and industrial practices. Many industries employ the specialized industrial practices whereas the academic institutes focus on the theoretical principles. Therefore, students are often required to undergo industrial training (as trainee engineers) or a period of volunteer work before they could actually start their job. Proper implementation of the co-op helps in bridging this gap. Students will be able to undergo industrial training during their studies thereby make a smoother education-to-work transition. In addition, there are other advantages as listed below:

- Benefits to the Students
 - Increased motivation
 - Career clarity
 - Enhanced employability
 - Smooth education-to-work transition
 - Vocational maturity
 - Financial support
- Benefits to the Industry/Employer
 - Corporate Social Responsibility (CSR)
 - Labor force flexibility
 - Recruitment and retention of trained workers
 - Opportunity to evaluate capabilities of future employees
 - Input into curricula



Students from Department of Electrical Engineering Gaining Hand-on Experience on Electrical Filters

- Benefits to the University
 - Better Industry Linkages
 - Industrial Input to the curricula
 - Better employability for graduates

Co-op as Corporate Social Responsibility

Apart from having several benefits for students, universities and participating industries, Co-op education can also be viewed as part of industry's Corporate Social Responsibility (CSR) in which participating industry not only provides financial support for educational purposes but also



Learning Visit of Students from Department of Industrial & Manufacturing Engineering at Karachi Tools Dies and Mould Centre (KTDMC)

provide industrial training for better employability of the students. In addition participating industry will be contributing in the development of partner University by providing their input and feedback in upgrading University's academic programs to meet the emerging industrial demands, provide technical and financial support for better technical training for students, and help in improving employability for University graduates. In the field of cooperative education, institutional partnerships can be extended to serve the research and developmental needs of the relevant institutions and their students. As a result of joining co-op program, participating

industry will be contributing in following Sustainable Development Goals (SDGs) as part of their CSR.

- SDG#4: Quality Education- By providing better learning and training opportunities to students
- SDG#8: Decent Work and Economic Growth- By promoting smoother school-to-work transition and increasing employability of young graduates
- SDG#17: Partnerships for the Goal- By implementing institutional partnerships and better University-Industry linkage for sustainable development



Learning Visit of Students from Department of Textile Engineering at Feroze Textile Mill

Moreover, considering co-op education as part of CSR, the value of time of personnel involved in the program as well as other related expenses may be counted towards CSR of the participating industry.



Learning Visit of Students from Department of Material Engineering at Marble Industry

Prospects of Co-op in Pakistan

Unfortunately, the cooperative education program is not available at universities in Pakistan. Most of the universities accept optional 4 to 6 week internship as the industrial experience of the student. There are various reasons that hinder the co-op education in Pakistan such as:

- Most of the curricula are regulated that do not have option of assigning credits to the industrial training

- Well-structured curriculum. Students need to take well defined course of studies and do not have option to elect courses of their choice
- Students are not willing to delay graduation because of the industrial training

Prospects of Co-op at NED University

NED University has taken a lead in introducing the co-op program considering the local needs and requirements of regulatory bodies. There are three scenarios in which the co-op education can be incorporated in the system without changing the existing course of study as mentioned below:

- Students may be allowed to take-up co-op at particular industry during summer and winter vacations returning back to studies during regular fall and spring semesters. The cycle may be repeated subject to satisfactory performance of the student



Students from Department of Petroleum Engineering attending “Quality Health, Safety and Environment (QHSE)” Session in Field Arranged by Oil & Gas Development Company Limited (OGDCL)

- Students may be allowed to take-up a part-time co-op (after University hours) at the partner industry during regular fall and spring semesters and full-time co-op during vacations. The cycle may be repeated subject to satisfactory performance of the student
- Participating co-op employers may assign well-defined tasks to students to complete in a year that may be counted towards final year project of the students

All these scenarios can be easily implemented in the existing academic framework of the University thereby allowing students to gain industrial experience at the participating co-op employer at the cost of additional efforts and time spent by the student. However, among these scenarios the first option is highly recommended in which the student will be alternating between the study and work terms that will provide easy management of student’s workload. Moreover,

the University has decided to name the student a fellow of the partner industry offering co-op program. For example, student inducted in co-op program by SSGC will be titled as “SSGC Fellow”.

