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# Sustainable Approaches to Higher Education Innovation: Issues and Considerations

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#### We're Then



Korea has always placed high values on education. The first form of modern schools appeared around 1880s. After the founding of the Republic of Korea in 1948 the government established a modern educational system that is composed of six years in elementary school, three years in middle school and another three years in high school.

Pre-schools and colleges are options. Nonetheless, most people wish to complete till college and competitions for their getting in good universities are tough. There are about 350 colleges and universities in Korea, divided into two-year and four-year course in general. Medical and dental colleges provide six years' courses. The figure also includes traditional offline universities, open university, cyber universities, and special types of higher education institutions: KAIST, GIST, DGIST, Korean Military Academies.

The Korean academic year begins with a spring semester in March. There is a summer break from July to August, and fall semester begin in September and followed by a winter vacation from December to February.

#### We're Now





We have 7.8 million students studying in primary and secondary education institutions and 3.6 millions in higher education institutions. Each higher education institution has set up its own process of recognition on foreign accreditations on the basis of Higher Education Law of state. As of the end of 2011 the number of inbound students is about 90,000 and outbound students of 290,000. Almost 80% of higher school graduates go to higher education institutions. And e-learning has been adopted as a major supplementary tools for delivery of education service in primary and secondary education institutions (85%) and in higher education (76%) as well.





#### **Growth of Korean Economy**



\*Source II Whan Ahn, WBI K4D, 2005, Korea reformulated by Dae Joon Hwang in 2011

#### I from an Enabler to a Platform of Education

National plans	MP 1: ICT literacy	MP 2: Promotion of ICT use in Education: e-Learning	PM 3: Advances ICT use in education: u-Learning	MP 4: Creative education by Leveraging Digital Learning Technology: m-Learning
Goals	Establish ICT infrastructure	Promotion of use of ICT in education	Advances in Education and Research Information service	Mobile technology for Smart education/Learning
Government initiatives	<ul> <li>1996-2000</li> <li>Establish ICT infrastructure : Internet connection among schools (100%)</li> <li>ICT literacy education and training: Students, teachers, and parents</li> <li>Open Internet Education</li> <li>Portal Service: EDUNET</li> <li>Feasibility study on establishing high-tech schools through adoption of e-Learning</li> </ul>	2001-2005 • Development and distribution of content • National system for sharing educational contents • Digital Library System • Improving teaching methods • EDUNET Teaching/ Learning center • Cyber Home Learning System • EBS lectures for college academic ability test • Establish Cyber University • Regional e-Learning Support Center	2006-2010 • Customized learning • Develop digital textbooks • u-Learning pilot projects • National Teacher Training Information Service • Restructuring EDUNET based on Web 2.0 • Develop Edu-fine • Establish KOCW • Education Cyber Security Center for safe use of education information • Global consulting on e-Learning • Promote to create foreign Knowledge business market	2011-2015 • Outcomes and evidence based policy making • Emphasis on creativity and critical thinking in education • Create digital ecosystem for learning and research • Social inclusion • Establish m-Learning Infrastructure • Leverage ICT for education innovation • Pay attentions to side effects of ICT • Nurture competency of teachers • Encourage stake holder's participation and networking
Teacher training policies	ICT training for over 25% of all teachers annually	ICT training for over 33% of all teachers annually	e-Teacher training for ICT optional) for even	use in education:30 h (15 h, ry 3 years
ICT use in education	Infrastructure, literacy training for teachers, students, parents	Enabler, Use of ICT: Cyber university	Platform, Smart innovation in education for creativity, quality, global competence	





- I. Background
- **II.** Issues of Higher Education
- **III.** Implication of Higher Education Issues to Asian Countries
- **IV. How to Make Higher Education Innovation Sustainable**
- V. Conclusion



# I. Background

#### **Major Issues facing Higher Education**

- Sustainability: roles, global recognition, social responsibility, community service
- Student education and learning
  - ✓ Awareness to changing characteristics of students
  - ✓ Collaborative and personalized learning
  - ✓ Leveraging technological for quality education
  - ✓ Content of education
  - ✓ Pedagogies
- Technologies: education delivery (OER, MOOCs), scalability, sustainable education infrastructure
- Resource creation: decreasing public funding
- Internationalization: mobility, global ranking
- Transformation of scholarship
  - ✓ Increasing incompatibility between research and teaching
  - Reward system putts more weight on research than teaching in the process of faculty evaluation, recruitment, and promotion
  - Future scholarship: research-teaching-student learning from research focuses
- Management and administrative (efficiency, outcomes, and sustainability)



### Life Style Switching to Mobile

- Mobile technologies change way of living, thinking, collaboration, and learning
- Different characteristics of students: digital native vs. digital immigrant
- Use of ICT in education innovation becomes important: leveraging vs. technologizing
- Practicing open paradigms allows more opportunities: content access, IPR, delivery of education service
- Life became deeply connected: SNS
- Big Data analysis becomes important
- Media literacy training gains more attention
- Increasing awareness to multiculturalism
- Allow disabilities for more social participation using Assistive Technologies



\*Number of mobile phone users: Korea (62%, 36,98million, 70% smartphone users), Sweden (51%), USA (49%), France(40%), Germany (38%), Japan (36%), Flurry Analytics in USA, 2014.

### More Open for Communication and Collaboration



\*Source : Partially adopted from Brian Solism and reformulated by Dae Joon Hwang

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#### **Education Becoming Connected**







#### What Do You Think?



\*Source: McCafferty, Dennis, How CIOs Really Feel about Technology, CIO Insight, 15350096, 2/20/2014



#### The Era of Big Data



\*Source: Jeong Ji-Sun, New Possibilities of Big Data and Counter Strategies, Mar. 2012, NIA, Korea

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#### Is Big Data a Strategic Investment?



