

# Industrial Engineering and Management Science in Korea

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**Dept. of Industrial Eng.**  
**Seoul National University**

# Presentation Agenda

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1. Korea(South Korea) Overview
2. KIIE and KORMS
3. Korean IE Education

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# South Korea overview ( Republic of Korea)



Geographically 3 big neighbors(China, Russia, Japan),  
Interests by 4 big countries(above 3 + USA)

Until mid 19<sup>th</sup> century, Korea's only neighbors were China and Japan. In old world, these 3 countries have been getting along very well except couple of conflicts until 1890's.

# South Korea overview ( Republic of Korea)



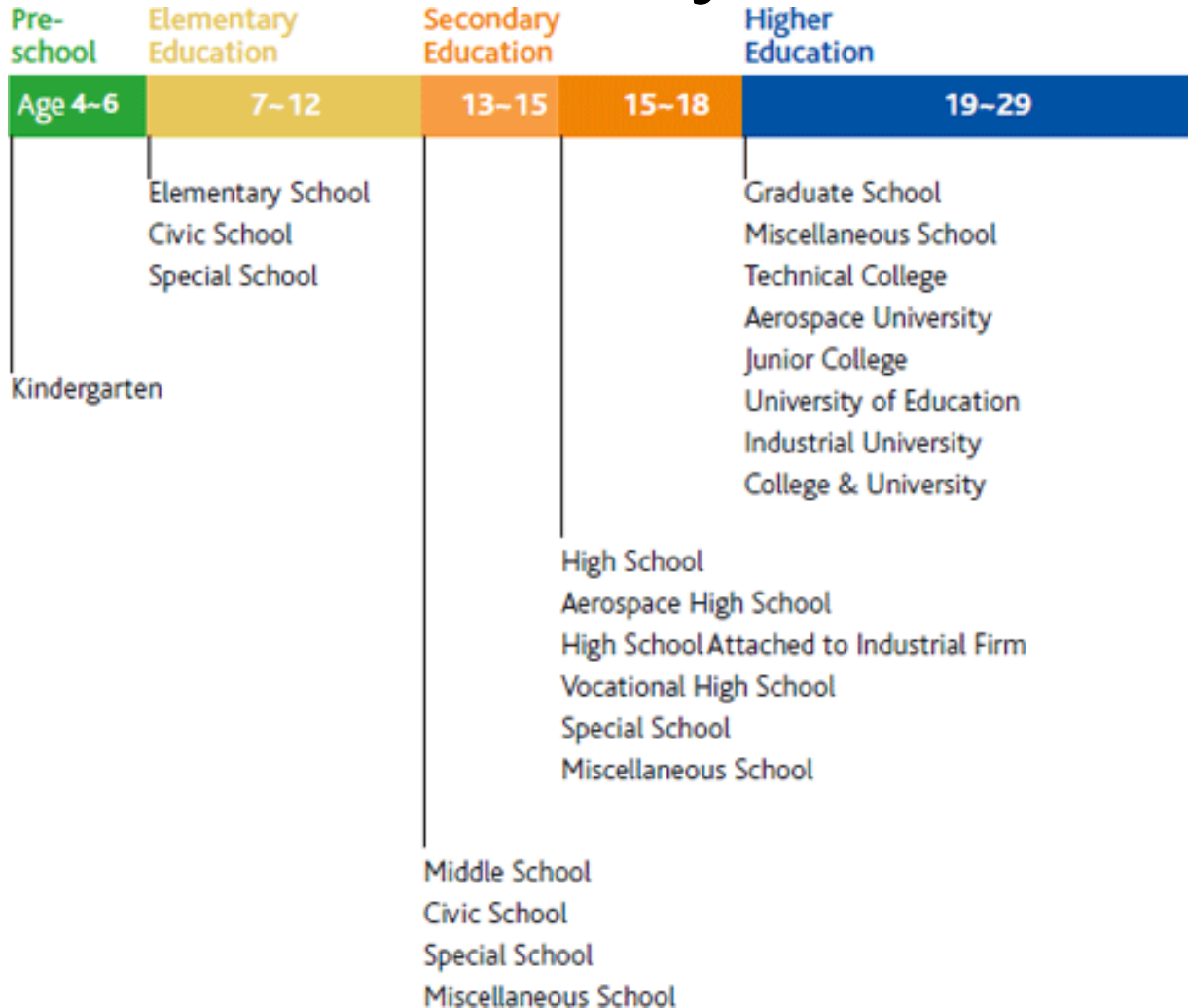
- Population: 50.95 million(2012).
- GNI:
  - US\$ 1.129 Trillion(2012)
  - US\$ 22,708 Per Capita(2012)
- Exports and Imports: US\$1.068 Trillion(2012)
- Major Industrial Products:
  - Semiconductors, automobiles, ships, consumer electronics, mobile telecommunication devices, industrial equipment, steel, and chemicals

