



World University Ranking Conference



On the Role of Research Universities and KAIST in the 21st Century

KAIST

Nam Pyo Suh, President, KAIST



Thank you for coming to
WUR Conference & KAIST

To my Korean colleagues,

영어로 말을 하고 슬라이드가 영어로
된 것 죄송합니다.

이해하여 주시기 바랍니다.

Outline of My Presentation

- 1. Role of Research Universities***
- 2. Introduction of KAIST***
- 3. Recent Initiatives of KAIST***
- 4. Implications of International Ranking***
- 5. Concluding Remarks***

Challenges for Research Universities

- 1. Improvement of the quality of life*
- 2. Research that can help economic development*
- 3. Advance knowledge base, e.g., materials science, computer science, information technology, biology, etc.*
- 4. Dealing with current issues for universities in the 21st century*
- 5. Critical factors in developing global university*

Role of Research Universities

Universities role in helping humanity

- 1. Knowledge generation -- DNA, information, materials science, computer science, etc.*
- 2. Generation of educated people -- successful in eradication of ignorance but not irrational behavior*
- 3. Microcosm of the society at large -- social experiment, exploration of risky ideas, modeling of ideal systems*
- 4. Research to solve problems faced by humanity and society*

Role of Research Universities

Economic Development and Research Universities

1. New England and research universities *(MIT, Harvard, etc.)*

*Before 1950 -- shoes, textile, apparel mfg
1950 to 1980 -- computers, medical, defense research
1980 to date -- financial, software, biotech, defense research
2000 and beyond -- biotech, nanotech(?), medical/healthcare, IT*

2. Korea and research universities

*1945 to 1970 -- Education of undergraduate education
1970 to date -- Generation of highly educated people (KAIST)
2000 and beyond -- Development of high tech industries led by
university research*

Role of Research Universities

Critical roles played by research universities and government

In the U.S., it was the selective funding by government and the research done at the selected research universities that have developed the basis for various academic fields and industrial base.

Examples: DARPA/NSF -- Materials Research Labs

DARPA -- Computer Science Labs

NSF -- Basic research in physical sciences and engineering

NIH -- biology, medical science, bioengineering

Energy, Defense, NSF -- nanotechnology

In Korea, the era of basic research was started in the early 1970's with the establishment of KAIST.

Role of Research Universities

Critical roles played by research universities and government

In Japan, the government invested R&D money in National Labs rather than selected universities, which was successful in the catch-up phase of Japanese industrial development, but not very successful in developing new ideas. (MITI vs Education Ministry)

Possible reasons:

- 1. Renewable of personnel*
- 2. Short-term research*
- 3. More D than R*
- 4. Industry-dominated agenda rather than research (curiosity) - dominated agenda*

Role of Research Universities

Current issues for universities in the 21st century

- 1. It differs from country to country, but in many countries the critical problems are both internal and external to universities.*
- 2. For many it is funding and availability of outstanding human resources (3% rule).*
- 3. Science and technology are changing faster than the ability to change for some universities.*
- 4. Education is becoming more capital intensive.*
- 5. Distribution vs Concentration (European model vs US model)*
- 6. Need to change research paradigm (Two ends of the research spectrum)*
- 7. Quantitative evaluation over qualitative assessment*

Role of Research Universities

Critical factors in developing global university

*I would like to illustrate this by going
through the recent changes we have
made at KAIST.*

Why, What , How.

Goals of KAIST

1. To make our school one of the best universities in the world
2. To educate future leaders in industry, education, and public service, etc.
3. To contribute to the economic development of Korea
4. To improve the quality of life for everyone in the world

Introduction to KAIST

1. Approximately 2,800 undergraduate students
2. Approximately 5,000 graduate students
3. About 680 faculty members, including 260 non-tenure track faculty
4. Approximately 20% of the courses are in English
5. Annual budget = Approx. US\$340 million
6. Incoming freshmen class will be taught in English only
7. Incoming freshmen class will have about 50 foreign students out of about 750 freshmen, which is larger than that of MIT.
8. Majority of the faculty received their PhDs from the US

Introduction to KAIST

1. 10 of the 18 National Engineering Prizes were receive by KAIST professors.
2. 25% of Samsung Electronics PhDs are KAIST graduates.
3. More than 10% of professors in Korea are KAIST PhDs.
4. KAIST graduates are now professors in other countries, including MIT, NTU, etc.
5. KAIST produced more than 31,000 graduates.
6. The Number of papers written by KAIST professors is on par with those of MIT.
7. 22% of our students are women students.
8. Large number of patents were granted to KAIST professors.