\*Source: www.dqindia.com, Nov. 2013



#### What a Sustainable Approach!

# Positive proof of global warming. 18th 1900 1950 1970 1980 1990 2006 Century

\*Source: http://gaggiftsrus.com/Smiles/LOL.html



# **II. Issues of Higher Education**



- Increasing accessibility expands to grow the number of tertiary enrollments (97 million ('00), 263 million ('25)): elite education -> mass education -> universal (or post-massification) education
- Student demographic changes: enrollments of non traditional students in higher education are increasing
- Growing complexity of university functions: from unary function to multifunctional (teaching, research, service, administration and management) -> pursing conflicting goals (valuing education, valuing pure research, valuing applied and development research)
- Internationalization brings more competition in global rankings and opportunities for collaboration
- Mobility of students and faculties is increasing: numbers of international students become an important indicator of international institutional competitiveness
- Unsecure job market situation (unemployment of youth, lost generation) due to global economic recession provides motivation for improving skills: 4.7% (tertiary education), 7.6% (upper secondary education), 12.5% (below upper secondary), by OECD average unemployment rates of 25-64 year olds in 2012

### **Evolving Stages of Higher Education**





### **Evolution of Higher Education**

S

Stages of evolution	Main actors	Core value	Key issue	Major roles and priority	Research focus
Elite higher education	Professors	Excellence	Academic freedom-> high-quality knowledge	Research productivity, Research > teaching > administration	Pure/basic > applied
Massification higher education	Academic managers	Quality, and Efficiency of education	Management reform	Teaching-research nexus, Equal priority: research, teaching, administration	Development > applied > pure/basic
Post- massification higher education	Students	Student satisfaction	College experience	Learning from teaching, Administration > teaching > research	Development > applied > pure/basic

\*Source: J.C. Shin, Te Scholarship of Teaching, Research, and Service, pp.75-83, The Future of the Post-Massified University at the Crossroads, Knowledge Series in Higher Education vol. 1, 2014, Springer.



#### **Tertiary Enrollment Rate**



\*Source: World Bank Data 2010

Note: Tertiary enrollment is defined as: (Total tertiary enrollment)/ (total tertiary age population)

#### Overall Public Tertiary Expenditure as a Share of GDP



\*Source: WDI database, 2011.

# Expected Growth of Budget and Tertiary Enrollment : 2005 -2025

(2005 = 100)



\*Source: United Nations, median projections (2006 revision).

#### Increasing Non-traditional Students in Tertiary Education

Country	Total enrollment	Female enrollment		Part-time enro	Part-time enrollment		Adult (age 40 and over)	
		Enrollment	%	Enrollment	%		Enrollment	%
Australia	1,040,153	570,726	54.87	375,089	36.06		132,252	12.71
Czech	337,405	181,649	53.84	13,918	4.13		11,717	3.47
France	2,201,201	1,217,193	55.30	-	0.00		-	_
Germany	2,289,465	1,137,777	49.70	130,787	5.71		61,479	2.69
Japan	4,084,861	1,865,180	45.66	384,526	9.41		-	_
Korea	3,204,036	1,201,303	37.49	-	0.00		104,986	3.28
Mexico	2,446,726	1,229,522	50.25	-	0.00		42,106	1.72
Poland	2,145,687	1,231,628	57.40	944,793	44.03		-	_
UK	2,336,111	1,339,174	57.32	903,072	38.66		392,439	16.80
USA	17,487,475	10,031,550	57.36	6,690,464	38.26		1,876,796	10.73
						1000	×7	

\*Source:(a) Source: OECD Stat Extracts: http://stats.oecd.org/wbos/Index.aspx?DatasetCode=RENRLAGE, 2006

(b) Enrollment is total tertiary enrollment (full-time ? part-time)

(c) Female and part-time enrollment are the "female enrollment" and "part-time enrollment" of the OECD data



- Privatization is accelerating due to growing perception of policymakers on higher education as private goods -> market principles adopted
- Growing demands for access to higher education and limited capacity has led to increased tuition and other costs for students-> drive publicly funded institutions to seek expanded revenue flow by entrepreneurial activities (e-university, establishment of host country campus)-> emerging new education providers
- Exponential growth of knowledge draws more attentions to learning than education: widening gab between knowledge production and academic preparation
- What to teach: procedural knowledge and competency than discipline-based knowledge, industry-specific or job-specific knowledge -> redesign of college education
- Unbundling professorial roles in research-led teaching of current universities in the post-massification stage: quality teaching is not much related to how much a professor knows knowledge -> adoption of the division of labor between teaching and research
- Selecting and reorganizing contents in classroom context becomes important: lead to development of new curriculum and instructional methods -> fundamental and structural reform of universities
- Community service became a core function of modern universities, but less attention paid in the reward system -> service activities of university bring more benefits to the public and HEIs, but they are much related to resource generation for universities -> questioning as to why community pay taxes for semi- or for-profit universities

#### Private Higher Education Enrollment Share by Region or Country



\*Source: PROPHE (Program for Research on Private Higher Education) International Databases, latest available year (2001–09).

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#### Private Enrollment and Institutional Share in Higher Education

	Public						
Country	Degree	Nondegree	Subtotal	Degree	Nondegree	Subtotal	Total
PRC (2009)	-	-	1,983	—	_	334	2,317
India (2006)	245	4,097	4,493	80	13,400	13,480	17,973
Indonesia	-	-	81	—	_	2,431	2,512
Malaysia	18	40	58	22	519	541	599
Philippines	424	1,352	1,776	1,363	2,045	3,408	5,184
Thailand	66	_	66	54	401	455	521
Viet Nam	305	_	305	64	_	64	369



\*Source: Sources: ADB 2008:45, Agarwal 2009: 91, ICHEFAP 2010, MOE 2010 (PRC)

### Explosion of Knowledge and Data

- The growth of academic knowledge production in academic journals from 1940 and 2010 in the Web of Science database:
  - ✓ Between 1960 and 1980: academic knowledge production increased 4 times (800,000 from 200,000 publications)
  - ✓ Between 1960 and 2010: academic knowledge production increased 8.5 times (1,700,000 from 200,000 publications)
- The volume, variety and velocity of data are growing at an unprecedented rate
  - ✓ 2 billion internet users
  - ✓ 250 billion emails / day
  - ✓ 200 million tweets / day
  - ✓ 100 billion google searches / month
  - ✓ 20 billion RFID tags
  - ✓ I hour of video uploaded at YouTube / second
  - ✓ More data in past 2 years than all other years combined
  - ✓ Volume of data doubles every 18 months

#### **Emerging New Higher Education Providers**

- 1974: Institute for Professional Development (IPD) founded for working learners, teachers and police officers
- 1976: University of Phoenix (UOPX): Apollo group's flagship school
- 1995: Western International University (West)
- 1997: College for Financial Planning (CFFP) established in 1972, 120,000 graduate
- 2007: Applo Global is established and expand the company's goal reach
- 2008: Universidad de Artes, Ciencias y Communica (UNIACC), a leading arts and communication universities in Latin America
- 2009: BPP University College, the UK-based organization, a leading provider of education and training to professionals in the legal and finance industries
- 2009: Universidad Lationoamericana (ULA) is fully acquired. The accredited, private university offers secondary and higher education in medical, dental and communication fields
- 2010: Cyber Universities are established on Lifelong Education Law
- 2011: Carnegie Learning is acquired. A publisher of research-based math curriculum including SW and technology from Carnegie Mellon University