# South Korea Overview ( Republic of Korea)



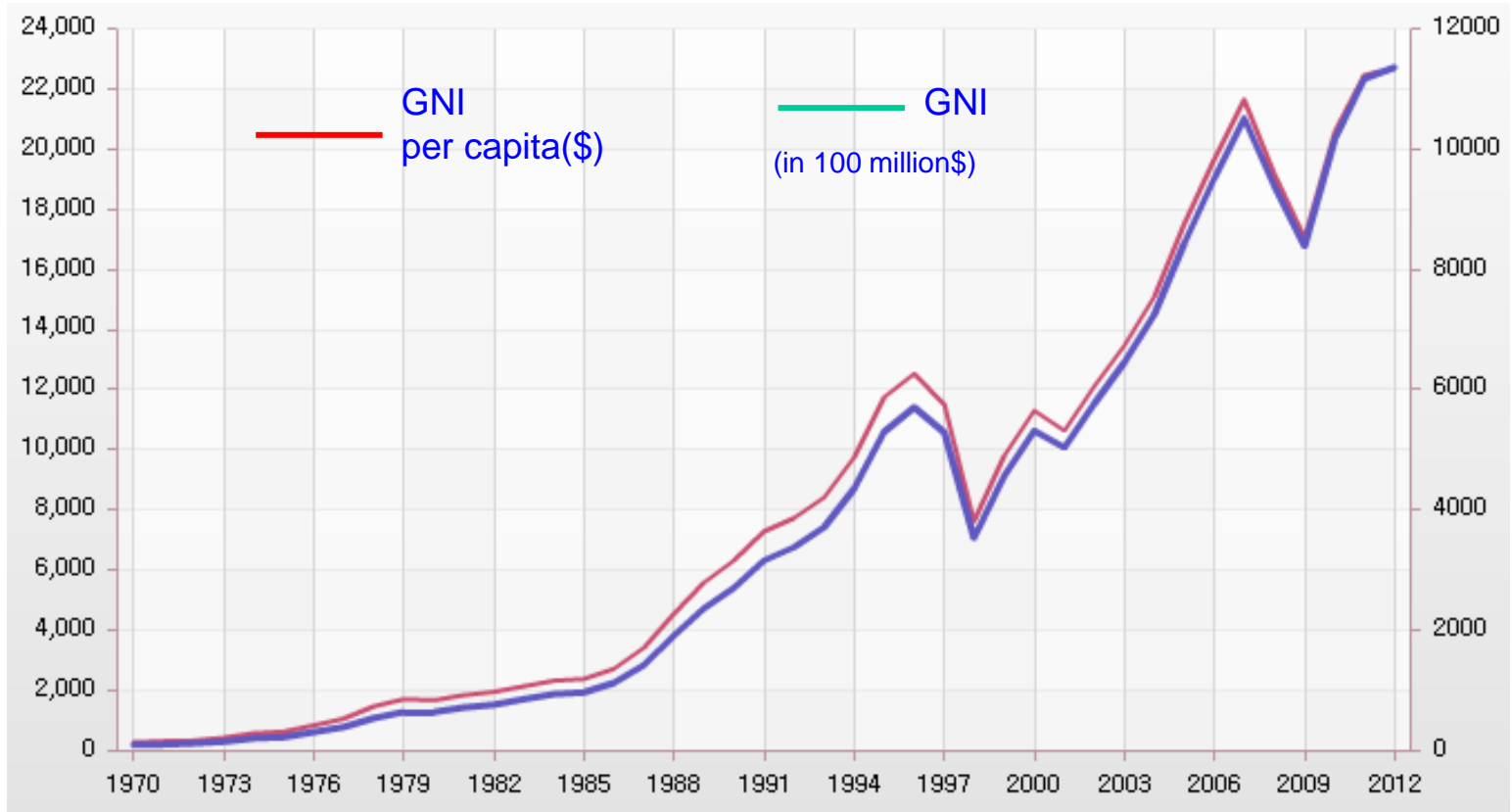
- Political System:
    - Republic (5 year single term presidential system)
  - Life Expectancy:
    - Male 77.7 years, Female 84.5 years(2011)
  - Religion: Among 51 million population
    - 10.7 million Buddhists
    - 13.8 million Christians(8.7 mil. Protestants)
  - **Still a divided country**, which happened after **WW II**.  
North Korean population is about **25 million** and Korea had been **one country since 670~1910AD** when it **became a victim of imperialism**.
-

# South Korea Overview : Educational System



As of 2010,  
411 institutions  
of higher  
learning,  
with a total of  
3.64 million  
students and  
77,697 faculty  
members

# Economic History of South Korea



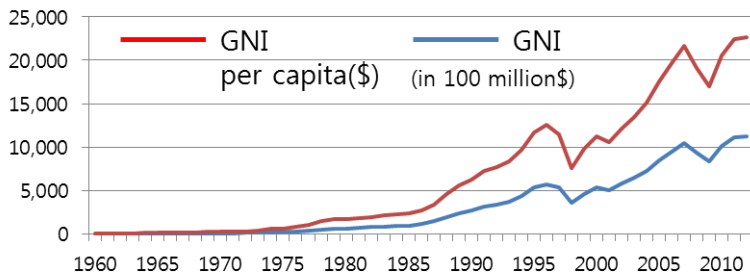
GNI per capita: 255(1970) to 22,708 US\$

GNI: 8.1(1970) to 1129.2(2012) billion US\$

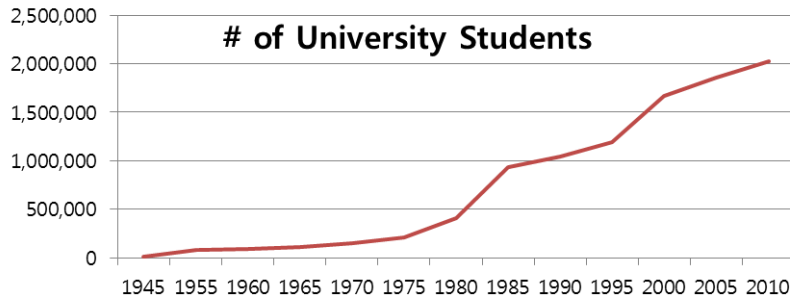


# Historical Overview of Korean Education System and Economic Growth

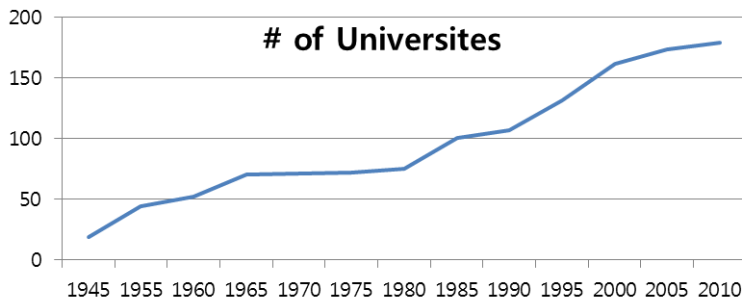
**National Income**



**# of University Students**



**# of Universities**



Year	# of universities	# of university students
1940	1	1,000*)
1955	44	78,649
1960	52	92,930
1965	70	105,643
1970	71	146,414
1975	72	208,986
1980	75	403,989
1985	100	931,884
1990	107	1,040,166
1995	131	1,187,735
2000	161	1,665,398
2005	173	1,859,639
2010	179	2,028,841

## Growth in Higher Education after Independence

\*)During the colonial period there was only one 4 year university. No science and technology graduate before the break out of WW2. Even among this number, 70% of students were Japanese. Very limited opportunity in higher education for 25 million Korean people at that time.