Finances

- The student’s fee to be paid by the employer as actual.
 - Total fee for eight semesters is approximated as Rs.250,000/-.
 - The fee is required to be paid at start of each regular semester (almost every six months) over the course of four year of study.
 - Average monthly impact on account of fee is approximated as Rs.5,200/= only.
- During the period when the student spends time in the industry he/she may get some stipend from the industry.
- The money value for the time spent for the personnel involved in the co-op mentorship may be counted in CSR of the participating industry.



Students from Department of Civil Engineering Performing Experiment in Hydraulics & Fluid Mechanics Laboratory to Gain Practical Knowledge

Implementation Plan

Following steps need to be taken in order to implement co-op education in NED University system.

- Liaison with industries to explore the potential co-op employers.
 - Directorate of Industrial Liaison (DIL) will be required to liaison with the industry to explore the co-op possibilities and coordinate to execute the co-op program.

- Negotiate with the relevant industries to establish terms and conditions for the co-op
 - A memorandum of understanding may be signed among University and the co-op employer on the mutually agreed terms and conditions.



Student from Department of Environmental Engineering Perform Practical Work in Field to Gain Indepth Knowledge

- Establish the criterion for the selection of students for co-op
 - Students selection will be based on the merit-cum-need basis
 - As per requirement of the employer, the selection of the student can be done at the University or jointly by the University and employer
 - Student will be required to maintain a minimum CGPA of 2.5 to enroll and continue in the co-op program
 - Student will be required to maintain satisfactory performance from the employer to continue in the co-op program
- Get feedback on the co-op from students as well as employers
 - The University will provide the employer feedback on the academic performance of the student
 - The employer will provide feedback on the student's performance in the industry
 - The University may obtain a feedback from student regarding his/her experience at the industry



Learning Visit of Students from Department of Food Engineering Visit IFFCO

ESTABLISHING NEW ENDOWED CHAIRS

Preamble

From its initial beginnings as an engineering college, NED University has transformed into a large university serving as a national center of excellence in engineering education, research and outreach. As the oldest engineering institute in Karachi, NED University has been positively contributing in the academic, social and economic developments in the region. NED University has always been eager to identify the good counterparts across the globe to establish academic and research linkage to strengthen the existing programs at the University and to prepare for the futuristic demands. NED University always tries to attract the highly qualified and accomplished faculty members to undertake research in specialized areas targeted towards current and futuristic social and industrial needs. An initiative regarding this objective is establishing endowment professional chairs at NED University using financial endowment from



Inauguration of Soorty Computer Lab at Department of Textile Engineering by Mrs. Nargis Soorty and Mr. Asad Soorty, Directors Soorty Denim, Pakistan along with the Vice Chancellor Dr. Sarosh Hashmat Lodi



Establishment of KE Lab at NED UET Karachi

external bodies.

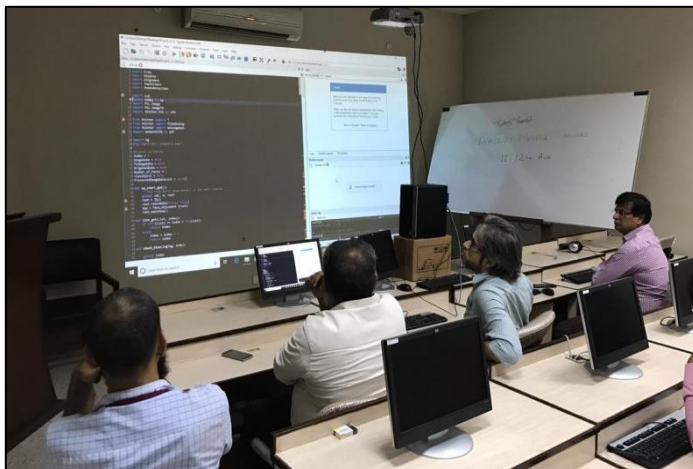
Financial Endowment

A financial endowment is a donation to a non-profit organization which uses the resulting investment income for a specific purpose. Generally, the financial endowment is structured to have an impact over a longer period of time.

Endowed Professorships (or Endowed Chair)

Academic institutions, such as colleges and universities, frequently control an endowment fund that finances a portion of the operating or capital requirements of the institution. In addition to a general endowment fund, each university may also control restricted endowments that are intended to fund specific areas within the institution. A common example is endowed professorships which is a position permanently paid for with the revenue from an endowment fund specifically set up for that purpose. Typically, the position is designated to be in a certain department. The donor might be allowed to name the position.