\*Source: Deane Neubauer, The University in the Context of Coming Globalization, PP 29-43, The future of the Post-Massificated University at the Crossroads, Springer, 2014

#### **Online For-profit Higher Education Institutions**

- For-profit universities are also a growing part of the online college market:
  - ✓ The University of Phoenix (UP)
    - More than **380,000 students** in degree programs in 2011
    - More than 100 degree programs at the associate's through the doctoral level
    - Students can attend class online, in a traditional classroom, or hybrid
  - ✓ Kaplan University
    - Ninety-six academic programs, including fifty-nine degree programs (associate's, bachelor's, and graduate), two diploma programs, thirty-two certificate programs, and three law-related degrees through distance, blended online, and on campus learning
    - More than 68,000 students enrolled during 2009–10
    - 75 percent were women and 55 percent were over the age of thirty
  - Laureate International Universities: enrolls students from more than 120 countries in bachelor's, master's, and doctoral programs
  - Strayer University offers associate's, bachelor's, and master's degrees in a variety of areas, including business administration, accounting, and IT

\*Source: Dennis J. Gale, Bhoendradatt Tewarie, and A. Quinton White, Jr., Governance in the Twenty-First-Century University, ASHE-ERIC Higher Education Report: Vol 30, No. 1, Adrianna J. Kezar, Series Editor



- Global e-learning market: \$107 billion in 2015: Europe (41.6%), Asia (28.4%), North America (22.4%), South America (3.3%), Middle East and Africa (2.1%), Oceania (1.9%) (by Global Industry Analysts in 2010)
- More than 1,000 U.S. colleges and universities offer online courses (by Pew Research Center survey in 2011)
  - ✓ Community colleges (82%)
  - ✓ Research universities (79%)
  - ✓ Liberal arts colleges (61%)
  - ✓ Two-year colleges (91%)
  - ✓ Four-year public colleges and universities (89%)
  - ✓ Private colleges and universities (60%)
  - ✓ Female online students (62%) vs male students (37%)
- Four-year public universities: Pennsylvania State University, the University of Massachusetts (UMassOnLine), University of Maryland University College (UMUC, online courses enrollment: more than 230,000 (more than 70,000 worldwide in 2011)

\*Source: Dennis J. Gale, Bhoendradatt Tewarie, and A. Quinton White, Jr., Governance in the Twenty-First-Century University, ASHE-ERIC Higher Education Report: Vol 30, No. 1, Adrianna J. Kezar, Series Editor

#### **Disruptive Education Delivery: MOOCs**

- Disruptive HE delivery for expanding access to HE and provide a space for experimentation with online teaching and learning: fun and enjoyment are important reason for enrolling (95%)
- Growing attentions from governments, institutions and commercial organizations
  Value propositions of MOOCs: education access, experimentation and brand extension (Li Yuan) and Stephen Powell, MOOC White Paper, JISC, 2013)

	сМООС	xMOOC
Learning model	Connectivinism learning theory Peer learning model,	Behaviorist approach, Traditional model, Professor- centric
Developer	George Siemens, Athabasca university, Canada, like-minded individuals	Sebastian Thurn and Peter Novig at Stanford university in 2011
Key providers	Manitoba university and Athabasca university, Canada	Udacity founded in 2011 by Sebastian Thurn and Peter Novig at Stanford university Coursera founded in 2012 by Daphne Koller and Andrew NG at Stanford University EdX founded in 2012 by partnership between MIT and Harvard
Main focus	Collaborative learning, connected learning	Content-based approach, Scalability
Learning platform	Availability of service: Internet Open source platforms	Hosting and delivery services through cloud Open source platform, propriety platform
Operational model	Content and technology management: Abathasca and Manitoba universities	Content: partner universities Technology management: platform owners
Business model	Non-profit	<ul> <li>For-profit: Coursera (7mil+ students/600+, certification courses/100+institutions), companies pay, human tutoring and assessment marking, applicant screening (https://www.coursera.org/)</li> <li>Non-profit: EdX (2mil+/175+/45+), certification (https://www.edX.org/)</li> <li>Udacity (1.5 mil+/35+/10+), certification, employers pay for recruit, job match service, (https://www.udacity.com/)</li> </ul>



- Fundamental and structural reform in different perspectives:
  - ✓ Administration: more emphasis on teaching from on research
  - Professorial roles: the division of labor between teaching and research from research-led teaching
  - Student development: changes to learning from education and to procedural knowledge, and competency with emphasis of liberal arts from disciplined knowledge and job-specific knowledge
- Academia has been compelled to change from "knowledge community" to "knowledge enterprise," (by Arimoto) -> growing perception of policymakers on higher education as private goods -> market principles adopted
- Effective governance of higher education: from a top-down to a bottom-up approaches, and from regulation to evaluation due to emphasizing accountability and the quality of education -> decentralized centralization from top-down
- Changing governmental roles: from strong supervisory role to strategic steering with reduced process control, and from regulation to evaluation due to emphasizing accountability and the quality of education
- Technology-enhanced education environment is an important factor to challenge changing education environment and innovation: collaborative, personalized education
- Cross-border educational service from advanced industrial to developing countries becomes a threat to national education identity and quality assuranceherE\_26Jun2014\_DJHwang (5)

#### **Research Orientation is Predominant**

- Shifted to research orientation in the models (German, Anglo Saxon, Latin): 3:5:2 (1992) -> 6:1:3 (2007)
- Research hours in advanced and the emerging countries: (16.8h, 11.9h) in 1992 -> (14.6h, 10.6h) in 2007
- Teaching hours in advanced and the emerging countries: (18.6h, 18.8h) in 2007

