



**NANYANG  
TECHNOLOGICAL  
UNIVERSITY**

# **IP MANAGEMENT & TECHNOLOGY TRANSFER AT NTU**

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# OUTLINE OF PRESENTATION

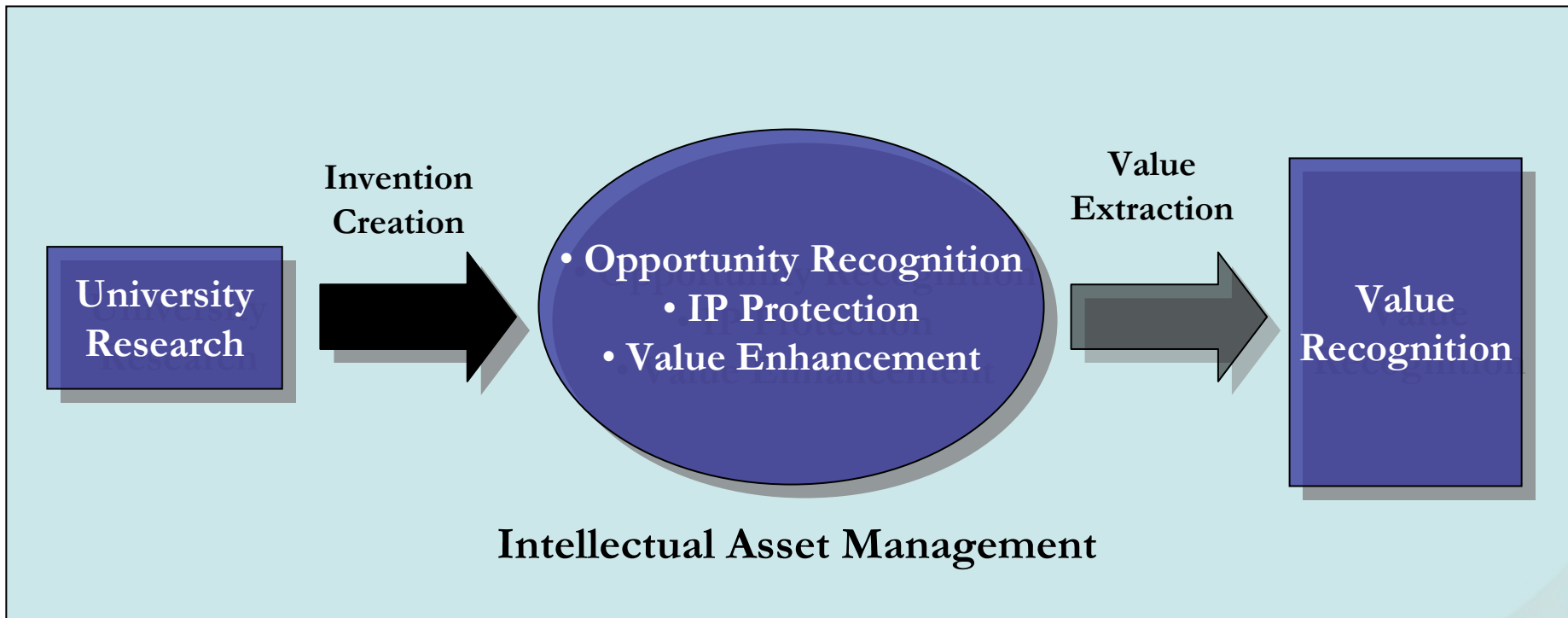
- **Mission & Functions of ITTO**
- **IP Management Strategy & Processes**
- **Technology Commercialisation**

# NTU's Technological Strengths & Innovation System

- Research converted to technology must be reduced to practice for public good
- To engage industry and other external partners in enhancing economic development through technology transfer, technology commercialization and high-tech start-ups
- In addition to the role in educating the future workforce, the development of novel technologies and talent pool will have strong impact on the competitiveness of Singapore firms

# Overview of Technology Transfer (TT): The Process

University Inventions → Technology Transfer → Industry



# Motivations for Technology Transfer

- Facilitate the commercialization of research results for public good
- Motivate and reward faculty and students
- Attract and retain talent
- Enhance job opportunities for students
- Create a conducive environment for entrepreneurship
- Contribute to regional economic development
- Generate income

# Mission Of Innovation & Technology Transfer Office (ITTO)

To manage, protect and commercialize innovation and intellectual property (IP) generated from NTU research enterprise, and to provide administrative, advisory and educational services to faculty, staff, and students on IP, business and industry collaboration issues

# Core Functions Of ITTO

- **Technology Transfer and Commercialisation**
- **Collaborative/Contract Research and Partnership Development**
- **Incubation Support**

# Key Activities In TT & Commercialization:

- Technology Disclosure Evaluation
- IP Protection and Management
- Proof of Concept and Prototype Development
- Technology Commercialization

# Key Activities In Collaborative Research And Partnership Development :

- Negotiation of IP and legal terms in research agreements and contracts
- Development of partnerships with government agencies and private/public organizations on supporting IP, technology transfer and entrepreneurial activities