Introduction to KAIST

9. KAIST undergraduates may be as good as the best in the world. 70% come from “Science High Schools” and a school for gifted students.

These schools collectively produce about 1,800 graduates a year. Each one of these schools accept about 100 a year per school out of perhaps 100,000 high school graduates.

10. I believe KAIST would be one of the best universities if it were located in the U.S.

Anticipated Future Development

- National Level -

- 1. Stronger competition in capital intensive business**
- 2. Shifting out of energy intensive business**
- 3. Greater importance of technology and technology innovation**
- 4. More competition from abroad in education, etc.**

Anticipated Future Development

- Educational Level -

- 1. Increasing important role of the Internet**
- 2. New role for residential university**
- 3. Rapid obsolescence of professors**
- 4. More merit based systems**
- 5. Transformation of disciplines**

Anticipated Future Development

- Educational Level -

- 6. Greater importance of research at the interface between and among disciplines**
- 7. Greater importance of biology, information science, cognitive science, etc.**
- 8. Greater emphasis on technology innovation and design**
- 9. Importance of good and effective education**

What are the characteristics of outstanding universities in the world?

- **Best in some or many fields of intellectual endeavor**
- **Give the student excellent educational experience**
 - **Produces outstanding graduates**
- **Generates scholarly outputs that impact the future of their field**
 - **Produces major technology innovations**
- **Produces new ideas that influence the thinking of others**
- **Influences the future direction of a nation, nations, and humanity**
 - **Establishes cultural norm for society**
 - **Many visitors want to come**

What are the pre-requisites of a great university?

- 1. Shared Culture and Values**
- 2. Human Resources**
- 3. Financial Resources**
- 4. Tradition**
- 5. Long-term Goals**
- 6. Strategies**
- 7. Implementation Policy**
- 8. Administrative structural framework**

Shared Culture and Values:

The Foundation for a Great University

- High ethical standards
- High regard for protection of intellectual property rights (IPR)
- High regard for intellectual achievements
 - Excellence in education
- Reward and recognition for outstanding contributions
- Allowing people to ask unthinkable questions
- High standards for academic achievements
 - Competitiveness
 - Community of scholars

Implementation Policy

- **What structural changes do you need to make to achieve your goals?**
 - **Personnel policy?**
 - **Reward system?**
 - **Major fund raising?**
- **Relationship with your environment?**
 - **International visibility?**
 - **Professional conduct?**
 - **Ethical standards?**

Ultimate Goal of KAIST

**To be one of the best universities
in the world**

Current Emphasis at KAIST

- **Emphasis on Outstanding Teaching/Learning/Understanding**
- **Research excellence in important interface between disciplines**
- **Transfer power and responsibility to the faculty**
 - **Globalization**
- **Fund raising from private sources**

Emphasize on Education

KAIST must provide the best education to our students.