Model	Countries		Teaching		Research: Hours (HEIs)		
		1992	2007	Total	1992	2007	Total (Increase)
Anglo Saxon	USA	18.7	21.1	2.5	16.5(5)	12.4 (4)	-4.1 (-7)
model (balanced	UK	21.3	18.3	-3.0	13.0(5)	12.1 (6)	-3.6 (+11)
between	Korea	23.1	21.1	-2.0	17.1(5)	18.1 (6)	1.0 (+12)
research and teaching)	Hong Kong	19.0	19.8	0.8	13.6 (5)	12.1 (6)	-1.5 (+9)
German	Germany	16.4	15.6	-0.8	19.2 (6)	15.6 (6)	-3.6 (-3)
Model (research oriented)	Japan	19.7	20.3	0.6	21.3 (7)	16.7 (7)	-4.6 (-2)
Latin American Model (teaching oriented)	Brazil	29.1	20.1	-9.0	12.6 (3)	9.0 (4)	-3.6 (+10)
	Mexico	16.9	21.3	4.4	11.2 (3)	9.1 (4)	-2.1 (+8)
Increase of research orientation (%) 55.6 59.2 +3							+3

\*Source: The Changing Academic Profession (CAP), reformulated by Dae Joon Hwang \*\* Akira Arimoto, Balancing the Scholarship of Teaching and Research, and Faculty Evaluation Systems, pp174-175, The Future of the Post-Massified University at the Crossroads, 2014, Springer.

#### Restructuring University Systems: Multilayer and Multiple System

- Establish different organizational units according to multilayer: undergraduate, graduate education, applied research, development research
- Multiple systems for evaluation and reward: separate track for teaching and research
- Effective coordination of multiple units and functions bring more benefits: efficiency of decision making, mutual benefits to professors and students quality of education, excellence of research etc..

			Undergraduat e education	Graduate education/pure research	Applied/development research
	Development rese	arch	Human development	Human development Production of knowledge	External resource generation
	Applied research	Governance	Shared	Shared	Top-down (business organization)
Ladoraro	Graduate education (Pure research)	Finance	Public funding	Public funding Some external resource	External resource
(Education research)		Professor's role	Teacher	Teacher and researcher	Researcher
		Quality control	Quality assurance	Excellence of research	Customer satisfaction and market value

\*Source: J.C. Shin, Restructuring University Systems: Multilayer Multiple Systems, The Future of the Post-Massified University at the Crossroads, Knowledge Studies in Higher Education Vol. 1, pp.217-229, Springer 2014. InnoHigherE\_26Jun2014\_DJHwang



## III. Challenges ahead Asian Higher Education



#### **Tertiary Growth Enrollment Ratios, 1980-2011**



Secondary and Tertiary Growth Enrollment Ratios, 2007-2008

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#### **Skill Gaps Identified by Employers**

 e. Indonesia: Three weakest job-specific skills (and sources of job-specific skills) for managers/professionals



g. Malaysia: Top three skills professionals and skilled workers lack the most in doing their job (manufacturing)





 h. Thailand: Top three skills professionals and skilled workers lack the most in doing their job (manufacturing)



\*Sources: di Gropello, Tan, and Tandon 2010, based on 2008 Philippines Skills Survey; di Gropello, Kruse, and Tandon 2011, based on 2008 Indonesia Skills Survey; World Bank IC Surveys database: Malaysia 2007; World Bank IC Surveys database: Thailand 2004; World Bank IC Surveys database: Malaysia 2007; World Bank IC Surveys database: Thailand 2004; World Bank IC Surveys database: Malaysia 2007; World Bank IC Surveys database: Malaysia 2007; World Bank IC Surveys database: Thailand 2004; World Bank IC Surveys database: Malaysia 2007; Worl

## Tertiary Unemployment Rates and Time to Fill Professional Vacancies



Sources: Sakellariou 2010b; World Bank ICSs (various years).

#### **R** &D Expenditure, East Asia and OECD



\*Source: WDI database (latest year, 2002–07)

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#### **Ratio of Students-to-Faculty**

#### percent Academic Qualifications of faculty

	Tot	al	Public HEIs		Private HEIs	
Economy	Share with PhD	Share with master's degree	Share with PhD	Share with master's degree	Share with PhD	Share with master's degree
Low-income economies						
Cambodia (2008/09)	8	52	8	49	7	55
Vietnam (2005/06)	14	32	13	32	23	32
Vietnam (2008/09)	10	37	_	_	_	_
Middle-income economies						
Mongolia (2004/05)	20	65	—	_	_	_
Mongolia (2007/08)	20	66	23	65	15	68
Philippines (2009/10)	10	36	13	54	7	29
Indonesia (2007)	7	40	_	_	_	_
Thailand (2005)	-	_	26	59	16	66
High-income economies						
Korea, Rep. (1994)	59	24	_	_	_	_
Taiwan, China (1992)	46	26	-	_	_	_
Japan (2005)	41	17	_	_	_	_

Sources: Cambodia: HRINC 2010; Indonesia: World Bank Indonesia Higher Education Sector Assessment 2009; Japan: Newby and others 2009; Mongolia: National Statistical Office data; Philippines: Commission on Higher Education 2010 data; Taiwan, China, and Republic of Korea: China Higher Education Reform 1997/2009; Thailand: Commission on Higher Education 2008 data and World Bank 2009a; Vietnam: MOET 2005, 2010. — = not available.



Economy	Student-to-faculty ratio
Cambodia	23:1
China	19:1
Indonesia	15:1
Korea, Rep.	16:1
Lao PDR	25:1
Malaysia	20:1
Mongolia	29:1
Philippines	23:1
Singapore	13:1
Thailand	37:1
Vietnam	30:1

### Number of Universities by Research Performance 2008-2011

Country or territory	World class	Excellent	Above average	Below average
CHINA	-	11	65	190
CHINA, HONG KONG	-	4	6	7
INDIA	-	-	8	44
JAPAN	1	5	30	108
KOREA, REP.	1	4	24	42
MALAYSIA	-	1	3	8
SINGAPORE	1	2	3	3
TAIWAN OF CHINA	-	4	29	35
THAILAND	-	-	6	9
TOTAL	3	31	174	446

\*Sources: Hazelkorn, Author's interview in the case study of Malaysia and Thailand, 2009

	Patent filings by office			Patent filings by origin
Economy	Total	Resident	Nonresident	Total
Japan	396,291	333,498	62,793	501,270
Singapore	9,951	696	9,255	3,538
Korea, Rep.	172,469	128,701	43,768	174,896
Malaysia	2,372	670	1,702	1,144
Thailand	1,388	877	511	1,049
China	245,161	153,060	92,101	160,523
Indonesia	4,606	282	4,324	308
Philippines	3,265	231	3,034	310
Vietnam	0	0	0	13

Source: WIPO 2009.

