Engineering Deans' Institute

International Collaborations at POSTECH and Korean Perspectives

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POSTECH
POHANG UNIVERSITY OF SCIENCE AND TECHNOLOGY

City of Pohang

Located in the southeastern area of Korea
Coastal city of 530,000 inhabitants

Home of POSTECH & POSCO*

* POSCO: Pohang Iron & Steel Corporation

POSTECH Overview

- Founded in 1986
- Faculty: 412 (268+144)
  International: 16.7%
- Students: 3,612
  1,422 (undergraduate)
  2,190 (graduate)
  International: 5%
- 320 freshmen per year
  representing top < 1% of
  high school graduates
- Undergraduate students/faculty:
  3.5 to 1
- Researchers: 636
  International: 11.6%
- Staff: 392
- Operating budget: ~US$300M (2011)
  excluding the accelerator.
  $200M for research

- Academic Programs
  - 11 Departments
    4 in Science
    7 in Engineering
  - 11 Divisions, Schools & Institute
  - Courses taught in English
    Undergraduate: 63% (major only)
    Graduate: 98%

POSTECH
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26 Years Young

POSTECH successfully settled in Pohang, owing to

- **Founder's visionary leadership**
- **Unprecedented large-scale financial support from POSCO**
- **Creative strategies that attracted talented scientists and students**

World Bank, 2010
The Road to Academic Excellence

Since 1996, *JoongAng Daily* ranked POSTECH #1 among Korean universities 7 times

1998 Asia's best science and technology university by *AsiaWeek*

2010 28th by the *Times Higher Education* World University Rankings

- **SCI papers: 1,539 (2011)**
- **SCI/faculty*: 5.54**

* Tenure-track faculty

- **Graduates (1990~2012): 14,393**
- **Ph.D.: 2,231**
- **MS: 6,540**
- **BS: 5,622**

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Challenges in Higher Education

- Broad attack and steady erosion of public support and confidence in higher education
- Commoditized higher education and no differentiation
- Research vs. education
- Fundamental changes in the society
- Rapidly-advancing technologies and fast-changing global industry
- Greater accountability and scrutiny
- Maintain and improve the quality when the resources are constrained
- Is the glass half full or half empty?

Why Internationalize?

- To develop diverse learning and research environments and culture: the value of diversity
- To prepare our students, both Korean and international, to become future global leaders
- To attract leading scholars and students from around the world
- To move POSTECH to a next level of excellence

International Programs at POSTECH

- Student mobility: 5% of our students per year go abroad for > 3 months
- Distinguished foreign professors
- Distinguished lecturers
- Global leadership program
- Cooperation with developing countries
- WCU (World Class University) programs
- IBS (Institute for Basic Science) campus site labs

Research Platforms and Institutes

National and international projects to host and build key research infrastructures and institutes for the advancement of the R&D competency of Korea

PAL XFEL

Pohang Accelerator Laboratory
X-ray Free Electron Laser

3rd generation 3 GeV accelerator

4th generation light source being built

- 0.1-nm hard X-ray 10-GeV XFEL
- Length: 1.1 km
- Budget: $400M

Max Planck

Max Planck Korea established in POSTECH

Center for Attosecond Science &
Center for Complex Phase Materials

APCTP

Asia Pacific Center for Theoretical Physics

Headquartered in POSTECH

Pursue theoretical physics and promote collaboration among its member countries

Issues

- Generous government support, but its associated overhead is large
- Substantial and meaningful partnerships
- Outstanding faculty recruitment and retention
- Silo mentality, and many faculty do not feel the need
- Still homogeneous rather than diverse
- Too many academic units
- Bilingual Campus
- Internationalization: a tool to help realize our goal rather than to raise the rankings and/or become an achievement itself

Korean Higher Education

Very Successful in Quantity

- Colleges and universities proliferated About 400 colleges and universities
- 3.5 million undergraduates enrolled **(6-fold increase since 1980)**
- 330,000 graduate students enrolled **(10-fold increase since 1980)**
- 82% of high school graduates go to colleges **(1st among OECD)**
- 63% Higher Education Achievements in 25~34 yrs **(1st IMD*, 2011)**

- Korean students studying abroad: 251,887 (2010)
- Korean students studying in U.S.: 72,000, 3rd ranks (2009)
- International students in Korea (2010): 83,842, 5-fold increase since 2004

* IMD: International Institute for Management Development

But not quite in Quality

Low global recognition of universities:
3 Korean universities in top 200 of THE (2011)

Number of international students: 1/3 of outbound

Low number of international scholars: 2% (FTE)

International Programs in Korea

- **Institute for Basic Science (IBS)**
  Leap to the world's top-10 research institute in basic sciences
  50 site labs, each with ~$10M/year
- **World Class University Program (Scholars)**
  Attract outstanding scholars from abroad to vitalize education and research and raise its quality
- **Global Korea Scholarship (Students)**
  Scholarship granted to 1,200 students from home and abroad per year
- **Campus Asia:** Mobility programs among Korea, China, and Japan
- **Global Research Laboratory Program**
  Develop collaborative research programs with the world-leading research groups
- **Global R&D Center Program:**
  Host world-class research centers in Korea
- **ODA (Official Development Assistance)**
  Share Korea's experience with the developing countries and provide support

