



# NUST

*Defining futures*

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# University Industry Interaction

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# Synopsis

- 1. An overview of Technology Commercialization*
- 2. University Industry Linkages*
- 3. Role of University Incubation in Technology Commercialization*
- 4. Technology Incubation Centre- A case study*
- 5. Incubation Centre at NUST*
- 6. Technology Incubators Networking*
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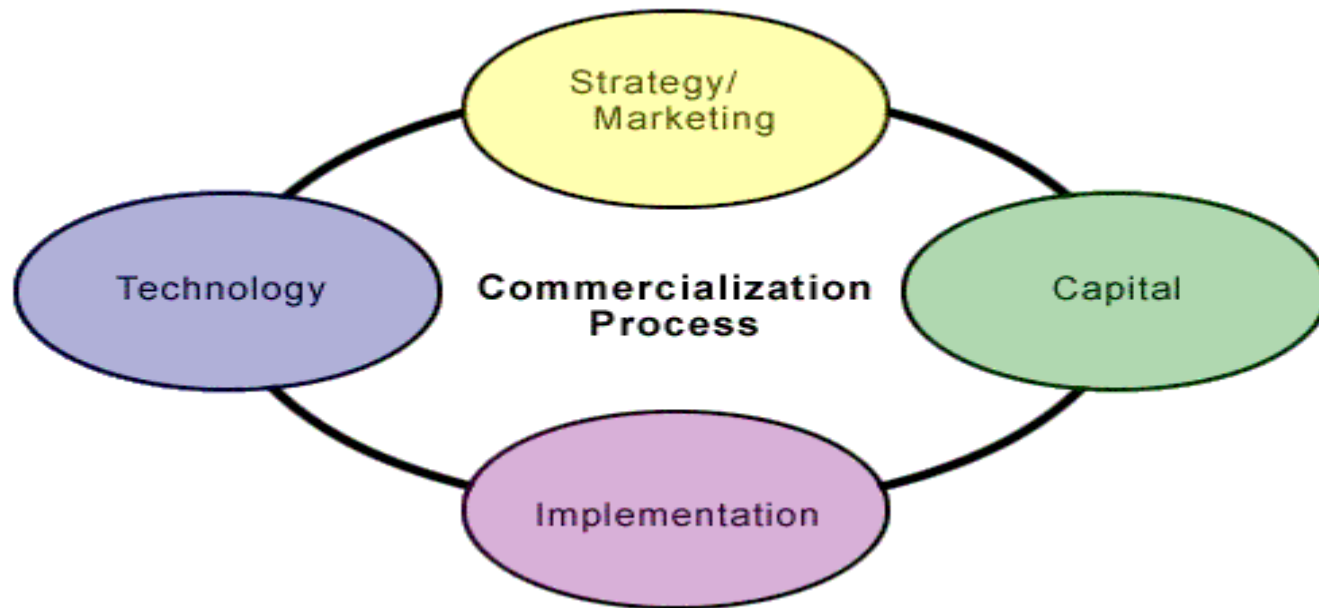
# Technology Commercialization

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# Technology Commercialization

- *Process of converting knowledge into products & services*
- *Move ideas from the concept to the laboratory model and onto the market place*
- *Creating a National Innovation System through University Knowledge Base*