The endowed professorships aid the university by providing a faculty member who does not have to be paid entirely out of the operating budget, allowing the university to reduce its expenditures



Professionals from IT Industry and Faculty Members from Department of Computer Information System Engineering Working at “National Center for Cloud Computing”, Established at NED UET Karachi along with Collaboration of Higher Education Commission Pakistan

to support the specific purpose. In addition, holding such a professorship is considered to be an honour in the academic world and the University can use them to reward its best faculty or to recruit top professors from other institutions. It is an excellent way to attract outstanding faculty and is a very important mechanism for recognizing research accomplishments. It is one of the few ways of publicly endorsing and honouring the achievements of research

faculty. In addition to recognizing individual talent, it helps promote the institution’s presence and expertise in particular areas of research.

The endowed professorship is considered as the highest academic award that the University can bestow on a faculty member, and it lasts as long as the University exists. Thus, it is both an honour to the name holder of the appointment and also an enduring tribute to the donor who establishes it.

Benefits

- To the University** – Endowed faculty professorships and chairs are crucial for recruiting and retaining the highest-quality faculty. The great institutions have the best minds, the most-creative researchers and the most-engaged teachers. Building a mighty base of faculty talent enriches the academic environment, which attracts the brightest students.
- To the Professor** – Recognizing the continued contributions of senior-level faculty as well as providing funds to push the frontiers of their scholarship are key functions of the endowed positions. The funds can propel research, help pay student workers or create opportunities for collaboration with scholars around the world.
- To the Students** – One professor or chair can touch hundreds of lives through the courses they teach, the students they mentor, or through their own academic work. Having endowed faculty means students get to rub elbows with the most talented scholars in the world. Students have the opportunity to work in research labs. For example, they do not learn only from textbooks, but from the real world of innovation and discovery.
- To Businesses and Corporations** – In a rapidly changing world, corporations realize the pace is often driven by the private sector. But much of the long-term thinking, basic research and most fundamental discoveries occur inside universities. Corporations support endowed chairs to give back to institutions that provide them with creative talent. The relationship also connects corporations with professors,



Proposed Building Layout of Panjwani Hisaar Water Institute to be established at NED UET Karachi

researchers and students who can inspire innovation and creative ideas in a competitive environment.

- **To Private Donors** – Donors provide funds for the overall improvement of the University, but some have personal interests in specific areas of study. By funding endowed chairs, donors can convene the brightest minds to focus on particular problems or issues and spur advances in those areas.



Establishment of Cowasjee Earthquake Center at NED UET Karachi

Existing Endowed Chairs at NED University

Currently there are following three endowed chairs at NED University

- **Pakistan Petroleum Limited (PPL) Chair** – The foremost exploration & production company of the country, PPL, has offered an endowment chair to the department of Petroleum Engineering at NED University. The objective of the PPL chair is to strengthen the academic program in Petroleum Engineering and laying strong footing for future research activities in the area.
- **Jersey Precast (JP) Chair** – The JP Chair is endowed by the renowned US-based company Jersey Precast having over 35 years of experience in providing quality precast and pre-stressed concrete products to the Tri-state and surrounding areas. The objective of the JPC chair is to strengthen research activities in concrete design and allied areas.
- **Oman IT Chair** – Sultan Qaboos Oman IT Chair endowment fund is dedicated to strengthen research activities in all methods and techniques relevant to Computer and Information Engineering.

Proposed New Endowed Chairs at NED University

In order to motivate young faculty and researchers, endowment chairs may be established to promote research on the focus areas of national interest. Following can be possible research areas for this purpose:

- Water
- Materials
- Manufacturing
- Energy (Including Storage)
- Any other (mutually agreed) focus area

As for the existing endowed chairs, the new endowment chair will be named after the name of the donor. The endowment chair will be treated as professor in the University focusing on promoting research in the relevant area.

Responsibilities of Endowed Chair

Following will be main responsibilities for the endowed chair:

- Leads research activities in the focus area
- Motivates young researchers and create a conducive environment
- Manages research laboratory
- Initiates / manages commercial activities in the lab
- Creates liaison with related industry, organizations, and research group



Inauguration of Spectro Lab at Department of Metallurgical Engineering-A gift from Agha Steel Industry

SETTING UP AN INTERREGIONAL TECHNOLOGY PARK

Preamble

NED University has played a pivotal role in augmenting technological and industrial development by providing dependable cadres of engineering graduates. Assigning the highest priority to quality in education and the development of indigenous capabilities in design, management and operation have been vital for the progress and prosperity of the nation. With the motto of “knowledge to business”, NED University now intends to augment regional economy by establishing Pakistan’s first and the largest Interregional Technology Park.