# Prof. JW Park's Experience

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- Elementary School(1958~64 : 60+ pupils /class, 3 classes/day\*) <9am~12pm, 12pm~3pm,3pm~6pm> , total 5,500 pupils in 'Midong' Elementary School)
- Middle and High School(1964~70 : 60 students /class)
- University(Entered as Mechanical Engr. in 1970., graduated as Industrial Engr. in 1974)–2<sup>nd</sup> Graduate Class of Dept. of Ind. Eng. (only 3 professors) .
- Graduate School
  - KAIST, Mar., 1974~Feb., 76, M.S.( 2<sup>nd</sup> Graduate Class) (Only 2 professors when began studying, 3 new professors recruited at graduation time)
  - Univ. of California, Berkeley 1980~85, D.Eng. (20 professors).
- Work Experience: Feb., 1976~Oct., 1979 Hyundai International Inc. (Now Doosan Heavy Industries, Inc. –Nuclear reactor/elec. generator manufacturer)

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\*)Since number of teachers were very small

# Presentation Agenda

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1. Korea(South Korea) Overview
2. KIIE and KORMS –role of professional organizations in enhancing the status of new discipline
3. Korean IE Education

# KIIE: Korean Institute of Industrial Engineers

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- The KIIE was established in 1974 as an academic institute to promote the practice of technology and theoretic development of industrial engineering.
- Started publishing the Journal of the KIIE in the same year.
- Home page: <http://kiie.org>
- Membership: 7199 including organizational members
  - Student members:3980
  - Regular members excluding students:3219
  - Life time members:562

# KORMS: Korea Operations Research and Management Science Society

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- The KORMS was established in 1976 as a multidisciplinary academic institute consisting of industrial engineers, mathematicians, statisticians, other engineers, social scientists, people in industry and military.
  - Started publishing the Journal of the Korean Operations Research Society in the same year.
  - Home page : <http://www.korms.or.kr>
  - Membership: 3608 including organizational members
    - Student members: 1121
    - Regular members excluding students: 2487
    - Life time members: 683
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# KIIE/KORMS- Domestic Activities

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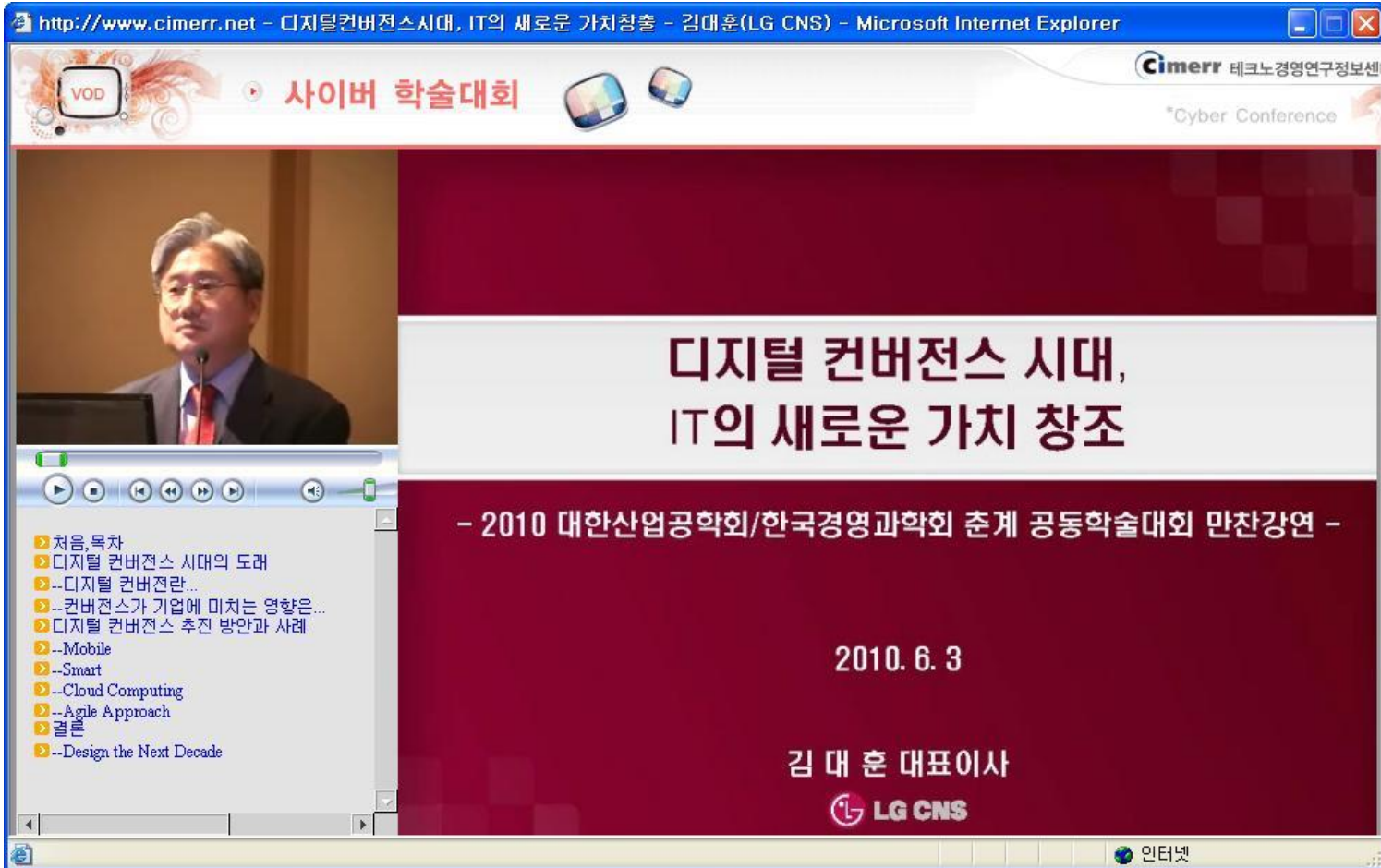
- Both institutes began publishing applications of the fields in the 1980s( KORMS in 1984, *the Applications of Operations Research*, KIIE in 1988, *IE Interfaces*) in addition to their regular theoretical academic journals.
- Since establishment, both organizations have had *two conferences every year*( spring and autumn conferences).
- Beginning from 1986, *Joint Spring Conference by two organizations have started*. KIIE or KORMS hosts the conference by taking turns each year and the tradition continues up to now

# The KIIE/KORMS Joint Conference in June, 2010



In Korea, thanks to the sponsorship of the ministry of education and science, all presentations of important academic conferences are video recorded and available for viewing on-line at later times. And above clip shows presidential speeches of our joint conference.