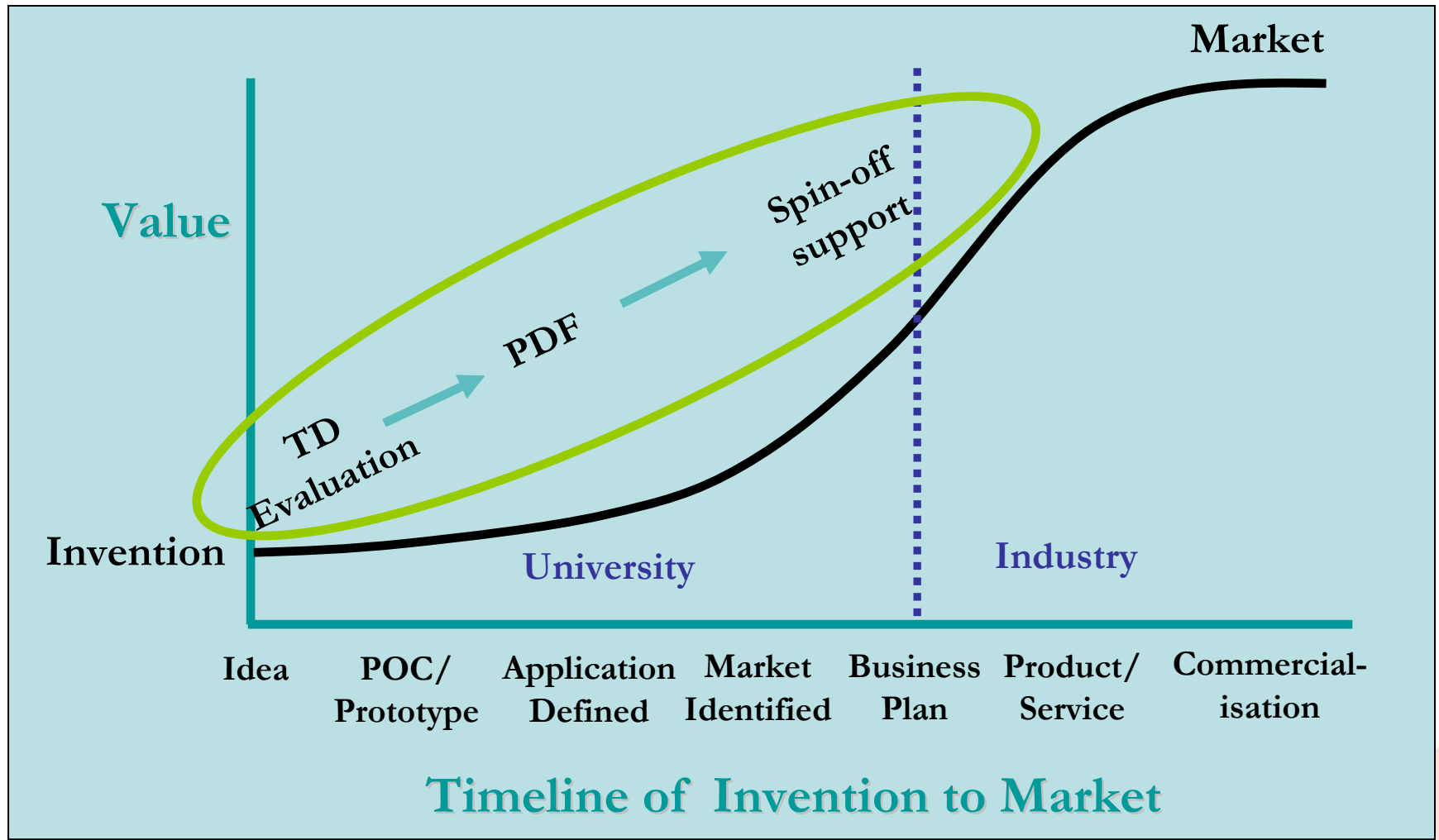
# Key Activities In Incubation Support:

- Management of incubation facility at the Innovation Centre
- Providing support and networking opportunities with NTU researchers, business and legal services providers, and start-up companies at other incubators in Singapore

# Challenges In Technology Transfer

- Research at universities are usually not product/ service oriented and do not address market needs
- Technology is usually at early stage of development
- Percent of the IP portfolio that can generate revenues is low