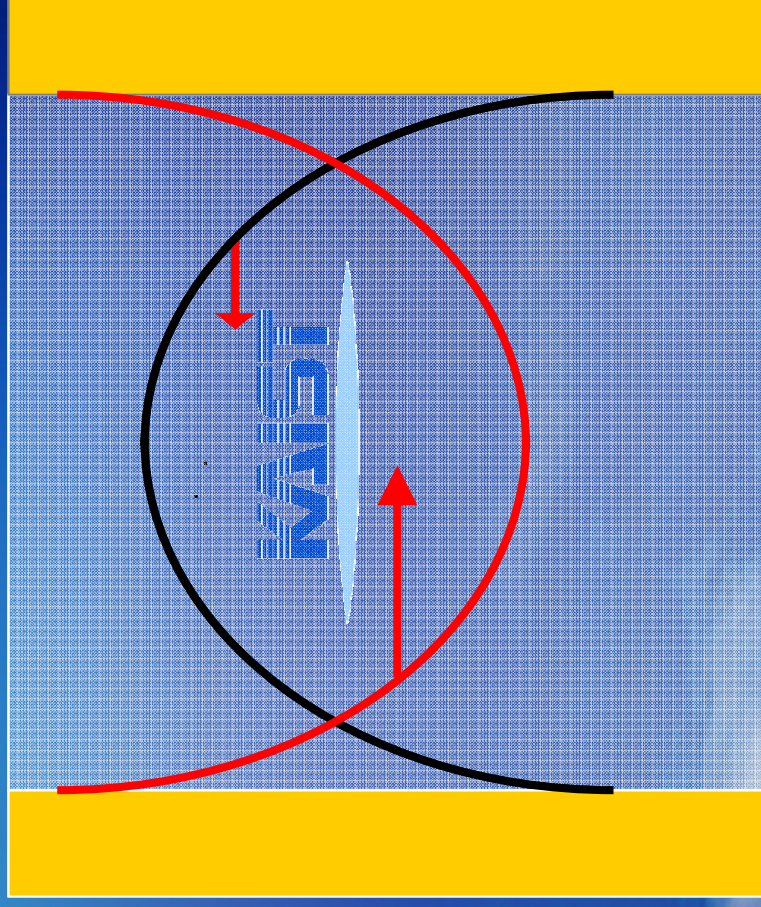
- a.** Imaginative curriculum
- b.** Teaching innovation
- c.** Concomitant education in Analysis and Synthesis
- d.** Bilingual education
- e.** Dual degree program -- GLT, etc.
- f.** Encouragement of broad education -- minor and major curriculum
- g.** More opportunities and support for student-initiated projects

Research Excellence

More emphasis at the two ends of the research spectrum

Effort & time
put into
Research

Impact



Basic or
Fundamental
Research

Technology
Innovation

Research Excellence

KAIST must be “leaders” in research through innovation and creative work.

- a. KAIST Institutes
- b. Individual research
- c. Hiring of outstanding faculty
- d. Recruitment of bright and ambitious students
- e. Secure research funding
- f. Capture big ideas
- g. Work hard

Empowering the faculty

- a. Department-Centric Boundary-less System**
- b. Appointment of Department Heads**
 - c. New tenure system**
- d. Distinguished KAIST professors**
 - e. New faculty search process**
- f. Merit-based system (scale of 6)**

Globalization at KAIST

- **Increase foreign faculty : 80 professors till 2010”**
- **Increase Foreign students: 500 students till 2010”**
- **Implement dual degree programs**
- **Conduct all courses in English: recruiting 50 freshman foreign students in 2007 spring semester**
- **Build bilingual campus**

Fundraising

- a. Goal of \$ 1 Billion in seven years**
- b. Assignment of duties to VPs**
- c. Distributed fund raising system (80/20 rule)**
- d. President's Advisory Council (PAC)**
- e. Appointment of Dean for Development**
- f. Acquisition of land for future expansion**
- g. Honorary degrees**

Implications of International Ranking

- 1. It is taken seriously, especially by the press.**
- 2. It can be a useful metric for improving higher educational system.**
- 3. It must be done fairly and accurately based on reliable data. Otherwise, it can damage outstanding universities.**
- 4. It may be better to evaluate research universities apart from largely undergraduate institutions.**

Concluding Remarks

- 1. Thank you for coming to KAIST and Korea to share your perspectives with us.**
- 2. We would like to work with you to improve the ranking system and improve the quality of higher education in Korea and other countries.**
- 3. We should continue to improve higher education to help the future well-being of everyone in the world.**
- 4. Education is perhaps the most important endeavor of humankind.**

Thank you for your attention.