University – Industry Collaboration in Education
- Situation in Japan -

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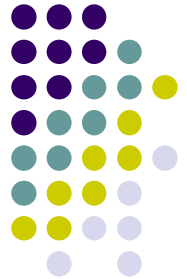
Yuji Kakizawa

Deputy Director
Division for Technical Education
Higher Education Bureau

MEXT
Ministry of Education, Culture, Sports, Science and Technology

Outline of Presentation



I Role of MEXT in Higher Education

II Historical Background – Human Resource Development and University-Industry Collaboration in Japan

III Recent Challenges, Necessity of collaboration in education

IV Competencies to be acquired in higher education, and Expectation of Industry

V Policies to promote university-industry collaboration in Education

VI Issues and Challenges

Ⅰ Role of MEXT in Higher Education

- Planning of higher education policy
- Grants permission of the establishment of higher education institutions
- Funding national universities (management expenses grants, facilities maintenance grants)
- Support education reform of national, public, and private universities through various programs
- Promote private schools through tax incentives, subsidies, and administrative guidance and advice
- Promote internationalization of universities and student exchange　etc

MEXT assumes overall responsibility for higher education system, in university-industry collaboration, cooperates with METI (Ministry of Economic Trade and Industry)

Ⅱ Historical Background （1）

- Human Resource Development and University-Industry Collaboration in Japan

Human Resource Development from postwar and high economic growth period to early 1990s

- Graduates of departments of science and engineering, colleges of technology generally meet the expectation of industry, contributing to high economic growth.
- Overall, the quality of university education had not been considered as a critical issue under several conditions that characterized Japanese labor market and employment environment.

Ⅱ Historical Background （2）

- Human Resource Development and University-Industry Collaboration in Japan

Unique conditions in Japan

- Continuing economic growth ⇒ high labor demand ⇒ competition to recruit and retain workforce intensified
- Life time employment and promotion by seniority
- In-house training within enterprises
- Package recruiting system (fresh graduates start their career in April right after the graduation)
- Highly selective process of university entrance ⇒ indicator of graduates' basic academic / cognitive skill

Companies weigh prestige of universities (selectivity)

Weak attention to "learning outcomes"

Ⅱ Historical Background （3）

- Human Resource Development and University-Industry Collaboration in Japan

Development of University–Industry Collaboration

- Collaboration in R&D has substantially advanced in the last two decades as S&T / innovation policy develops.