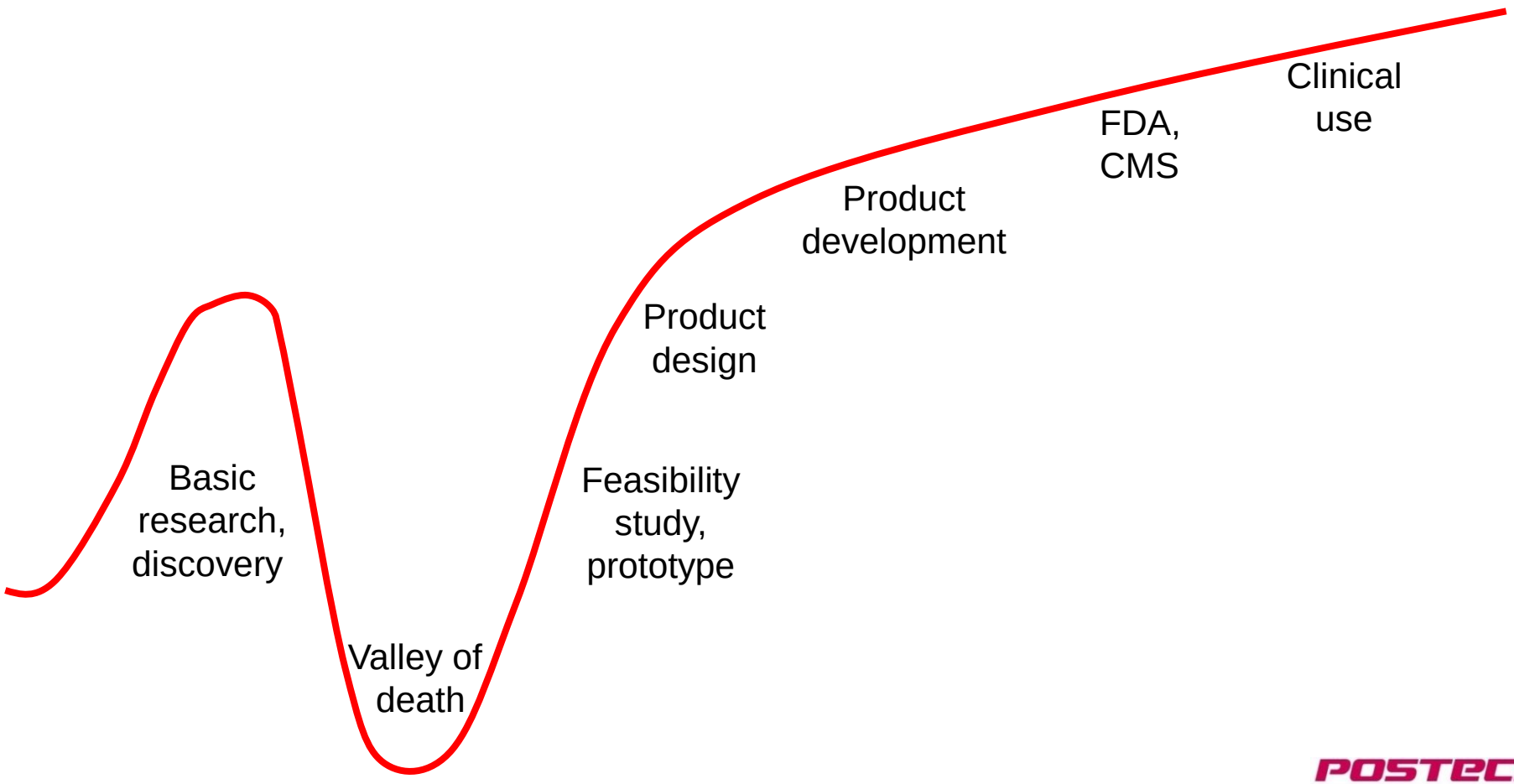
Issues

- Too many programs?
- Imbalance between outbound and inbound students
- English lectures
- International scholars: not enough contributions to education & research so far
- University rankings: particularly influential in Asia
- Unhealthy (?) academic power distribution
- Roles of government
- Lack of patience and consistency

Ingredients for a High-Impact Academic Unit

- Outstanding faculty
- Well-trained future leaders in our students and postdocs
- Critical mass
- External research funding
- Research leadership and risk-taking
- IP and technology transfer
- Mutually-beneficial relationship with industry
- Excellent staff
- Excellent facilities and infrastructure
- Support from government, industry, institution and individuals
- Culture of excellence
- Entrepreneurial and collaborative spirit
- Stable and innovative leadership

Innovation & Technology Commercialization Stages



Conclusion

- There are numerous challenges that universities face
- Crisis everywhere, but opportunities abound
- Resources are available in Asia, but how long?
- Internationalization is very important, but how much?
- Pursuing excellence requires a fundamental culture change
- Many opportunities for collaboration

POSTECH's Vision with Internationalization and Excellence

- **Become a great place for learning**
  - where inspired students can learn from inspiring professors
- **Be recognized as an outstanding research institution**
  - where faculty, students and graduates pioneer and lead science and technology fields and discover solutions to the world's grand challenges through innovation and collaboration

Thank you!

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