# The KIIE/KORMS Joint Conference in June, 2010- invited speaker, Mr. D.H. Kim, president of LG CNS



http://www.cimerr.net - 디지털컨버전스시대, IT의 새로운 가치창출 - 김대훈(LG CNS) - Microsoft Internet Explorer

VOD 사이버 학술대회 Cimerr 테크노경영연구정보센 \*Cyber Conference

디지털 컨버전스 시대,  
IT의 새로운 가치 창조

- 2010 대한산업공학회/한국경영과학회 춘계 공동학술대회 만찬강연 -

2010. 6. 3

김대훈 대표이사

LG CNS

- > 처음,목차
- > 디지털 컨버전스 시대의 도래
- > --디지털 컨버전란...
- > --컨버전스가 기업에 미치는 영향은...
- > 디지털 컨버전스 추진 방안과 사례
- > --Mobile
- > --Smart
- > --Cloud Computing
- > --Agile Approach
- > 결론
- > --Design the Next Decade

인터넷



# KORMS- Domestic Activities

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- In 1995, began publishing [the International Journal of Management Science](#), an [English Journal](#) two times a year(now 3times a year).
- Some prominent Academic Societies in Korea, that started out as a small study group of KORMS in the 80's and 90's:
  - [Korea Society of Management Information Systems](#)
  - [Korea Business Intelligence/Data Mining Society](#)
  - [Korea Intelligent Information Systems Society](#)( formally [Korea Expert System Society](#))

# KORMS- International Activities

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- In 1976, first Asian Conference related to Operations Research was held in Taiwan, the Pacific Conference of Decision Analysis.
- In 1984, APORS( Association of Asian-Pacific Operational Research Societies within IFORS) was formed.
  - China, Hong Kong, India, Japan, Korea(Chair Country elected) and Singapore from Asia
  - Australia, New Zealand from Oceania.
- Prof. Iri of Japan, then V.P. of the IFORS was one of the main contributors for the birth of the APORS.

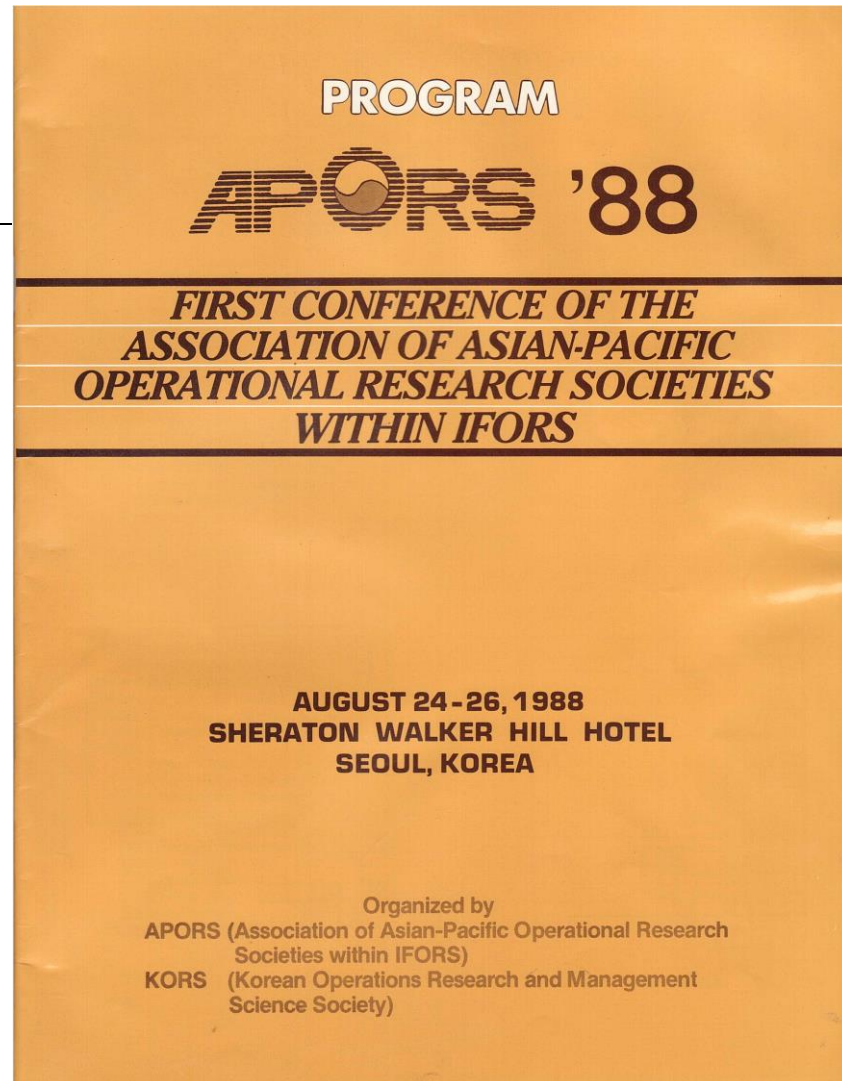
# KORMS- International Activities

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- In 1988, the 1<sup>st</sup> APORS( Association of Asian–Pacific Operational Research Societies) Conference took place in Seoul, Korea, and the hosting institute was the KORMS. And APORS conferences are being held in every three years. APORS 1991 and APORS 2012 conferences were held in China.
- In 2000, KORMS hosted the INFORMS/KORMS Joint Conference with the theme of Information and Knowledge Society of the 21<sup>st</sup> Century.
- KORMS was elected as the secretariat country of APORS in 2012 and is responsible for the maintenance of APORS home page. Next APORS Conf. will be hosted by Malaysia in 2015, which is the presidential country until 2015.

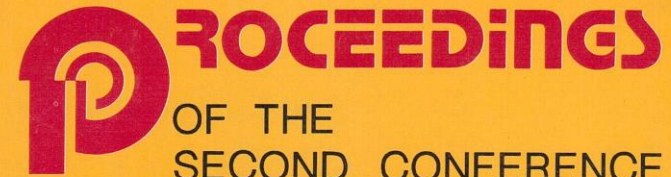
# APORS 1988

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# APORS 1991

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**PROCEEDINGS**

OF THE  
SECOND CONFERENCE OF  
THE ASSOCIATION OF  
ASIAN-PACIFIC  
OPERATIONAL RESEARCH  
SOCIETIES (APORS)  
WITHIN IFORS  
BEIJING 1991