# Adding Value: TT & Commercialisation

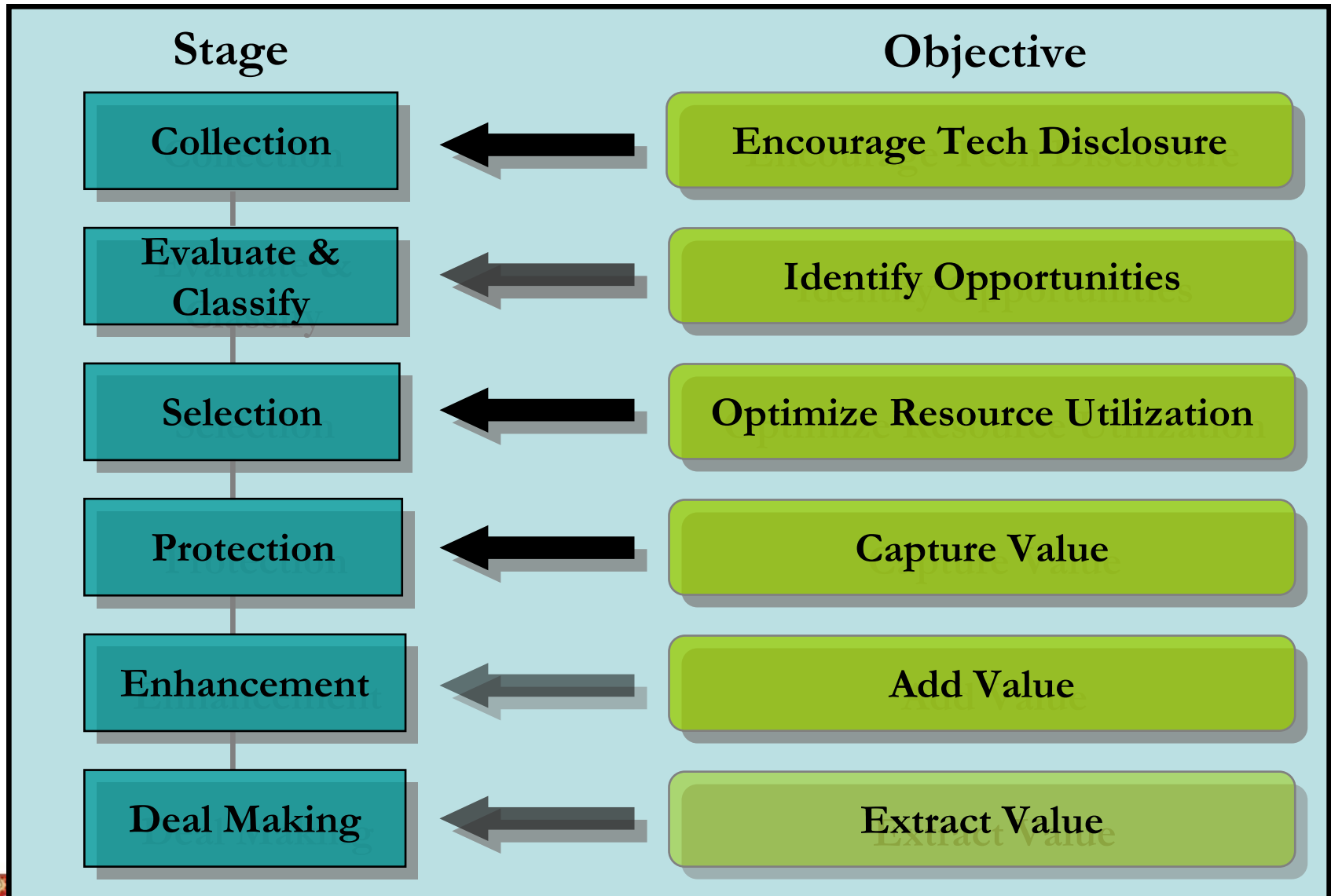


# IP MANAGEMENT STRATEGY

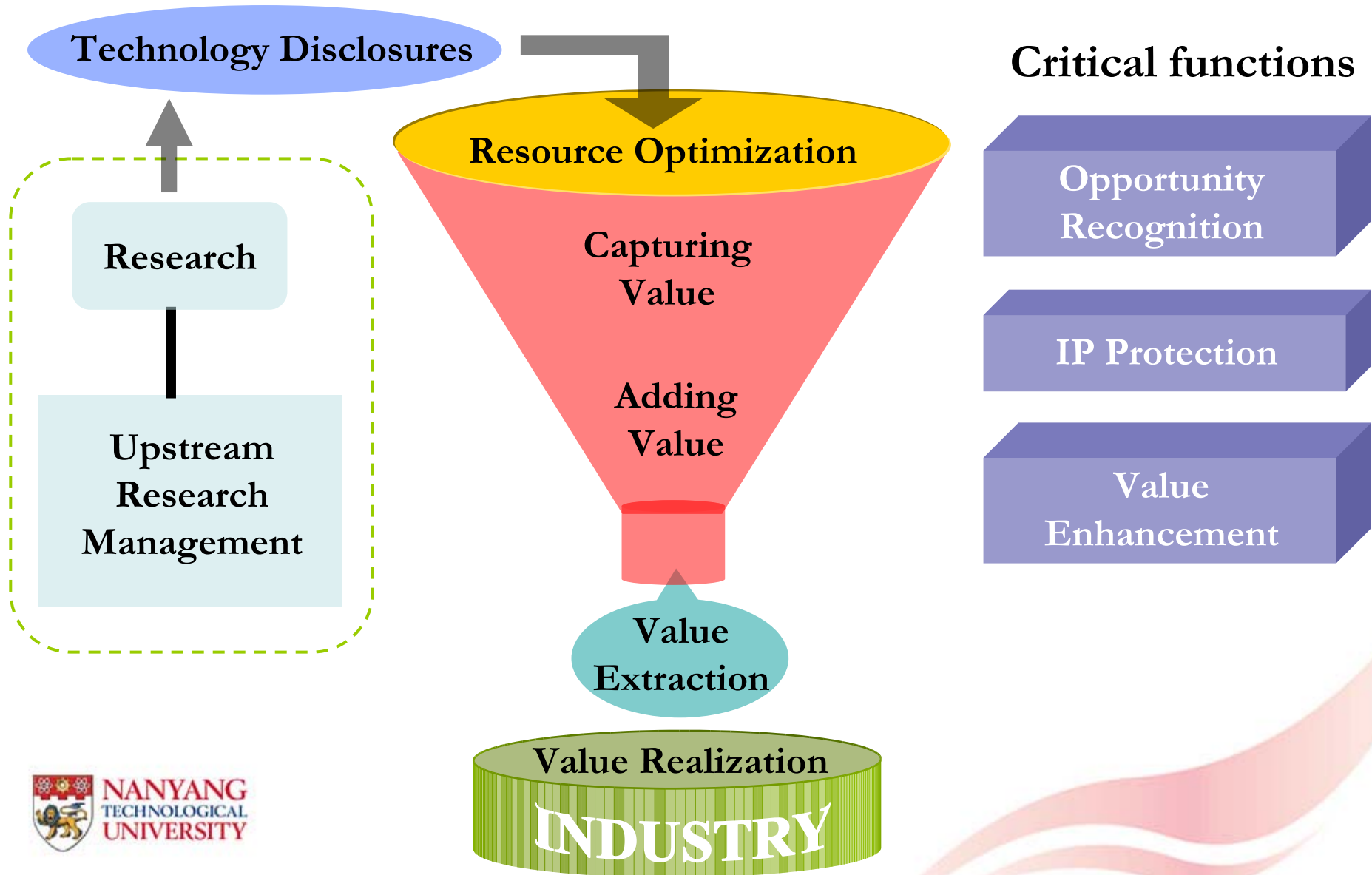
# Adopting a Proactive Approach

- Necessary to realize the potential benefits from IP exploitation
- Strategy needed to be focusing on identifying promising technologies with commercial potentials
- Resulted in more time and resource spending on an IP portfolio enriched in technologies with better commercial potentials

# A Proactive Strategy



# IP Management Process Overview



# Opportunity Recognition

- Technology Disclosure
- Technology Evaluation
  - Verify ownership and right to commercialization
  - Determine if technology is patentable and should be patented
  - Screening for commercial opportunities

# Technology Disclosure

- **Mandatory requirement under the IP policy for staff to disclose inventions to ITTO with generous incentives**
- **The process is:**
  - **User-friendly, straight-forward and not labor intensive**
  - **Timely (decision within 3 months)**
  - **Value-adding (providing feedbacks on patentability and commercial potential)**

# Technology Evaluation Process

- **Verify ownership and right to commercialization**
  - Who are the inventors?
  - Where did the research fund come from?
  - Any research agreements in place?
  - Other people's proprietary materials used for the research?