# Technology Commercialization Process





# University Industry Linkages

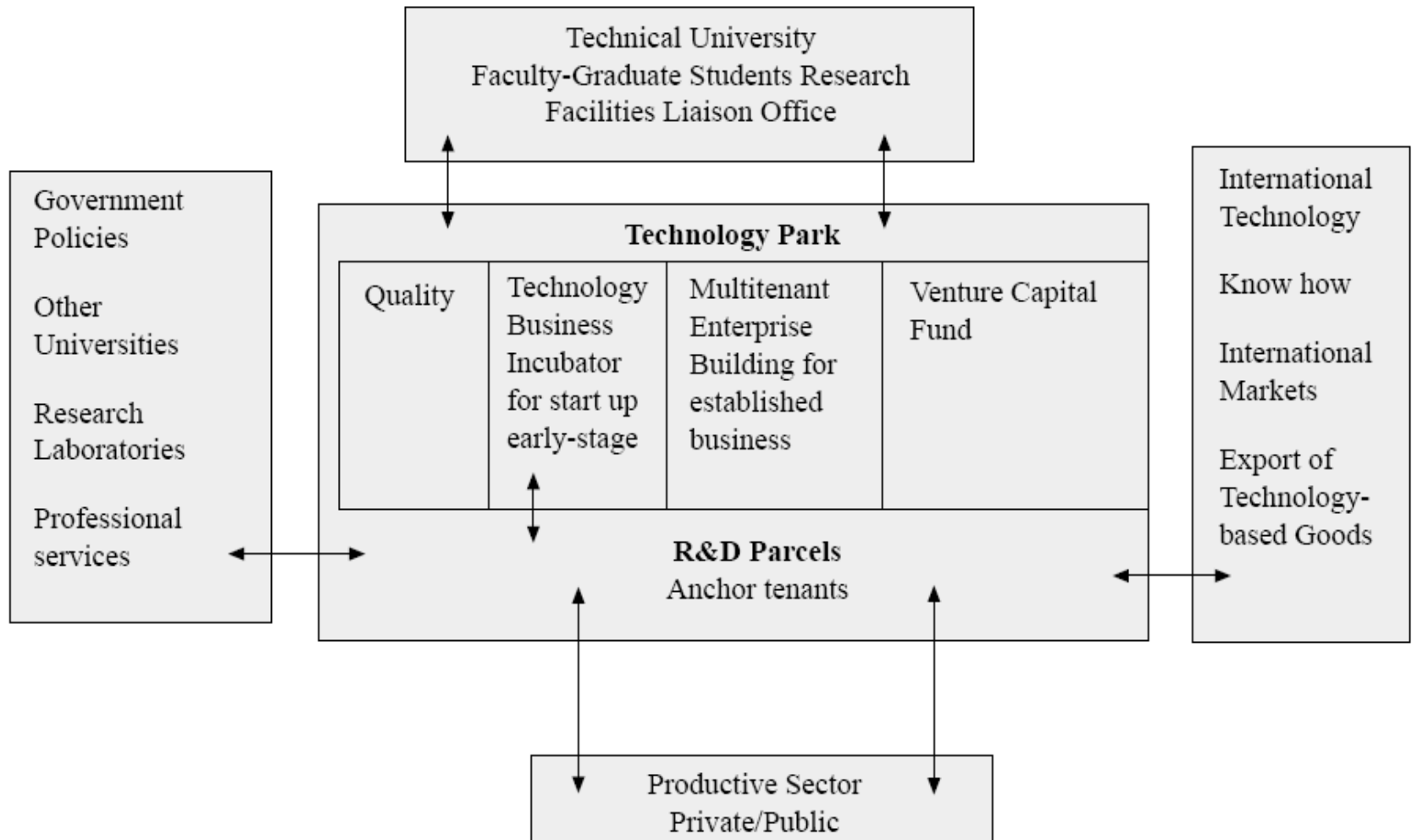
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# University Industry Linkages

- *In a knowledge-based economy, university based technology venturing is a key factor of internationally comparative advantage in industry*
- *Technology venturing through university incubator activity is emerging*
- *Technology Business incubator become an important instrument in the creation of new enterprises and jobs*
- *Technology Incubators' contribution to high-tech start-ups in the newly industrializing economies*



# UNIVERSITY INCUBATOR SUCCESS FACTORS





# Role of University Incubation in Technology Commercialization

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# Role of University Incubation in Technology Commercialization

- *Establishment of strong University Industry Linkage through Business Incubators*
- *Successful development of entrepreneurial companies through an array of business support resources and services*
- *Production of successful firms*
- *Incubator graduates have the potential to:*
  - *create jobs*
  - *commercialize critical technologies*
  - *strengthen local and national economies*

# Role of University Incubation in Technology Commercialization

- *Technology Business Incubator promotes University Industry Relationship through the establishment of the following sub offices:*
  - *Intellectual Property Rights Office*
  - *Transfer of Technology Office*
  - *Entrepreneurship Development Centre*
  - *Establishment of a Technology Park*