Note: Data for Indonesia and the Philippines are for 2006.

### Findings and Implement Higher Education Innovation in Asia

#### Facts findings and analysis

Diversity in economy, Low enrollment ratios Low quality of education and low skill level Poor research infrastructure Lack of fully qualified faculty and instructional staff Required to increase fund on research Limited job opportunities and markets for the graduates

#### What to challenge

Increase efficiency (internal, external) Differentiate institutional missions Enhance internal competencies in sustainable way Find optimal ways to address issues conflicting

#### How to implement higher education innovation

Holistic and sustainable approaches to innovation Establish performance management system Nurturing competencies of faculty and administration staffs Create institutional communities for learning and sharing practices and experiences

## What to Do for Higher Education Innovation

- Differentiating institutional missions
- Recruiting more quality instructional staff at right time
- Improving academic performance of instructional staff
- Develop fair faculty evaluation and reward systems
- Creating positive institutional culture for
  - ✓ Participation and innovation
  - ✓ Integrity: eradicate corruption and academic dishonesty
  - ✓ Collegiality: mutual respectable community
- Strengthening university-based research function in a cost-effective way
  - Government increasing investment on innovation and technological changes -> accompanying more burden to university's operational budget
  - Develop Integrated research management system: intellectual property rights, patents, research outcomes
  - Regular showcase and advertise research capacity of university InnoHigherE\_26Jun2014\_DJHwang (6)



- A way for balancing the competing demands for greater access, more research, cost containment, and prestige: focuses on a mission appropriate for resources and context relevant to specific goals
- Implementation is different on the basis of the roles and responsibilities
  - ✓ Flagship/research-oriented institutions (top-tier universities)
  - Teaching-oriented institutions: some attention to applied, locally relevant research (second-tier universities)
  - ✓ A postsecondary "demand-absorbing" institutions: vocational, technical, and academic programs (third tier): little government funding -> many private universities are found in this third tier
- Balanced allocation of national resources to higher education institutions
- Find sustainable approaches to address conflicting expectations
  - Provide higher education for more students: prepare more employment opportunities for the graduates in local and international labor markets -> university-industry partnership + government leadership
  - Develop internationally competitive research programs for local and national economic development and technology -> prioritize national budget + government coordination function and merit-based research fund
  - ✓ Attract new sources of revenue and cost cut: decrease unit cost of education and research using technologies
  - ✓ Increase quality overall

## Improving Recruitment of Instructional Staff

- Suffering shortage of qualified faculty
- Universities have responded in three ways
  - Hiring their own graduates: inbreeding problem -> limits the infusion of new ideas and creativity
  - ✓ Inviting faculty members from overseas: expensive
  - Increasing temporal employment of part-time academic staff, who may also work at other institutions: conflicting demands on their time and attention
- Possible solutions
  - ✓ Improving compensation and conditions of employment for instructors
  - Undertake actions to upgrade those personnel already in the institution with inadequate professional and scholarly preparation
  - ✓ Recruit core faculty from around world
  - ✓ Faculty exchange program: universities located in urban and rural area
  - ✓ Invite university-industry cooperation professors based on programs
  - ✓ Use endowment professor
  - Recruit teaching-oriented foreign instructors and professors, and researchoriented staffs and professors
  - ✓ Annual recruitment exposition for PH.D candidates of top-tier universities in US
  - ✓ Run recruit Information Management system

## Lessons from the World-Class University

- Current research-led teaching university systems are accompanied by high cost: unit cost of research is much more expensive than education
- Many universities aiming to be recognized as the world-class university for talented students and faculty members and resource generation: break balance in teaching, research, and service functions -> diversified university classes as worldclass/national/local
- Teaching function of faculty is seriously devalued in universities especially seeking world-class status focusing on academic productivity: more time for research, lesser activities for teaching and service functions -> unfair faculty evaluation and rewards
- Growing concerns about skepticism of social contribution of research: more academic productivity does not mean to more contribution to society -> Raising questions on "why public funds are used for research even with negligible social contribution" -> research need to be socially contextualized
- While declining public funding on tertiary education attributed to economic crisis, but the cost of research and global competition are increasing, national policy to increase R&D investment -> high burden for university's operational budget -> increase tuition fee -> undergraduate program focus on education, while graduate programs focus on research

## Why Public Support for Research in Higher Education Institutions

- Reasoning issues on public goods
  - Contribution of research to social development is negligible -> raising question as to rationalize public funding for research
  - ✓ Reasoning support for for-profit higher education institutions by public fund
  - ✓ Social contribution is different: high productive quality (82.8%), silent (9.9%) of the physicist of top 50 institutions vs. silent (35.7%) in the non-high ranking institutions in USA (by Johns, 1982)
  - ✓ Effects of global rankings:
    - Positive: acceleration of research and development of indicators for research productivity
    - Negative: differentiation of society between haves and have-nots, separation between research universities and non-research universities, increase of research paradigm and decline of teaching orientation





## Strengthening University-based Research

- Economic and social development is highly affected by innovation and technological changes: 1% of increase in the level of R&D typically leads to a 0.05%–0.15% increase in output (LaRocque 2007)
- Governments want the research to promote international prestige associated with world-class university, innovation, technical development, and productivity by increasing invest on R & D -> accompany more burden to the operational budget of universities
- Excellence in research is expensive and requires specialized talent and facilities:
  - Systems for ensuring rigor are not well developed: peer review for grants is not a large part of the culture (Levin 2010)
  - Shortage of qualified researchers in many developing countries in Asia <modest number of graduate students studying science and technology
  - ✓ Lack of a vibrant and strong intrinsic **research culture** in most universities
  - Inadequate research infrastructure impedes research: university-industry relationships
- Public or private goods: pure/basic research more like public goods than applied research



## **Cost and Financing**

- Cost refers to the resources needed to deliver higher education; financing refers to the source of those resources
- Most governments in low income countries spend 34 times and 14 times more in higher education compared to primary and secondary education, respectively vs. in highincome countries are 1.8 and 1.4
- The explosive growth in enrollments over the last decade put enormous pressure on governments to absorb these costs: grew faster than available funds
- To handle these costs, many governments and universities
  - ✓ Cut corners
  - Reduce operating costs by allowing student-to-faculty ratios to increase -> the real value of instructional salaries to fall
  - ✓ Deferring maintenance
  - ✓ Recruiting less qualified (and less expensive) instructors
  - ✓ Starving libraries and laboratories of funding -> quality suffered
  - ✓ Resource finding