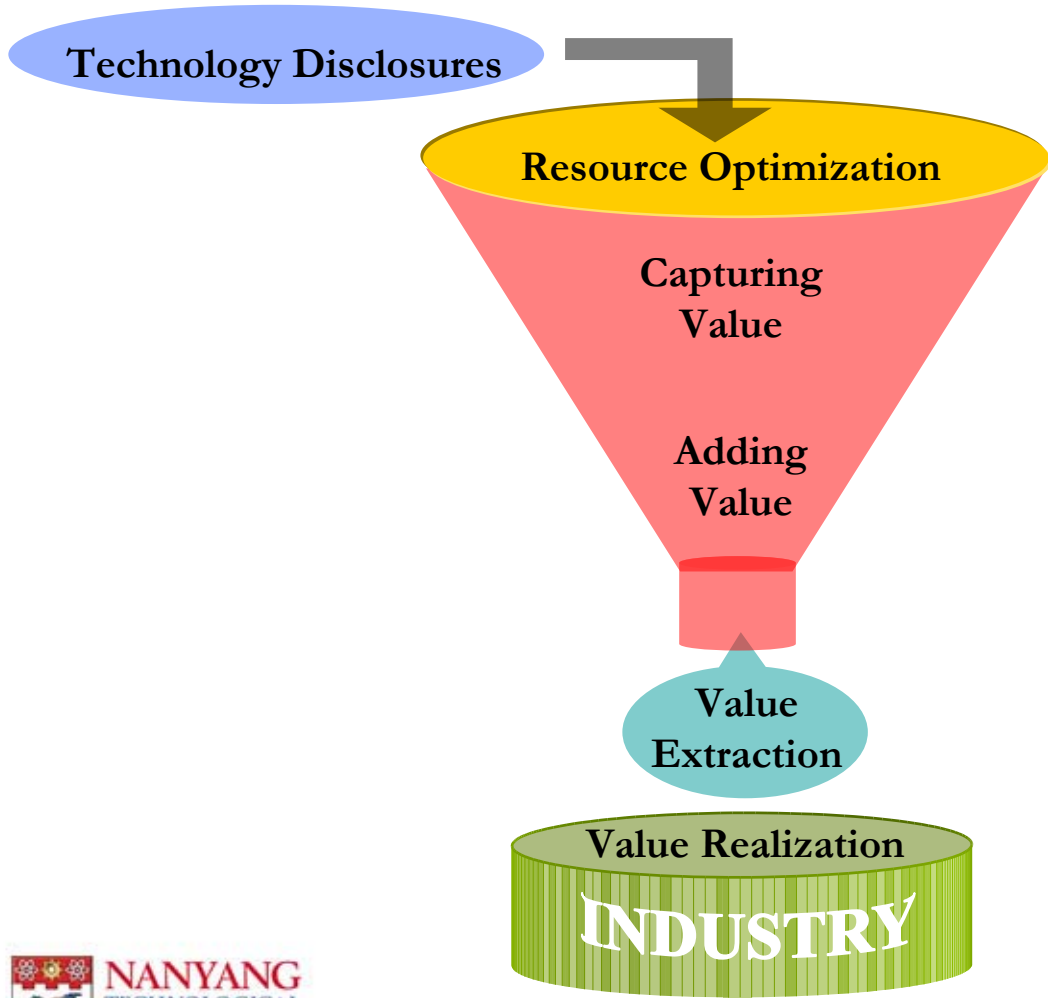
# Technology Evaluation Process

- Determine if technology is patentable and should be patented
  - Satisfies the mandatory requirements of novelty, non-obviousness and utility
  - The practical value of having the technology patented depends on whether the claimed invention is truly a commercial and technical advance over the prior art :
    - Types of claims: product, process/method or both
    - Likelihood of being strategically useful to industry
    - Would infringement be difficult to detect?
  - What other protection is available?
    - Tangible research property
    - Trade secret
    - Copyright

# Technology Evaluation Process

- **Screening for commercial opportunities**
  - **Initial assessment of the potential applications and market conditions**
    - **Technical assessment of the technology**
    - **Identification of the major attributes that have impact on value creation**
    - **Determination of the resource requirements and risks involved**

# IP PROTECTION



## Critical functions

Opportunity Recognition

IP Protection

Value Enhancement

# IP Protection Strategy

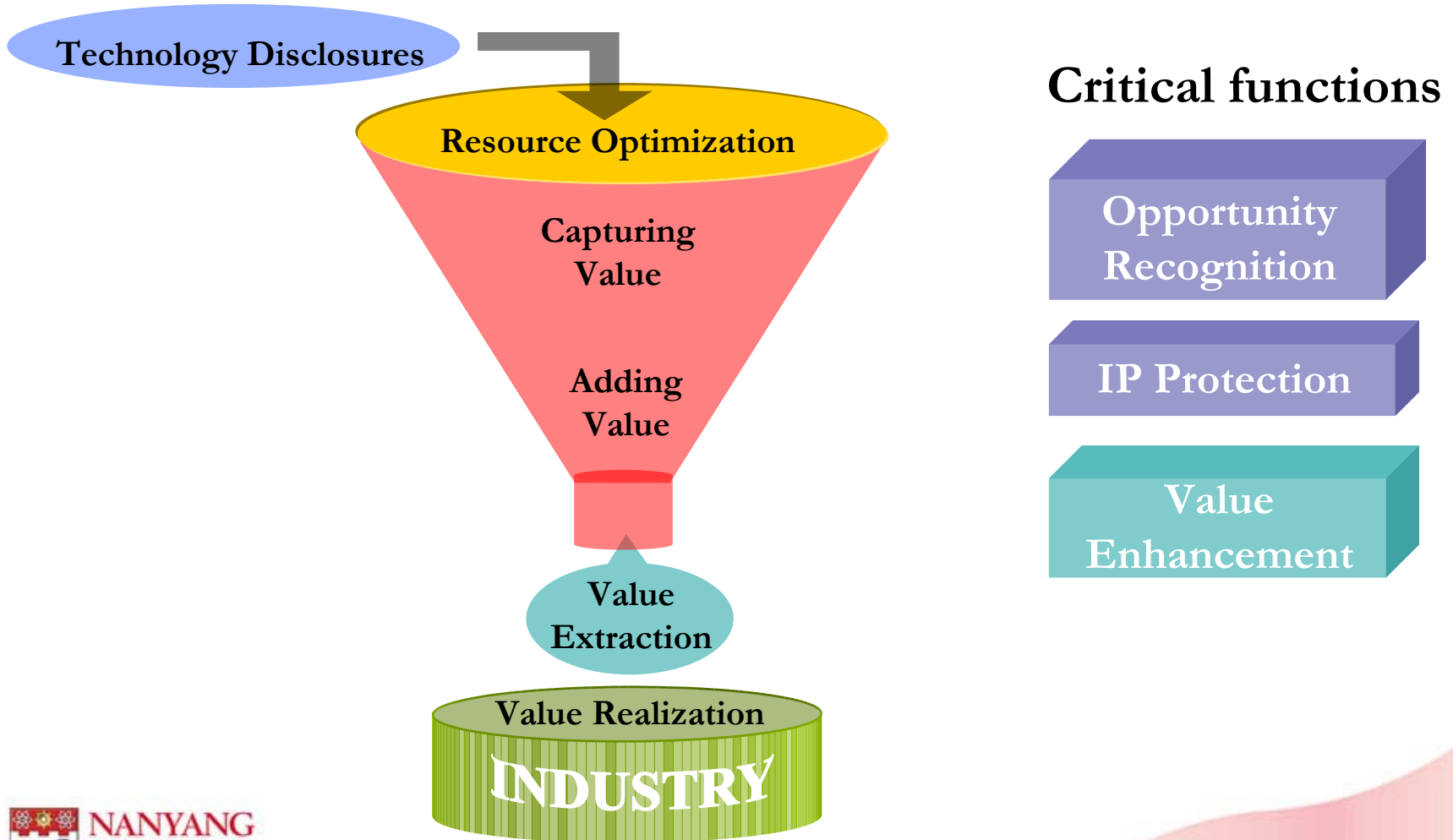
## ■ Which countries to file?