# Technology Incubation Centre

## A case study

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# Overview

- *Technology Incubation Centre (TIC) is an initiative of the National University of Sciences and Technology (NUST),*
- *Major thrust is to incubate technology based start-up companies*
- *TIC is among a number of other new NUST institutes being established at H-12 sector of Islamabad*

## Mission Statement

*“We provide an environment that attracts and nurtures technology based start-up companies transforming them into commercially viable enterprises”*

## Goals & Objectives

- *To help potential entrepreneurs such as students, NUST faculty, and general public to incubate their technology based companies*
- *To provide support to NUST colleges/institutes/centres for patenting their research and development work*
- *To liaison with private/public sector enterprises and funding sources, govt. agencies, industrial associations, chambers and FPCCI to provide facilitation and networking for incubatee companies.*



# Incubatee Companies (Engineering Sector)

- **SPEAR Technologies**
  - *Initiated its endeavors in defense sector*
  - *Offers its services to industry in finding solutions for optimization problems*
- **COSMOS**
  - *Initiated its endeavors in the field of Hi-Tech Engineering Development*
  - *The first R&D project took-up by COSMOS was Fire Control Computer (FCC) for Tank Al-Zarrar*
  - *The second R&D project is Digital Driver Panel (DDP) for Tank Al-Khalid*

# Incubatee Companies (Engineering Sector)

- ***Raza Industrial Engineering Solutions (RAIES)***  
*[On hiatus (Operations Frozen)]*
  - *RAIES offers its services in the areas such as Engineering Component Manufacturing, Process Design/Improvement and Technology Management. RAIES helps organizations increase their competitiveness and prepare for challenges of globalization*
- ***PowerCraft***
  - *Mr. Umar Malik, a local physicist and scientist intends to design & manufacture renewable and clean energy resources for power generation through innovative utilization of special electromagnetic materials*
  - *He is in the process of creating his first prototype*

# Incubatee Companies (Engineering Sector)

- ***IWBC Protection Founders***
  - *IWBC deals with building protection chemicals and materials.*
  - *IWBC produces OCRYLIC, dispersion for bonding plaster to brickwork and screed to concrete. It also ensures proper setting of pointing mortar and fine surfacings. Adding IWBC Product to plaster affords its higher resistance to weathering and cracking, while allowing*

# Incubatee Companies (ICT Sector)

- ***Electro Soft Technologies***
  - *involved in the development of state-of-the-art web enabled control system applications*
  - *Provides IT solutions locally and internationally, implementing innovative proprietary software products, turnkey projects and systems development services as well as software distribution and support*
- ***Turnotech Solutions***
  - *Turnotech is a solution provider to telecom industry*
  - *Turnotech is working on visual business intelligence tools.*

# Incubatee Companies (ICT Sector)

- **Dual Matrix**
  - *Dual Matrix Corporation (DMC) provides development and consultancy services for medium to large scale organizations*
  - *Key products being offered by the DMC include Organizational Effectiveness Profiling (OEP), Enterprise Content Management (ECM) System and Web 2.0 Advertising for the next generation internet applications compliant advertising system*
- **Software Bridge Inc.**
  - *Software Bridge facilitates in overcoming the challenges in managing and operating IT business, especially in the domain of software engineering and quality control*
  - *Professionals at 'Software Bridge' combine their expertise and experience with innovative thinking to assist the customers to define a long term strategy in terms of software design processes and utilize tools to provide best possible solutions*

# Incubatee Companies (ICT Sector)

- ***Maalik Creative Engineers***
  - *Maalik Creative Engineers (MCE) deal in business-critical software applications. They offer a wide variety of computer application programs ranging from simple MIS solutions to complex production planning and monitoring systems. Maalik Engineers have strong relationships with leading manufacturing industry specific solutions providers*