## **Potential Choices for Cost and Financing**

- Find new sources of funding
  - Internal privatization of public higher education institutions: offer "extension,"
     "diploma," or "executive" courses for private tuition
  - ✓ Restructuring institutional system: multilayer and multiple systems (JC Shin)
  - ✓ Mentoring
  - Shifting costs to students and families: cost sharing, income-contingent and mortgage
  - Promote collaboration through dynamic networking: inter-institution, international
  - ✓ Sharing practices and experience related to writing research proposal
- Lower the cost of delivering instruction and the cost of administration in ways that do not erode quality: 7 of the world's 11 largest open universities (together serving 6 million active students) are located in Asia, separation between teaching and research functions -> mutual benefits to professors and students (lower tuition fees and high quality of teaching)
- Develop a differentiated higher education system, by deliberately concentrating resources in top-tier institutions: student's satisfaction
- Eradicate corruption: intensify ethics education, establish ethics guideline



## **From Teaching to Learning**

Increase in personalized, collaborative, and self-directed



\*Source: Diana Laurillard, Teaching as a design science: Enabling teachers to be innovators in learning technology, London Knowledge Lab Institute of Education, UNESCO IITE Conference, Nov. 2012.

# **Evolution of Learning Management Systems**

Supplementary tool to offline classroom

Provide simple and independent functions for online evaluation on assignment, evaluation, bulletin board

S

Q



#### Integration of learning tools with mobile devices

Provide services in an integrated way

Intelligent manErament tool for student data in association with University information system

A platform with diverse learning tools

6 D

A communication tool with social networking tools





LL.

An **integrated open learning platform** supporting formal, informal and non formal educations

ManErament of e-Portfolio and big data of students

- **D Learning analytics tools** for personalized service and consultation based on diagnosis on student's learning behavior
  - A framework of learner centered learning/teaching model

LinkEra between universities and society through open learning platform



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## **Costs for Increasing Student Cohort Size**



The per-student support costs never improve through economies of scale

## ajor Players of Open Educational Resource

- Consortia
  - Extending the role and scope of OER: Open Courseware Consortium (41 countries), EADTU
  - ✓ Organized global discussion and knowledge sharing initiatives: UNESCO OER Community, OER Commons', OER Community
  - ✓ Government backed publicly funded initiatives: UKOER programme
- Providers
  - ✓ Funded institutional repositories: OCW and xMOOCs (MIT), cMOOCs (Manitova Univ.), OpenLearn (OU in UK), OpenER (OU in Netherland)
  - Non-institution-based (referatory): MERLOT (Multimedia Educational Resources for Learning an Online Teaching), ADRIADNE (Alliance of Remote Instructional Authoring and Distribution Networks for Europe) Foundation, Connections
  - ✓ Non-funded community based initiatives: OpenCoursEducator, CommonContent
  - Specialized developer: MELCORE (Macquaire e-Learning Center of Excellence in Australia) developed LAMS (Learning Activity Management System), MAMS (Meta Access management System)
  - ✓ Proprietary channels: iTunesU, YouTubeEDU



## **Types of Analytics**

Types of Analytics	Level or Object of Analysis	Who benefits?
Learning Analytics	<b>Course-level</b> : social networks, conceptual development, discourse analysis, "intelligent curriculum"	Learners, faculty
	<b>Departmental</b> : predictive modeling, patterns of success/failure	Learners, faculty
Academic Analytics	Institutional: learner profiles, performance of academics, knowledge flow	Administrators, funders, Marketing
	Regional (state/provincial): comparisons between systems	Funders, administrators
	National and International	National governments, education authorities

\*Source: Long, PD, and Siemens, G, Penetrating the Fog: Analytics in Learning and Education, EDUCAUSE Review, September 2011. http://www.educause.edu/ero/article/penetrating-fog-analytics-learning-and-education.



## **Learning Measurement Environment**



\*Source: Paul Resta, Professor of Learning Technologies and Director, Learning Technology Center, The University of Texas at Austin, U.S.A. \*Source: CourseSmart, ANALYTICS, CourseSmart Solutions, IMS GLC 2013 Showcase, San Diego, U.S.A. InnoHigherE\_26Jun2014\_DJHwang



- Internationalization and global competitiveness of higher education became the keywords of open networking and networking for sustainable growth of national economy
- International recognition on foreign accreditations demands universities to collaborate to address this issue: UNESCO National Information Center (NIC) Network
- University networking in both the region and the globe became equally important as academic mobility keeps increasing: ERASMUS and ERASMUS Mundus programs, CAMPUS Asia, CONAHEC, ASEAN Cyber University (ACU) project
- University networking became diversified on the basis of its context: the physical space, the cyber space, and the cases to achieve their own contexts
- Open access to educational resources promotes university networking in e-Learning, course ware, and practices
- Collective approach to University-Industry-Government cooperation became critically important to Nation's economy and sustainable growth
- Pay attention to harnessing technology and resources to change university networking more dynamic, scalable, and responsive

\*Source: Dae Joon Hwang, Clustering and Networking in Education across the Globe, 9<sup>th</sup> ICED Conference 2012 on Across the Globe Higher Education Learning and Teaching, 22-25 July 2012, Bangkok, Thailand InnoHigherE\_26Jun2014\_DJ



## **Major University Networks**

Program	Region and Participating Countries	Major Activities	Regional Scope
CAMPUS Asia	<ul> <li>Asia (Korea, China, Japan)</li> </ul>	<ul> <li>Focus on student exchange based on joint degree and curriculum</li> </ul>	<ul> <li>Supposed to be extended to the whole Asian region</li> </ul>
ERASMUS Mundus	<ul> <li>European Union</li> </ul>	<ul> <li>Unification of European higher education system</li> <li>Expanding international cooperation with non-EU countries</li> </ul>	<ul> <li>Worldwide beyond EU region</li> </ul>
CONAHEC	<ul> <li>North America(U.S., Canada, Mexico)</li> </ul>	<ul> <li>Focus on student exchange in North America</li> </ul>	North America

\*Source: Dae Joon Hwang, Clustering and Networking in Education across the Globe, 9<sup>th</sup> ICED Conference 2012 on Across the Globe Higher Education Learning and Teaching, 22-25 July 2012, Bangkok, Thailand InnoHigherE\_26Jun2014\_DJH