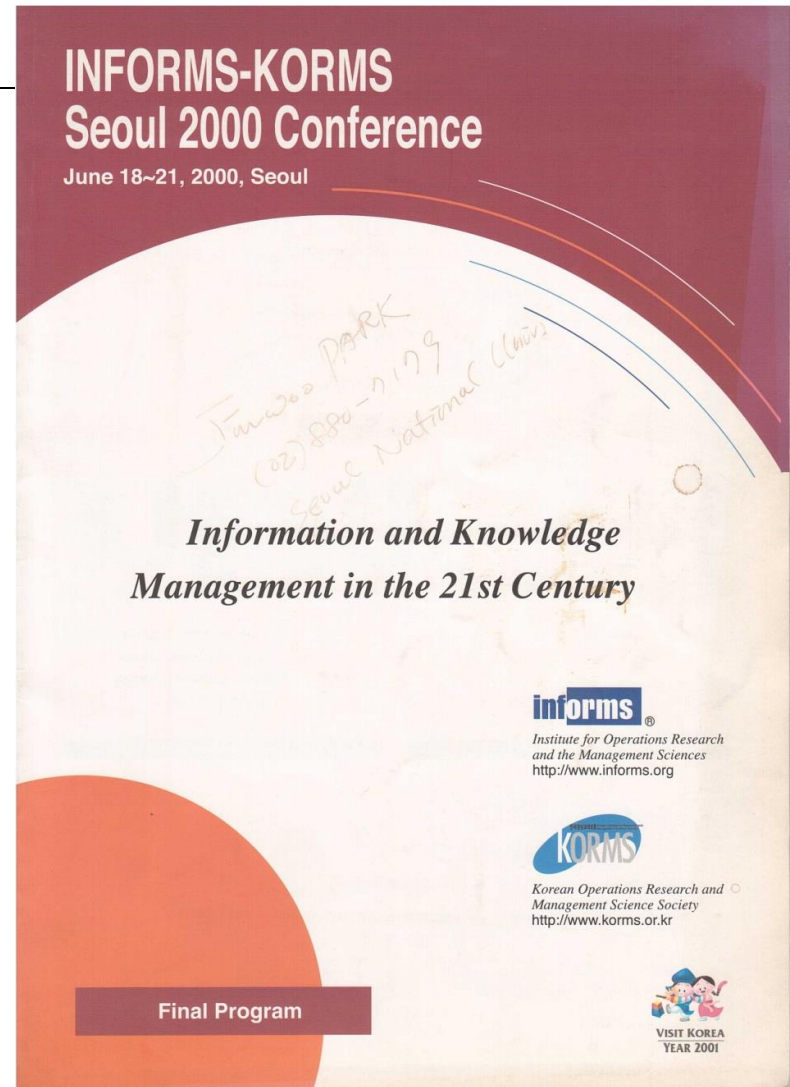
OR: Making Decisions for Winning Victory

CHIEF EDITOR Cang-pu WU

PEKING UNIVERSITY PRESS

# 2000 INFORMS/KORMS Joint Conference

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# KIIE- International Activities

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- **15<sup>th</sup> APIEMS**(Asian Pacific Industrial Engineering and Management Systems) Conference in **Oct. 12~15, 2014**  
(<http://www.apiems2014.org>)
- Ramada Plaza Jeju Hotel, **Jeju Island, Korea.**

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## Colleges & Schools

As of April 1, 2013

### 16 Colleges with 84 Departments for Undergraduates

- Humanities, Social Sciences, Natural Sciences, Agriculture and Life Sciences, Business Administration, Education, Engineering, Fine Arts, Human Ecology, Liberal Studies, Law, Medicine, Music, Nursing, Pharmacy, Veterinary Medicine

### 1 Graduate School with 99 Programs

- Master's Program: 70 Programs and 28 Interdisciplinary Programs
- Doctoral Program: 71 Programs and 28 Interdisciplinary Programs

### 9 Professional Graduate Schools

- Business, Environmental Studies, Convergence Science and Technology, Dentistry, International Studies, Law, Medicine, Public Administration, Public Health

## Faculty

As of April 1, 2013

### Number of Faculty 5,361

- Professors 1,306
- Associate Professors 412
- Assistant Professors 177
- Professors Emeriti 815
- Professors (Foundation Fund) 262
- Humanities Korea (HK) Professors 21
- Humanities Korea (HK) Research Professors 37
- Visiting Professors 122
- Full-time Research Professors 138
- Full-time Lecture Professors 63
- Adjunct Professors 659
- Part-time Lecturers 1,349

## Students

As of April 1, 2013

### Number of Enrolled Students 28,011

- Undergraduate Students 16,712
- Graduate Students in Master's Program 8,002
- Graduate Students in Doctoral Program 3,297

### Number of International Students

- International Students in Degree Programs 2,881
  - Undergraduate Students 1,029
  - Graduate Students in Master's Program 1,093
  - Graduate Students in Doctoral Program 759
- International Exchange Students
  - 587 as of March 2010 ~ Feb. 2011
  - 622 as of March 2011 ~ Feb. 2012
  - 683 as of March 2012 ~ Feb. 2013

### Degrees Conferred in 2012

- Bachelor's Degrees Conferred 3,466
- Master's Degrees Conferred 2,893
- Doctoral Degrees Conferred 1,138
- Honorary doctoral degrees conferred since 1947 110

# College Of Engineering



## Faculty Members

2012.09.01 Status

Department	Professors	Associate professors	Assistant professors	Total
Department of Mechanical and Aerospace Engineering	33	9	5	47
Department of Chemical and Biological Engineering	25	2	4	31
Department of Materials Science and Engineering	35	5	4	43
Department of Electrical and Computer Engineering	54	5	7	66
Department of Computer Science and Engineering	24	5	2	31
Department of Energy Systems Engineering	15	5	3	23
Department of Architecture and Architectural Engineering	12	2	3	17
Department of Industrial Engineering and Naval Architecture	23	9	3	35
Department of Civil and Environmental Engineering	20	2	2	24
<b>Total</b>	<b>241</b>	<b>44</b>	<b>33</b>	<b>318</b>

# Dept. of Industrial Eng.



서울대학교

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1968	Created as Department of Production and Mechanical Engineering
1971	Changed to Department of Industrial Engineering
1973	First Bachelor's Degree Awarded
1974	First Master's Degree Awarded
1980	Moved to Building 35, Gwanak Campus
1982	First Ph.D. Degree Awarded
2006	Moved to Building 39 (Current Location)
2007	Created Technology Management & Policy Program
2008	In the Process of Becoming Independent Admission Entity
2012	Enrolled Student- Bachelor(146), Master(68), Doctorate(55)

# Curriculum of IE Department of SNU

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Course Title(Mandatory)	Course Title(Formally Mandatory)	Course Title(Elective)
Work System Design	Computer Integrated Manufacturing	Service Engineering
Intro to Computing	Cost Accounting	Simulation
Production Control	Management Information Systems	Management of Technology
Engineering Economy	Linear Programming	Data Mining
Human Engineering	Production Systems Design	Product Development Process
Operations Res. I	Operations Res. II	Human Interface Design
Database Systems	Manufacturing Process Design	Internet Applications
Quality Management	Advanced Statistics	Optimization Models

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# Curriculum of IE Department of SNU

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- Graduate Courses—37 courses including

Course Title	Course Title	Course Title
Theory of Scheduling	Dynamic Systems	Reliability
Vehicle Ergonomics	Quality Assurance	Combinatorial Opt.
Stochastic Process	Decision Analysis	Internet Svc Eng.
Engineering Economy	Theory of Forecasting	Investment Risk Mgt.
Integer Optimization	Product/Svc Mgt.	Data Mining Tech.
Network Optimization	Human Performance	Convex Optimization
Advanced Topics in Statistical Learning	Enterprise Information Systems Engineering	User-centered Product Design & Development
Integrated Supply Chain Management	Theory and Res in Technology Innovation	Strategic Planning & Control

# Engineering:

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The profession in which a knowledge of the **mathematical and natural science** gained by study, experience and practice is applied with judgment to develop ways to utilize, **economically**, the materials and forces of nature for the benefit of mankind.