# Incubatee Companies (Services Sector)

- ***NUST Consulting (NC)***
  - *NUST Consulting (NC) is a semi autonomous subsidiary set up by NUST on July 1st 2002*
  - *NC was given another dimension as TICs anchor incubatee in December 2004.*
  - *NC bring to bare more than 600 faculty members of NUST in varied engineering disciplines, management experts, IT specialists and medical researchers to meet the ever growing market needs*
- ***Compliance Management System (CMS)***
  - *Provides training, consultancy, research and development services in the fields of:*
    - *Accounting, Compliance, Information Technology, Fraud Examination, Financial Analysis & Modeling, Financial Risk Management and Investment Management*

# Incubatee Companies (Services Sector)

- ***National Energy Management Services (NEMS)***
  - *Formed to initiate business mainly for CDM Consultancy in Pakistan ranging from CER verification and transaction management services*
  - *Business Focus*
    - *Project Identification & Structuring*
    - *Effective use of new & approved methodologies*
    - *PDD Development*
    - *Management of the process from validation & registration*
    - *Preparation & management of the monitoring strategy*
    - *Verification & issuance management*



# Incubatee Companies (Services Sector)

- **Science and Technology Research Partner (STREP)**
  - *The basic idea of STREP is to develop novel technologies for renewable energies and healthcare. STREP brings together scientific, technical and management expertise to deliver projects successfully. It can deploy physics, chemistry, nanoscience and materials science together with our knowledge of relevant industry sectors to find novel solutions to existing problems*

# Virtual Incubatees

- ***Black Stone Venture Capital***
  - *Black Stone Venture Capital is the first true venture capital firm in Pakistan in the private sector. They are interested in Bio and Nano technology products*
- ***NANO-Technology International***
  - *Nano Technology International (NTI) provides nanotechnology product which are well known in certain properties of nano-silver*
  - *NTI has filed 3 national patents with Technology Incubation Centre and one United States patent is in the filing process*

# Virtual Incubatees (Contd)

- ***IndusTech Solutions(ICT)***

*Indus tech solutions is a consulting and IT service company specializing in the following areas:*

- Industrial automation*
- Mobile software development*
- Enterprise applications*
- Software product engineering*
- Indus tech solutions provides expert consultants and strong technology*

# Incubation Services

- ***Enterprise Development***

- *Review and selection of incubatee companies*
- *Advisory services in business plans formulation, marketing strategies, project selection, etc.*
- *Training on basics of entrepreneurship*
- *Customized consultancy from NUST faculty*
- *Networking opportunities*
- *Identification and access( subject to availability) to state-of-the-art labs*
- *Filing of patents, copy rights, design rights, and trademarks*
- *Support in marketing through website and use of NUST TIC name*
- *Advice in legal and financial consultancy*

# Incubation Services (Contd.)

- ***Admin/Physical Support***
  - *Furnished office space with plug-in internet and phone*
  - *Access to fax, photocopy, central mailing via courier*
  - *Conference room facilities equipped with multi-media*
  - *Display of company's profile on TIC's main website*
  - *Email address on TIC's domain*
  - *Real property service (security, maintenance, etc.)*
  - *Support staff assistance at reception and events*
  - *Canteen services for tea, coffee, meals, and soft drinks*
  - *Display of company's name on TIC's main board*
- ***Investment Management***
  - *Identifying funding sources (public, venture capital, etc.)*
  - *Matching funding sources with incubatee company needs*
  - *Attracting international venture capital fund companies*

# Support Services

- **Engineering Services (CAD/CAM Services)**
- **Intellectual Property Rights Office (IPRO)**
  - IPRO provides following consultancy and support to the client firms in protecting their intellectual property:*
    - *Administering the law relating to Patent and Trademarks.*
    - *Advising on Patent, Trademark and Copyright protection.*
    - *Advising on the Trade- Related Aspects on Intellectual Property.*
    - *Facilitating the commercial interests of and due rewards to innovators/researchers.*

- *Offering Intellectual Property protection of innovators/ researchers by filing of Patents, Copyright, Trademarks, and Design Rights etc.*
- *Establishing a national network of Intellectual Property Rights related services.*
- *Collaborating with International Organization such as WIPO to facilitate the filing of Patents at international level.*
- *Developing and deploying an electronics service for easy access to the abovementioned service from anywhere within the country.*
- *Providing services related to evaluation of products/innovations.*