Inauguration of National Incubation Center under Public Private Partnership Program by the then Prime Minister of Pakistan Mr. Shahid Khaqan Abbasi in April 2018

NED Interregional Technology Park

NED Interregional Technology Park (ITP) will be the first fully-integrated Science and



The Vice Chancellor NED UET Karachi, Dr. Sarosh Hashmat Lodi Addressing Startups and Corporate Sector at NIC Karachi on Occasion of National ICT Education Round Table

Technology Park of the country to be established within the premises of NED University under **Public Private Partnership** model. The initiative is meticulously aimed at redesigning the knowledge economy of Pakistan by stimulating and nurturing innovation-led germination and growth of hi-tech entities. ITP will be the new

national tech-pad where entrepreneurs and multinationals will come together to discover, ideate, create, collaborate and break new ground. Core objectives of NED-ITP include:

- To build an innovative ecosystem through entrepreneurship and incubation programs to stimulate the creation of new technology enterprises
- To stimulate innovation-led economic growth of the country and region
- To promote commercialization of research and development in association with local research centers and academic institutions



A Startup Working on Development of Indigenous Drone at NIC Karachi established at NEDUET Karachi

- To encourage active collaboration between private and public sector technology development.
- To support the developing regional start-ups by small and medium-sized enterprises (SMEs) aiming to grow and sell various products, services and intellectual property (IP) based on technology

- To create and enhance international and national strategic linkages to further growth and economic diversity

The activities of NED Interregional Technology Park (ITP) would include:

- Business development by reducing barriers to entry in the market.
- Increased entrepreneurialism and business support by developing special economic zones
- Supports the emerging local companies which seek to develop and export diverse technology-based products, services and intellectual property.

- Mentoring/Networking startups and companies at incubator client and anchor business levels
- Encourages the active collaboration between the public and private sector technology to develop the initiatives.
- Attracts global technology, businesses, and research organizations focused on moving their operations to the largest city and innovation and talent center in Pakistan
- Promotes the commercialization of Research and Development (R&D) in association with local research centers of NED University
- Creates and maintains national and international strategic links along with interregional and international business windows



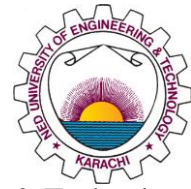
Faculty Members from Department of Computer and Information System Engineering Supporting Startup “Aqua Agro” at NIC Karachi

Advantages of Proposed Location

- Close to the Karachi Northern Bypass connecting major cities of the country
- International Airport is 20 minutes’ drive from the proposed location
- International Sea Port of Pakistan is 45 minutes’ drive

Advantages of NED-ITP

NED Interregional Technology Park (ITP) will be a venue of transformation into an Expatriate Enclave with modern infrastructure and tax incentive packages which will include exemption of Custom Duties and Taxes strictly on import of capital equipment under SEZ Act 2012. Due approvals from Investment Department, Sindh Economic Zone Management Company (SEZMC) and Public Private Partnership has already been accorded to NED University and the feasibility study is going to start soon. Nonetheless, NED University is ready for the soft launch of the proposed technology park at its current premises where companies and multinationals can



start their businesses and R&D services which can be further powered by more than 20 research centers of NED University.

Proposed Infrastructure & Facilities

The Interregional Technology Park is proposed to have the following facilities. However, the list is not exhaustive and other facilities may be included:

- Common Facility & Training Center (CFTC)
- Information Technology Workshops
- Warehouse/Logistics Area
- Business Centers
- Commercial facilitation Centers
- Restaurants/5 Star Hotel
- Auditorium
- Incubation Centers
- R&D Centers
- E-Commerce
- Engineering workshop and product centers

Post Script

The entire world is significantly affected by COVID-19 pandemic since the beginning of the year 2020. Among other challenges, several emergency needs evolved including rapid development and supply of critical medical supplies and health care equipment. NED University management and faculty instantly mobilized its creative resources for the service of humanity. The development of NED Ventilator is an example. It has successfully passed its critical trial and assessment till April 2020 and is not poised to enter into the next phase of development. Some other contributions include support to the government authorities in epidemiological projections of the pandemic as critical decision support assistance to policy makers.