- ME(Mechanical Eng.), EE(Electrical Eng.), Civil Eng., Ch.E(Chemical Eng.), CE/CS(Computer Eng./Science), IE(Industrial Eng.)

# Industrial Engineering(Def. by IIE\*) :

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Industrial Engineering is concerned with the **DESIGN, IMPROVEMENT and INSTALLATION** of **INTEGRATED SYSTEMS** of **PEOPLE, MATERIAL, EQUIPMENT, INFORMATION and ENERGY**.

It draws upon specialized knowledge and skills in the **MATHEMATICAL, PHYSICAL** and **SOCIAL SCIENCES** together with the principles and methods of engineering analysis and design to **SPECIFY, PREDICT and EVALUATE** the results to be obtained from such systems.



**IE Symbol suggested by SNU students:  
Conductor of Engineering Orchestration**

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\*)The Institute of Industrial Engineers(<http://www.iienet2.org/>)



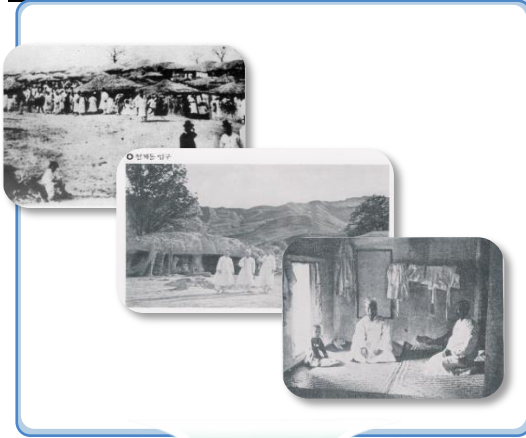
# IE Education for the Future

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- Current key themes in Korean Academia
  - Fusion
  - Convergence
  - Sustainability
  - ...

# Where we are going?

110 years ago



60 years ago



Present



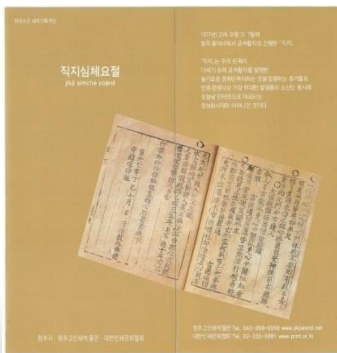
50 years  
Later?

100 years  
Later?

# Creativity enhancing education

## Characteristics of Korean People

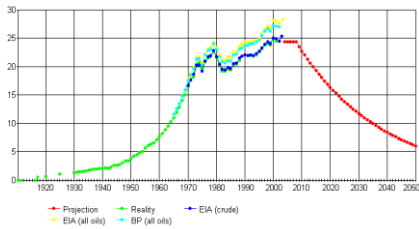
- Fast, fast – 빨리빨리
- Scholar revering culture
- Be winner – very competitive society



**“KOREA PRODUCTION SYSTEM”**

## Resource

World Oil Production (GB/yr) 1859-2003



## Productivity

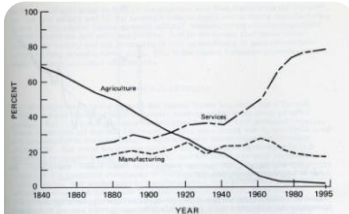


FIGURE 1 Employment as a percentage of total labor force, 1830-1995. Prepared by M. Dingman from Historical Statistics of the U.S., Colonial Times to 1962 and Predicted, 1962.

## Pollution

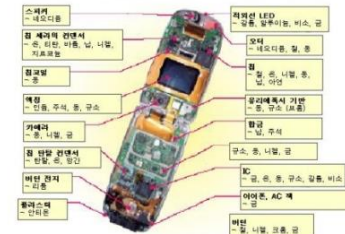


## Employment



## Recycle, Reuse

< 휴대폰에 함유된 금속 사례 >



## Imbalance of Wealth

▶ 지니계수 및 소득 5분위 배율 추이 (단위: %)

\*자료: 통계청



\*지니계수는 1에 가까울수록, 소득 5분위 배율은 높을수록 빈부격차가 크다는 뜻. 소득 5분위 배율은 소득 상위 20% 가계의 평균소득을 하위 20% 가계의 평균 소득으로 나눈 것.

# Ubiquitous Computer Society

Multi-tap



₩ 5,000

Grounded Multi-tap



₩ 8,000

Individually grounded M-t



₩ 15,000

EMI protected M-t



₩ 660,000

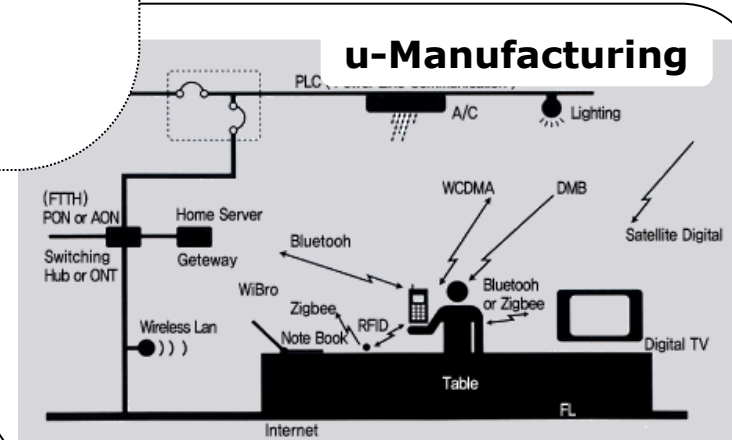
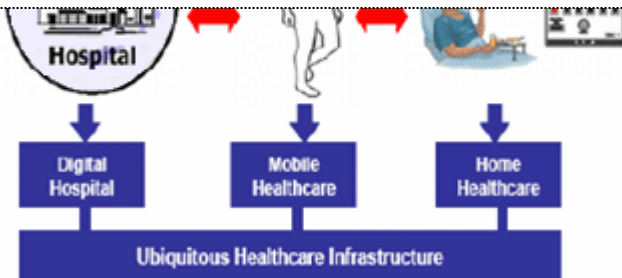
Home Network  
/Remote Control  
/Arti. Intelligence



?