- Should be in countries where the biggest markets located
- Can the patent be easily enforceable in these countries?

## ■ What to file?

- Provisional, national, or PCT applications
- Provisional: technology not completely developed, imminent public disclosure, need more time to determine if there is a business case for patent filing
- PCT: option to enter many different countries, delay upfront costs, delay decisions on which countries to file

# VALUE ENHANCEMENT



# Adding Value Through Technology Enhancement

- Lower the technical risk to entice commercialization
  - Proof-Of-Concept funding
    - Prototype development
  - Working with external parties to further develop the applications
- Build a business case
  - Perform technology & market competitive intelligence
  - Develop commercialization scenarios to help attract investors or licensees

# TECHNOLOGY COMMERCIALISATION

# Routes to Commercialization

## ■ Technology Licensing

- ITTO negotiates technology licensing deals
  - What kind of company (start-up, small or large company)?
  - What expertise/resource would the licensee need?
  - Exclusive vs. non-exclusive
  - What are the payment terms? Royalty, upfront payments, and/or milestone payments

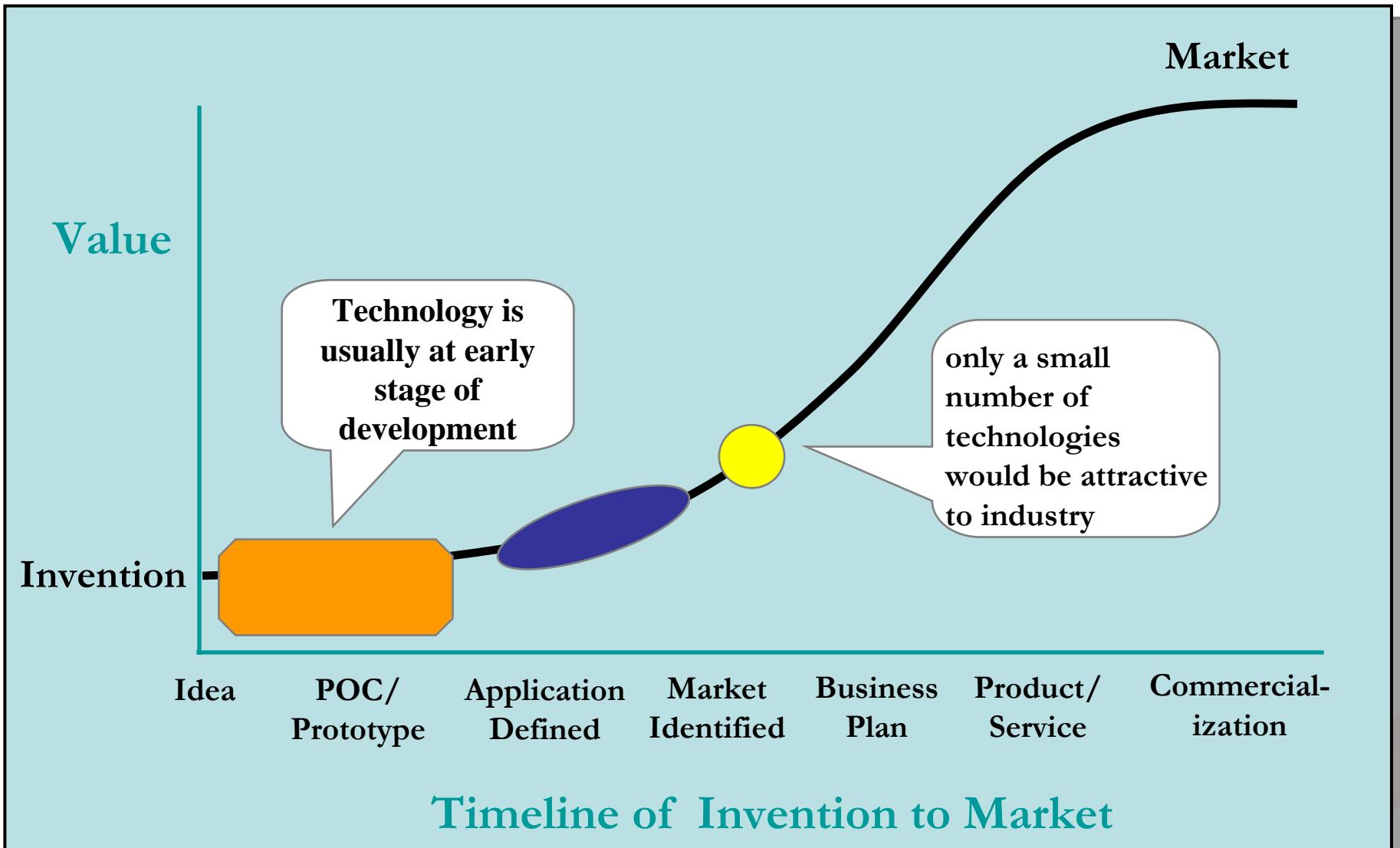
## ■ Start-Up Companies

- ITTO facilitate the formation of start-up companies through technology licensing, IP management support, business and investor networks

# What Industry Wants

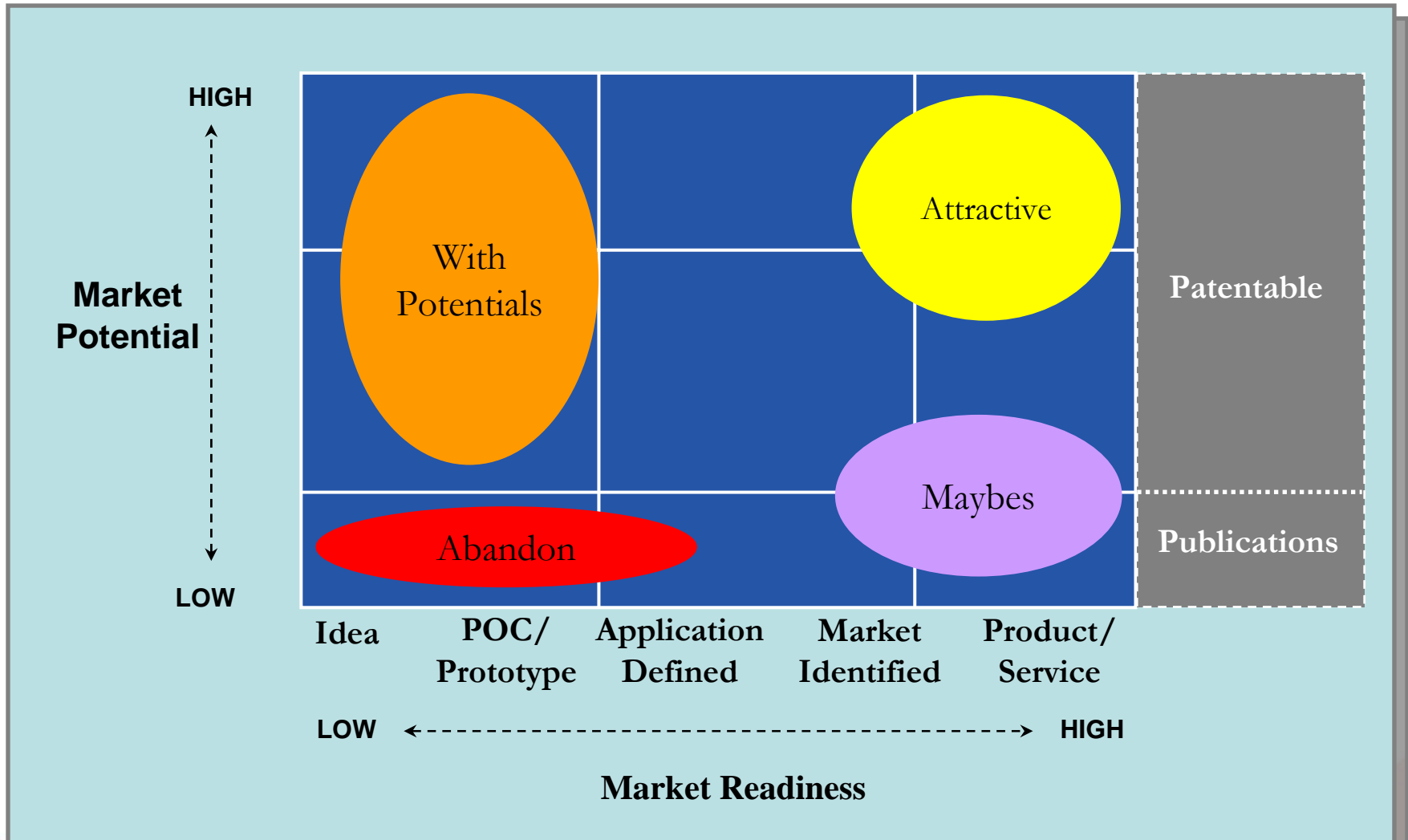
- New or improved processes, methods, products and services to help maintain their competitive edge in global markets
- They are looking at improving efficiency, reducing costs, addressing new opportunities thereby increasing sales revenue, market share and profits
- Licensed technologies must have reduced technical risk as the licensees will face high development and market risks