## **CAMPUS Asia Program**

- Collective Action for Mobility Program of University Students in Asia (CAMPUS Asia) program aims to harmonize Higher Education in the region
- ✓ East Asia's three big education markets have taken a small step toward integration with the first government-level meeting aimed at increasing the regional mobility of students and professors
- ✓ CAMPUS Asia project is intended to harmonize universities in Korea (Republic),

China, and Japan and ultimately keep more students in the region, which is a major supplier of undergraduates students (+ 200,000/year) to American and European countries

 CAMPUS Asia is the latest attempt to bridge the cultural, linguistic, and structural barriers in higher education



\*Source: Dae Joon Hwang, Clustering and Networking in Education across the Globe, 9<sup>th</sup> ICED Conference 2012 on Across the Globe Higher Education Learning and Teaching, 22-25 July 2012, Bangkok, Thailand InnoHigherE\_26Jun2014\_DJF



- Goal: Providing opportunities for education and exchanging human resources among ASEAN countries through e-Learning
- Initiated by Korea in 2011 as 5-year project after ASEAN President Summit
- Now
  - Active credit exchange and sharing courses materials among CMIS: Members (7): Cambodia (1), Myanmar (1), Lao (1), Viet Nam (1), UN-APCICT, Korea (3)
  - ✓ Developed common e-Learning platform and guideline for credit exchange
  - ✓ Physical installation of ACU under discussion
  - Voices uprising on the future of ACU: sustainability of program, participation, mutual recognition on credits
  - Need the guideline for building infrastructure: learning platform, interoperability of diverse LMS

\*Source: Dae Joon Hwang, Future of ASEAN Cyber University: a Hub of Education and Human Resource Exchange, 1<sup>st</sup> Roundtable Meeting on ACU Project "Advanced eLearning in Higher Education for & by ASEAN, SCU, 3 Sept 2013, Seoul, Korea



# IV. How to Make Higher Education Innovation Sustainable

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## Scope of Higher Education Innovation (1)

- Management and administrative: efficiency, outcomes, and sustainability
  - Sustainability of innovation: strategic innovation, adaptability and alignment based implementation of innovation, holistic approach
  - ✓ Complexity management of university functions
  - $\checkmark\,$  Create culture for collaboration and innovation
  - ✓ Management strategy: centralized/decentralized/decentralized centralization
- Awareness to environmental changes
  - ✓ Changing characteristics of students: demographics, attitude, technology affinity
  - ✓ Goals of higher education: elite (excellence, 15% of the respective age group), mass (equity, beyond 15% of the respective age group), post-massification (student's satisfaction, beyond 50% of the respective age group)
  - Exponential growth of knowledge: widening gabs between knowledge production and academic preparation -> unbundling the labor of professors between teaching and research
  - Advances in technologies: diversify education service delivery, new pedagogies, new curriculum, new content development strategies

## Scope of Higher Education Innovation (2)

- Restructuring university systems: governance, realign university functions
  - ✓ Lessen multifunctional complexity
  - ✓ High quality education and learning and research excellence
  - Reasonable assessment and reward systems: from academic products focused to diversified goals focused
- Quality issues of education and learning
  - Learning from education: widening gab between what students want and have to learn and what faculty can teach
  - Content of education: procedural knowledge, competency, liberal arts from disciplined knowledge and job-skill knowledge
  - ✓ Development new pedagogies and new curriculum
- Transformation of scholarship
  - ✓ Increasing incompatibility between research and teaching
  - Reward system putts more weight on research than teaching in the process of faculty evaluation, recruitment, and promotion
  - Future scholarship: research-teaching-student learning orientation from research orientation-> nurturing competence training

## **Overview of Strategic Innovation: SKKU**

- Set up clear vision and goals of innovation through collaboration between university and private consulting institutes: Global Top 10, Core faculty, Smart campus, Global professional education, Virtual global SKKU
- Adopt strategic innovation to innovate higher education systems
- Implementation of innovation is based on adaptability and alignment (or ambidexterity)
- Performance evaluation system: 6 Sigma, KPI, BSC, separate track faculty evaluation with same framework and feedback
- Nurturing competences of faculty and administration staffs: Edupert
- Public and political support: as the vision develops and is translated into practice, the support of the public and of the political leadership at all levels of the system must grow
- Networking: building networks that study, pilot, and support the new vision of the education system is essential in establishing lasting systemic change
- Teaching and learning changes: teaching and learning is at the core of the new system -> need and can learn the higher-level skills of understanding, communication, problem solving, decision making, and teamwork
- Harnessing technologies and resources
- Administrative roles and responsibilities: for the changes in classrooms, administrative roles and responsibilities need to shift to one of support and shared decision making from a hierarchical structure of control (the school, district, and state levels)
- Policy alignment: state and local policy need to be aligned around the beliefs and practices of the new system for curriculum frameworks, instructional methods and materials, student assessment practices, resource allocation, and the inclusion of all types of students



- Key considerations
  - ✓ Be able to encompass both conceptual and practical perspectives
  - ✓ Instrumentation is based on contextual and structural ambidextrous approaches
  - Innovation should be adaptable to individual countries based on real issues and problems facing
  - ✓ Harness available resources: technologies, practice open paradigms



## What Strategic Innovation is about...

- Strategic innovation is a holistic, systematic approach beyond incremental, breakthrough or discontinuous innovation, which generate a portfolio of breakthrough business growth opportunities using a disciplined yet creative process
- Seven dimensions of strategic innovation
  - 1. Managed innovation process
  - 2. Strategic alignment: enthusiastic internal support among key stakeholders to galvanize an institution around shared vision, goals and actions
  - 3. Understanding emerging trends and foresight (Industry foresight): provide top-down perspective
  - 4. Understanding articulated and unarticulated needs (Consumer/Customer insight): provide bottom-up perspectives
  - 5. Core technologies and competencies: leveraging and extending available assets
  - 6. Organizational readiness: ability to take action to implement new ideas and strategies and manage operational, political, cultural and financial demands
  - Disciplined implementation: effectively managing the path from inspiration to institutional impact for success

\*Source: Derrick Palmer and Soren Kaplan, A Framework of Strategic Innovation, Managing principals, and InnovationPoint LLC, www.innovation-point.com ..