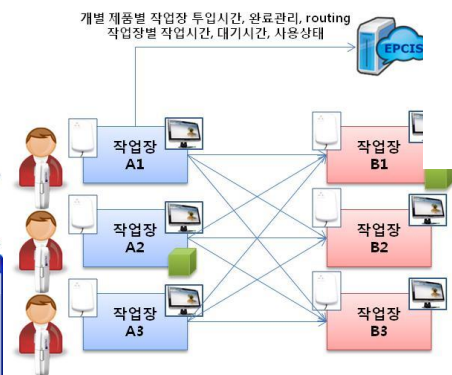
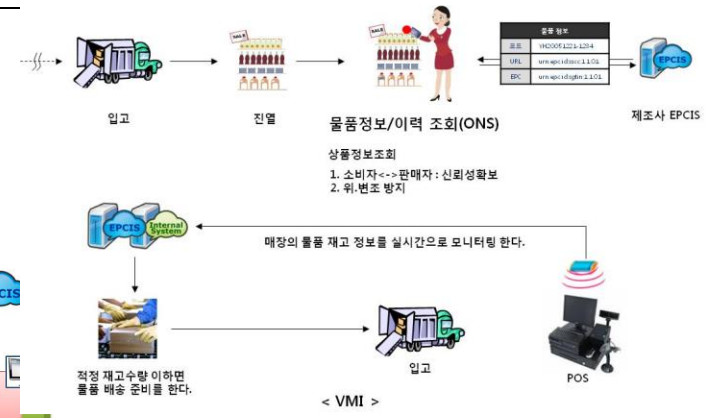
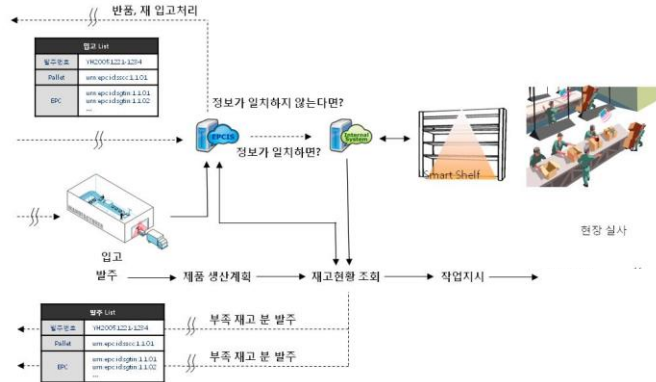


Smart ware





# u-Laboratory in SNU



G-IS Simulator - Manufacture

Process Menu

- Manufacture
  - Manufacturing
  - Palletizing
  - Shipping
- Retail
  - Receiving
  - Disaggregation
  - Sale
- Collector
  - Receiving
  - Palletizing
  - Shipping
- EPC
  - Receiving
  - Disaggregation
  - Storage
  - Disposition

Manufacturing Palletizing Shipping

EPCIS Event Settings

Event Type: ObjectEvent Action: ADD

BusStep ID: urn:globepcpcis:ce:bi:step:commissio Disposition ID: urn:globepcpcis:ce:dis:prod\_sellable

ReadPoint ID: urn:globepc:loc:0000001.00001.RP011 BidLocation ID: urn:globepc:loc:000000100001.1