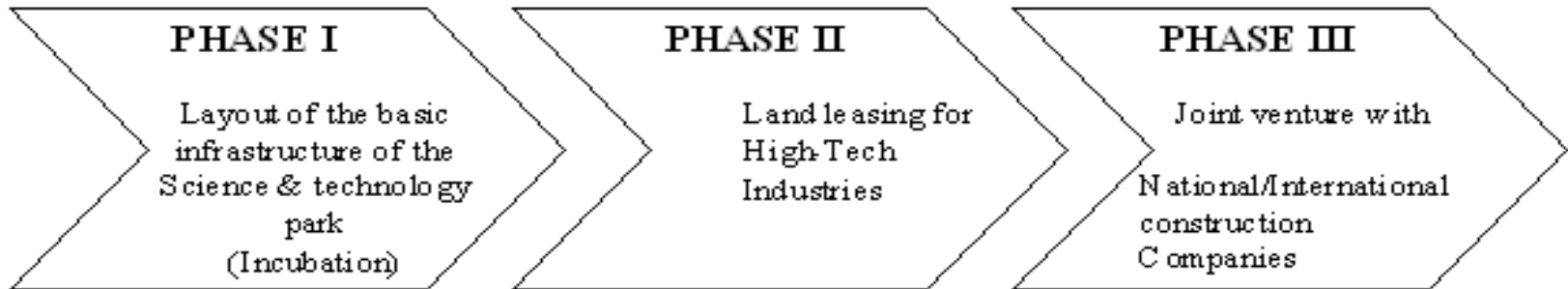
# Establishment of Technology Incubation Centre and Technology Park at NUST

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# Strategy

- ***The development of Science & Technology Park will be achieved in three phases***



*The land so dedicated for this Technology Park, would be sub-divided into the following three areas:*

- ***Land leasing for High-Tech Industries***  
*80% of the total land*
- ***Incubation***  
*5% of the total land*
- ***Customized Buildings Infrastructure including R&D Centres***  
*15% of the total land*



# PHASE I

**Layout of the Basic Infrastructure of the  
Science & Technology Park (Incubation)**

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# Phase I

- ***Basic Layout***
  - *Incubation Services*
  - *Office and Wet & Dry Labs Space*
  - *Technopreneurship Development Centre (TDC)*
  - *Transfer of technology office (TOTO)*
  - *Venture capital firms*
  - *Research Centres*

# Incubation Services

- *Technical & Management Assistance*
- *Promotion, Legal and Business Matching Assistance*
- *Guidance to obtain public funding*
- *Furnished Office Premises & Lab Space*

<b>Dry Labs</b>
Engineering
Industrial/Manufacturing Systems
Computers/Informatics
Energy
Environmental Technology
Internet technologies & Services
Software
Agro-food/Agriculture
Electronics
IT/Telecommunications and/or data communications

<b>Wet Labs</b>
Pharmaceuticals
Chemistry
New materials
Biotechnology/Life Sciences

# Technopreneurship Development Centre (TDC)

- *NUST-Technology Incubation Centre will have an established Technopreneurship Development Centre (TDC) at H-12 to produce future Technopreneurs. The services offered by this Centre will be :*
  - *Training*
  - *Consultancy*
  - *Teknomics*

# Transfer of Technology Office (TOTO)

## **TOTO Goals:-**

- *Protect academic freedom*
- *Transfer Technology to the commercial sector for public benefit.*
- *Generate sources of unrestricted income for institutional purposes, including grants, overhead, and royalty income;*
- *Induce industry to fund direct cost of research and training,*
- *Limit the institution's legal liability and minimize financial risk;*
- *Protect sponsor-university relations;*
- *Create consulting and advisory opportunities for faculty;*
- *Generate license income for professional and personal use*
- *Development local and regional enterprises*

# Venture Capital Firms

- *High technology entrepreneurs usually have more financing difficulties because startup funds must be raised for several years of technology development before a product is ready for the market*
- *Formal and informal venture capital are complementary sources of funding for high tech new ventures*
- *The inclusion of Venture Capital Firms will encourage the growth of high-tech firms and act as a catalyst for the creation of new products and services*