# Challenges in Commercialization

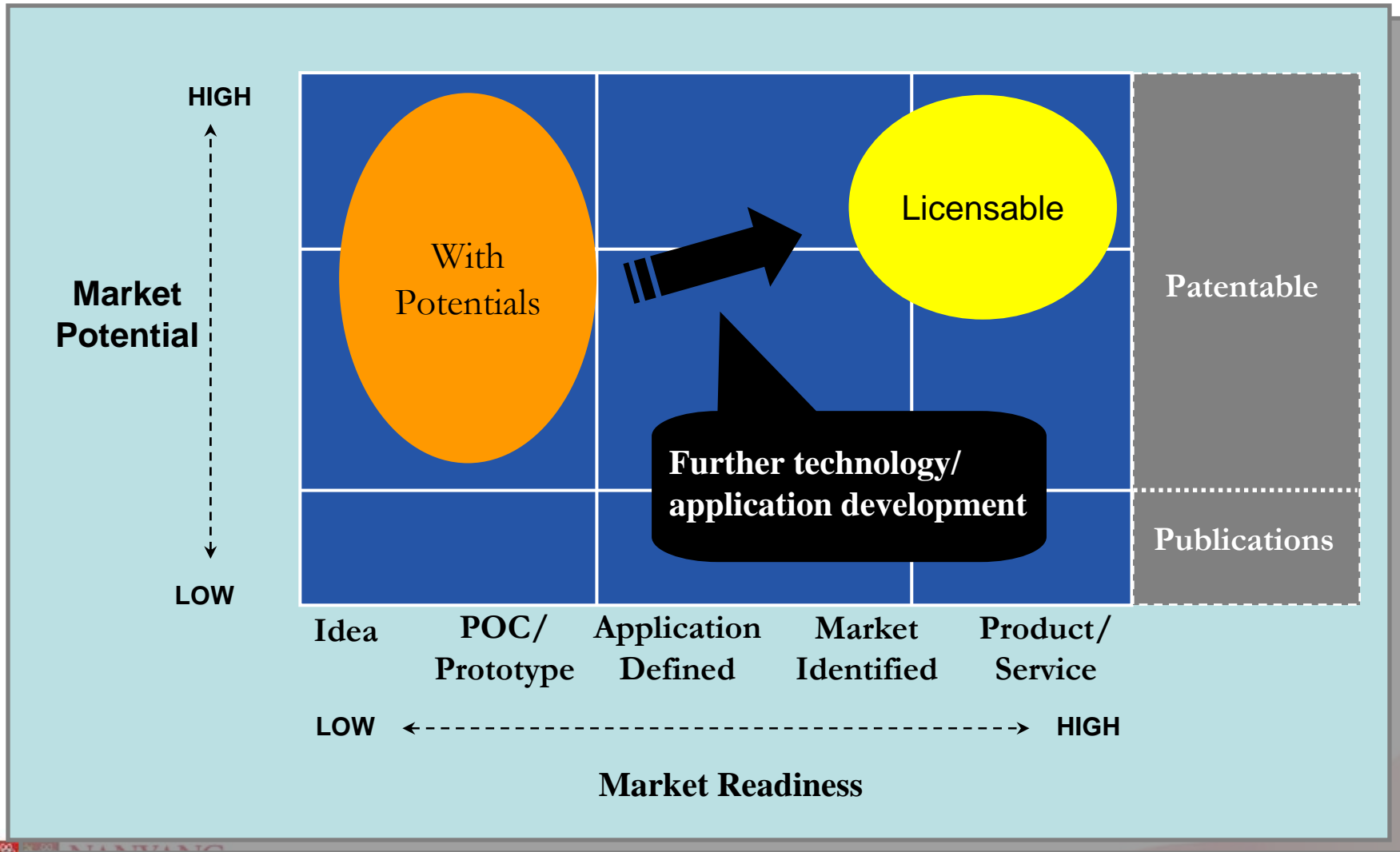


Timeline of Invention to Market

# Technology Classification Matrix



# Opportunities Through University-Industry Collaborations



# TECHNOLOGY DEVELOPMENT

- Technology/application development with industry partners
- POC funding for internal development

# Q & A