TBD TBD

EPC 대기중

EPC Parents

EPC 코드

EPC List

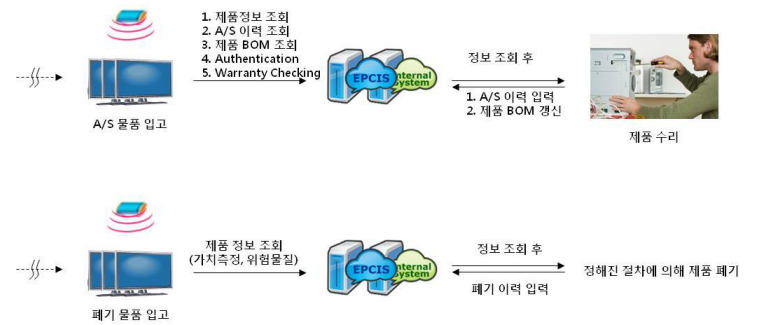
EPC 코드

코드형성

코드형성

코드형성

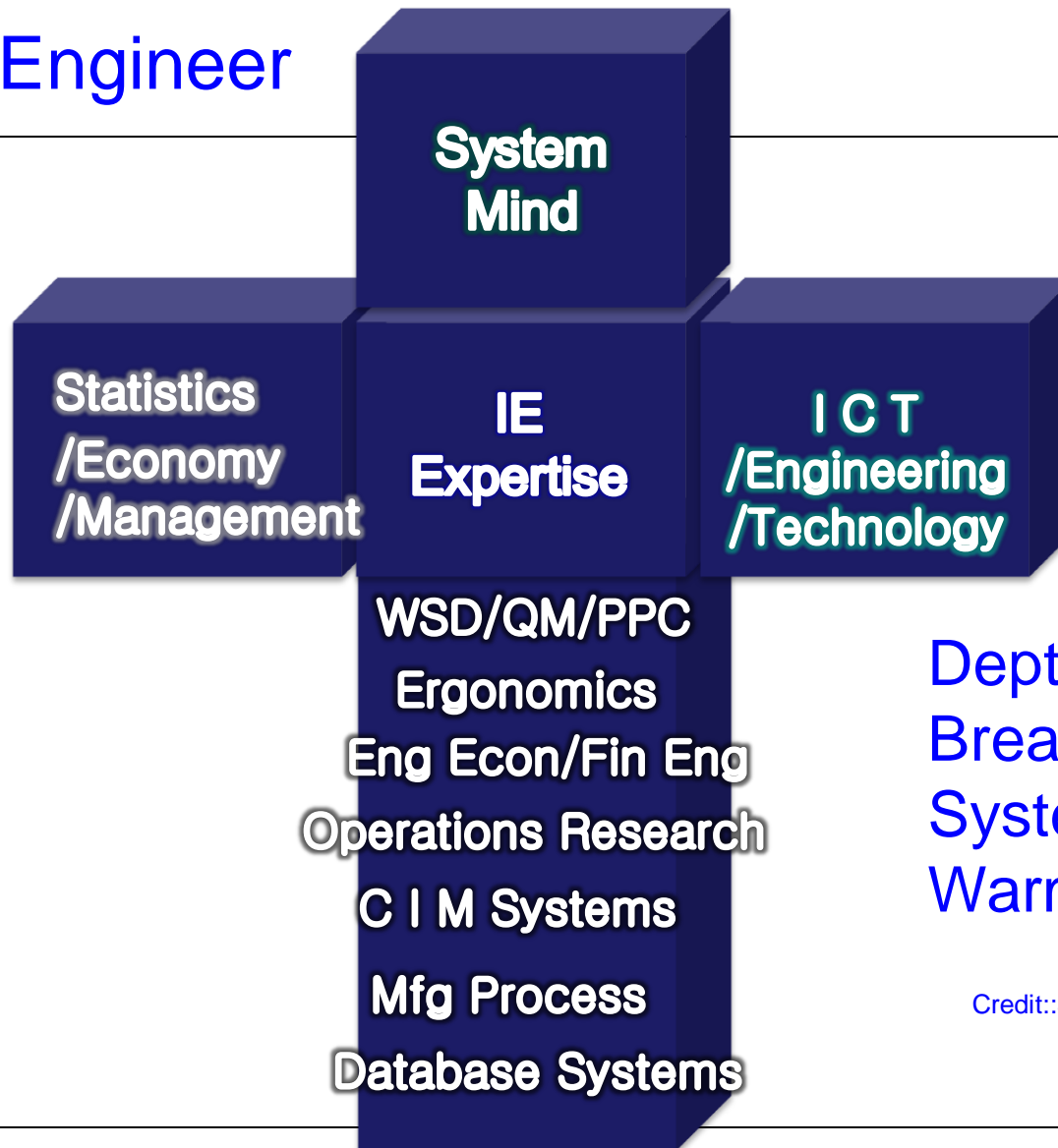
대행트 발행



# u-Laboratory in SNU



# Preferred Industrial Engineer

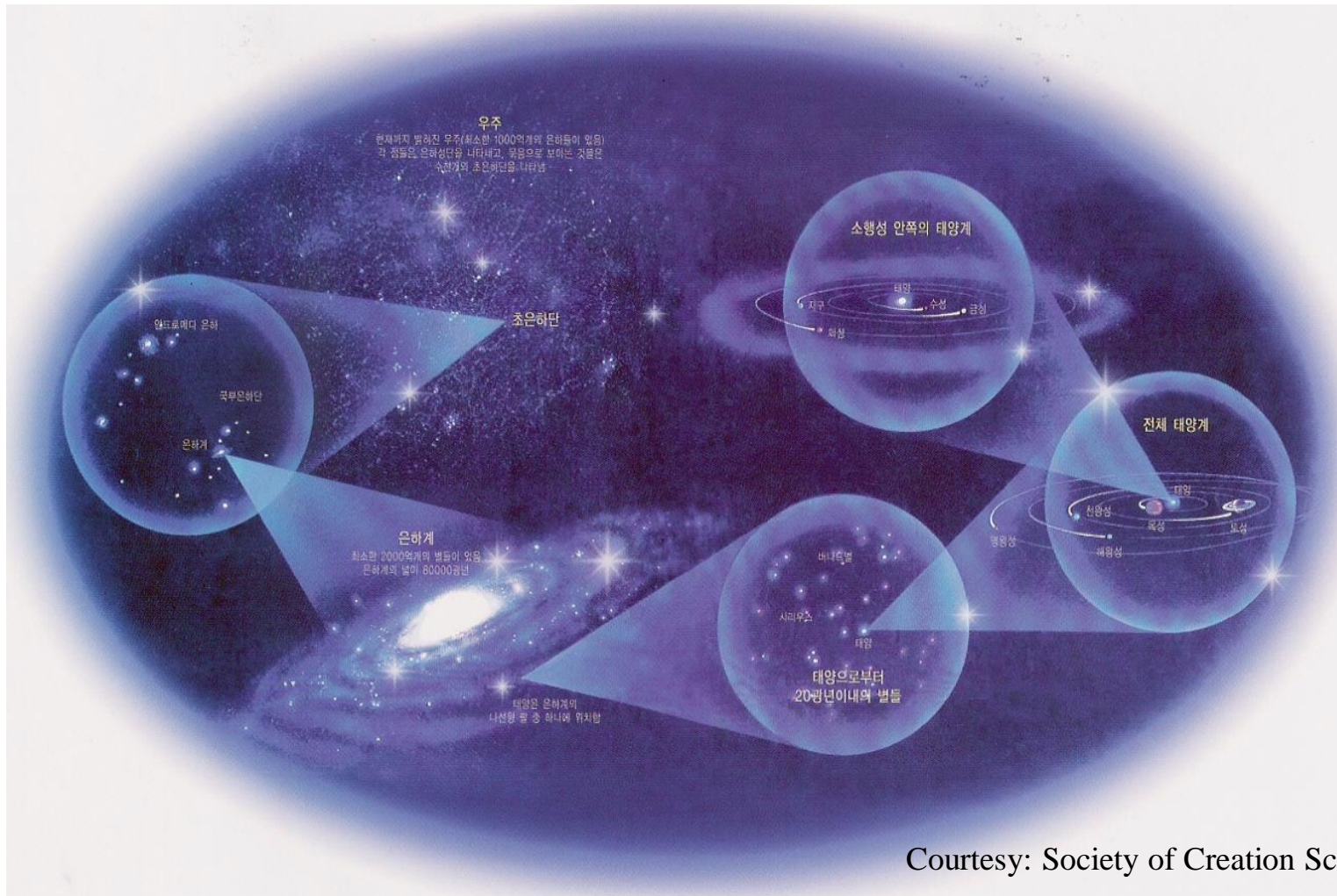


Depth+  
Breadth+  
System Mind+  
Warm Heart

Credit::JWPark/HJKim/DMLee



# Some people see the present and say why?\*)



## We dream of IE dreams and say why not?

\*)modified from George Bernard Shaw's famous poem, 'Back to Methuselah.'

# Web sites

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- Official government site : [www.korea.net](http://www.korea.net)
- Seoul National Univ. : [www.snu.ac.kr](http://www.snu.ac.kr)
- SNU College of Engineering: [eng.snu.ac.kr](http://eng.snu.ac.kr)
- Dept. of Industrial Eng. : [ie.snu.ac.kr](http://ie.snu.ac.kr)

**Thank you!**

**Any comments or questions?**