## Research Centres

- *The existing R&D organizations and Academia around the sector H-12 could be approached for collaboration with the Science and Technology Park. In addition to that following Research centres could be established at the Science and Technology Park:*
  - *Electronics and Computer Technology Centre*
  - *Center for Genetic Engineering and Biotechnology*
  - *Metal and Materials Technology Centre*
  - *Nanotechnology Centre*



# Electronics and Computer Technology Centre

- *The main tasks of the centre will be:*
  - *To support and carry out research, development, design and engineering in electronic, computing, telecommunication and information (ECTI) technologies*
  - *To be a centre for collaborating with the industrial sector, universities and international research centers on ECTI technology development*
  - *To promote and accelerate the Information Technology (IT) services provision*
  - *To enhance the competitiveness of ECTI industries by promoting and pushing the development of product testing systems and product and service quality assurance to achieve the international standards*

# Centre for Genetic Engineering and Biotechnology

- *The role of this centre will be to operate more effectively to support and transfer technology for the development of industry, agriculture, natural resources & environment*
- *The main objective of this centre will be to induce dynamics in research, development and application of biotechnology*

# Mechanical and Metal / Materials Technology Centre

- *The role of this centre will be in the development including manufacturing and design for both public and private companies and institutions*
- *The central labs for this centre will be:*
  - *High Rapid Precession & Prototyping*
  - *CAD/CAM/CAE Technology Laboratory*
  - *Nuclear Magnetic Resonance Spectroscopy, NMR*
  - *Gas Injection Molding Technology*  
*Powder Characterization Laboratory*
  - *Thermal Spray Laboratory*

# MEMS/Nano-technology Centre

- *The objective of this centre will be to set the agenda and lay out the nanotechnology roadmap to lead and support R&D programs in nanoscience and nanotechnology*
- *This centre will provide informational seminars on*
  - *Nanopolymers*
  - *Nanocomposites*
  - *Nanoparticles*
  - *Nanoclay*
  - *Nanofibers*
  - *Nanotubes*
  - *Nanoporous materials*
  - *Nanocatalysts*
  - *Solar cells*
  - *Nano-biosensors*



# PHASE II

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## Phase II

- *The Park will develop the land and lease it to companies interested in maintaining close contact with the university community*
- *The land will come in various sizes with basic infrastructure*
- *Park will also offer ready-built commercial properties for lease by tenant companies*
- *Tenant companies will be able to readily tap into NUST student pool for fulfilling their manpower requirements.*

## Phase II

- **Land leasing for high-tech companies**
  - *High-Tech Companies will be given land for lease for setting up their high tech industries at the technology park*
  - *Land leasing can be utilized to finance the development of the park*
  - *The land lease will be provided on a nominal basis for the proportion of the land attributable to the Multinational Firm*
  - *The entire R&D carried out in the industrial park will be contributed towards real industrial problems*
  - *The total land available for land leasing could be utilized for setting up a minimum of 50 High-Tech Industrial Companies*



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# PHASE III

## Joint Venture with National/International Construction Companies

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## Phase III

- *For the construction of buildings at the technology park, there can be a joint venture with the national/international construction companies*
- *The joint venture will depend upon the company's relevant experience in the development of Science & Technology Parks*
- *These companies can assist in building customized infrastructure and operate on equity sharing basis or on BOT (Build, Operate, Transfer)*



# Technology Incubators Networking

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# Technology Incubators Mapping

- ❖ *Total number of Technology Incubators in OIC Countries*
  
- ❖ *Their Technology Configuration:-*
  - *Electronics / Electrical*
  - *Bio-Technology*
  - *Information / Communication Technology*
  - *Nano-Technology*
  - *General Purpose*
  
- ❖ *Market Access to the graduating companies*

# Dual-Track Strategy

- ❖ *Networking between the developing 8 Muslim Countries and preparing them for global competition*
- ❖ *Networking between least developed Muslim Countries to start their incubator programmes in low technologies*
- ❖ *Output would be hi-tech SMEs from developing Muslim Countries and low-tech SMEs from the least developing Muslim Countries.*



# Conclusion

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**Thank You**

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