## Conceptual Map of Strategic Innovation: SKKU





## **Restructuring Education System**

- Ambidexterity is instrumented in curriculum design and course development: contextual, structural
- Establish solid foundation for undergraduate program based on liber arts: early-bird program, liberal arts, disciplinary subject
- Consolidate trans-disciplinary and interdisciplinary



## System Performance Monitoring: 6 Sigma







## **Global Edupert Program**



## How to Implement Strategic Innovation (1): SKKU

• Student Learning: accessibility and flexibility, open discussion

- ✓ Mobile campus: anywhere any time and 24 hours
- Promote new pedagogies: mobile pedagogies, PBL, team based teaching and learning, faculty competence evaluation system, Cross-border Collaborative Design Lab
- ✓ Digital library: cultural center for student and community, center for knowledge repository and sharing
- Mentoring and couching systems for students (foreign students) and faculty: center of teaching and learning
- Sustainability: social responsibility, recognition, community service
  - Competence management system: KPI, BSC, annual symposium on outcomes of organizational units, 3-Rank system (foreign language skill, ICT skills, service)
  - Evaluation and reward systems: multi-track evaluation for faculty, administration staffs: global Edupert training system for staffs
  - ✓ Nurturing global competence: faculty for pedagogies, and content development
  - Strategies of networking: open and strategic (companies, research institutes (home and global, BASF), universities, local communities
  - ✓ Service activities for community: students, faculty, administration staffs
  - Knowledge and talent donation program: communities, society
  - Increase affordability of education and professional training through e-Learning (Cyber MBA with Credu Inc.)

## How to Implement Strategic Innovation (2): SKKU

• **Technologies:** integrated use, use education innovation catalyst

- Synchronous education facilities: video conferencing rooms, CIC facilities, e+classrooms
- Asynchronous education/learning facilities: i-Campus LMS, asynchronous learning and communication tools (webinar, Cacao, Line,...), e-Classroom
- Use in administration and education and learning: video conferencing facilities, webinar
- Establish sustainable university infrastructure: open paradigm based cloud computing

#### Resource creation

- ✓ Fund raising: mentoring, Annual SKKU intellectual property expo, Open Lab.
- ✓ Create business incubation project
- Strategic collaboration with companies, government, and communities: contract department and tracks (System Semiconductor Department, SW department, Super long Bridge Construction Dept.), promote industry cooperation
- ✓ Faculty's consulting service: small to medium business
- ✓ Push services: personalized delivery service through Internet
- Develop on-demand base special programs, courses, and projects: for presentation to government, public, organization and companies
- ✓ Recruit top-tier faculty and students
- ✓ e-Interview with faculty applicants
## How to Implement Strategic Innovation (3): SKKU

#### Internationalization

- ✓ Recruiting expo for foreign students by visiting 8 countries
- ✓ Host SKKU International Summer Campus program annually
- ✓ Intensify excellence in research and teaching for international recognition
- ✓ Increase number of partners
- $\checkmark$  Encourage cross-border education and research
- ✓ Disruptive institutional networking: dynamic networking

\*Source: Derrick Palmer and Soren Kaplan, A Framework of Strategic Innovation, Managing principals, and InnovationPoint LLC, www.innovation-point.com ..

## Sustainable Higher Education Infrastructure: SKKU



## **Disruptive Faculty Competence Training**



## New Approaches to Promote University Cooperation

#### Contemporary approaches to networking

- Collaboration space is separated and physically limited
- ✓ Modes of networking: static
- ✓ Implementation: exchange, visit, access
- ✓ Major interaction support: asynchronous, non real time
- ✓ Cost effectiveness: low
- ✓ Responsiveness: low
- ✓ Outcomes: focused on physical arrangement

#### New approach to networking

- ✓ Collaboration space are integrated and tailored
- ✓ Implementation of collaboration would be more scalable
- ✓ Modes of networking: dynamic
- ✓ Progressive networking: inter-cluster
- ✓ Types of interaction: asynchronous, synchronous, all modes of communication
- ✓ Flexibility in partnership: mixed modes of visit, SNS, and blended
- ✓ Higher cost effectiveness and resilient
- Outcomes: focused on evidence and contextual change (eg) GLORIAD network





## An Infrastructure for Dynamic Networking



## Global Ring Network for Advanced Application Development (GLORIAD)

- is an advanced collaborative research network based on space integration using high speed Internet, launched in January 2004 by the U.S., China, and Russia, and expanded to Korea, Canada and the Netherlands in 2005 and to the five Nordic countries of Denmark, Finland, Iceland, Norway and Sweden in 2006.
- The network promotes new opportunities for collaboration and cooperation among scientists, educators and students.
- GLORIAD is constructed from a fiber-optic ring connecting universities and national laboratories with individual network providing up to 10 Gbps.
- The GLORIAD is providing over 4,000 daily users: scientists, educators, and students
- Virtual Room Videoconferencing System is a unique, globally scalable system for real-time collaboration among small, medium, and large working groups.



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\*Source: Dae Joon Hwang, Clustering and Networking in Education across the Globe, 9<sup>th</sup> ICED Conference 2012 on Across the Globe Higher Education Learning and Teaching, 22-25 July 2012, Bangkok, Thailand InnoHigherE\_26Jun2014\_DJHwang

### **Outcomes of Strategic Innovation: SKKU**

			1
	Year	Ranking	
	2013	162	
	2012	179	
	2011	259	
	2010	343	
	2009	357	
	2008	370	
	2007	380	
	2006	520	-
	2005	550	2
2005 2006 2007 2008 2009 2010 2011 2012 2013			
It is a student satisfaction community service and in R & D competence			

create culture for collaboration and innovation

Tangible outcomes: budget saving (\$2.85 million/year ), administration

process improvement (111%)



## V. Conclusion



- Strong leadership, initiative, and clear vision and context of innovation of higher education institutions (or government) are critically important to its success
- Taking sustainable and synthetic approaches to higher education innovation are strongly recommended: adaptability and alignment based implementation
- Establishing open communication environment within the campus community
- Establish open networking environment to generate support from external stakeholders and developing positive publicity for the outcomes
- Restructuring university encompasses alignment of roles of university, balancing teaching and research functions on the basis of efficiency and quality, and democratic governance
- Increasing awareness to students characteristics
- Harnessing the potentials of technologies and human resources alike became most important to challenge issues of higher education
- Creating institutional culture of collaboration among stakeholders and innovation is important

Asian Higher Education Summit Creating Innovation, 26-27 June 2014, Hong Kong

# Thank You 감사 합니다



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