【Legal Framework】

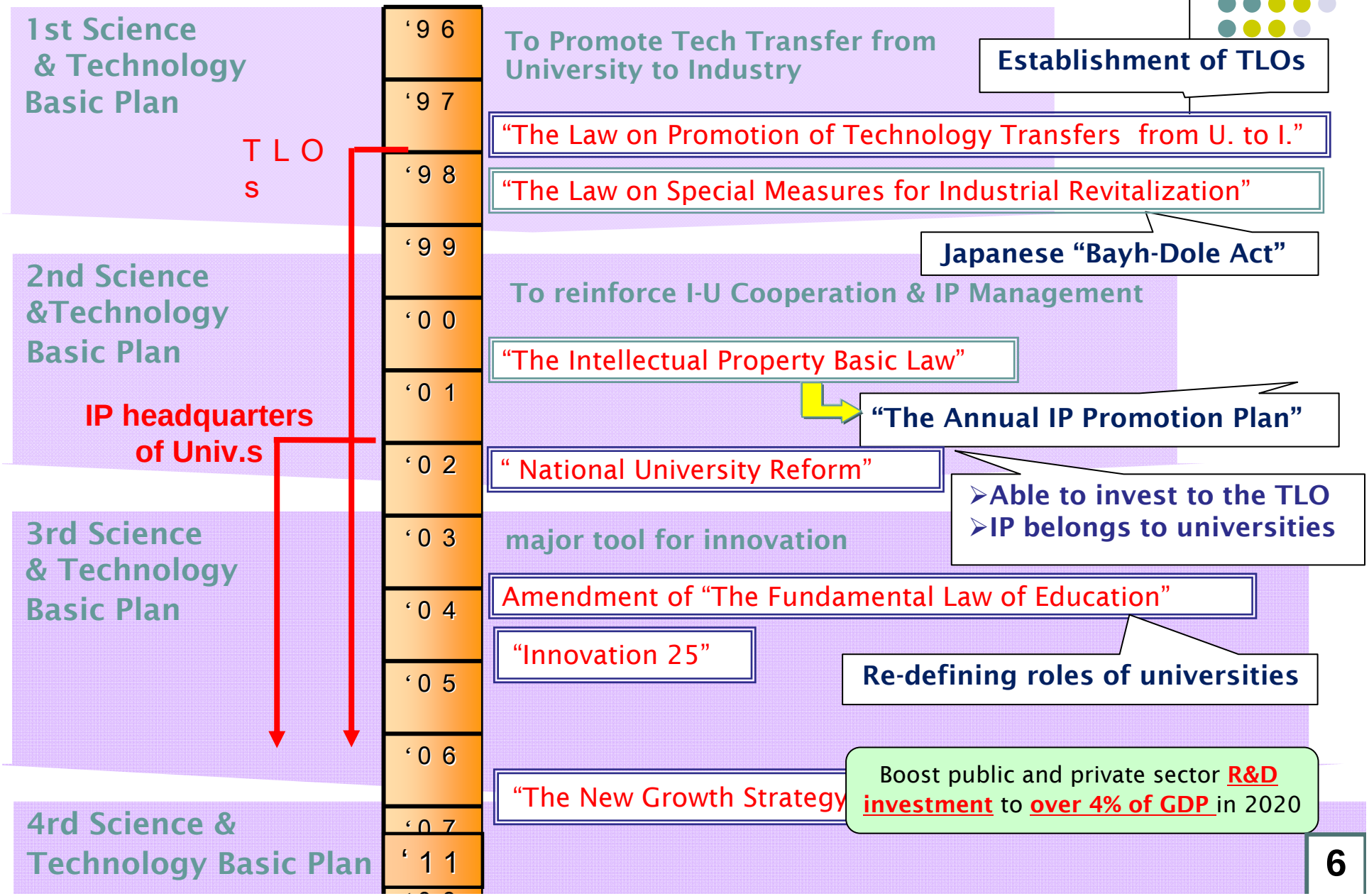
- S&T Basic Law (1995)
- The Law on Promotion of Tech Transfer
- Japanese “Bayh Dole Act” (1999)
- S&T Basic Plan 1st(1996-2001) ~ 4th(2010-2014) etc

【Government Policy Measures】

- competitive funding for joint R&D, support for establishing TLO (Tech Transfer organization), supporting university start-ups, forming innovative regional clusters etc

Tangible Results (drastic increase of joint R&D projects, tech transfer from university to industry, university start-ups etc

History of Industry-University Collaboration in the context of S&T policy



Ⅱ Historical Background （4）

- Human Resource Development and University-Industry Collaboration in Japan

Development of University–Industry Collaboration

- Collaboration in R&D contributes to enhancing the quality of education by offering faculty and students an opportunity to learn practical issues and needs of industry. ⇒ but only limited to some departments of science and engineering.

What about collaboration in education?

- Until recently, policy initiative at the national level had been not so strong, compared with S&T policy.
- Collaboration activities by individual motivated faculty members, but sporadic…

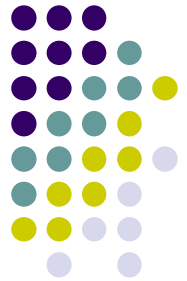
lll Recent Challenges, necessity of collaboration in education

Necessity to enhance the quality of higher education through collaboration with industry has become highlighted in the last decade.

WHY?

- Knowledge-based economy ⇒ need to create innovation ⇒ skill gap (creative thinking, problem solving, interdiciplinarity etc)
- Prolonged recession ⇒ enterprise cannot sustain lifetime employment, less capacity for in-house training
- Rise in the advancement rate to higher education ※(57.8% in 2010 as compared with 10.3% in 1960 ※university, junior college, college of technology)
- Youth unemployment rate rise, “marginal university” ⇒ need to develop students’ employability
- Emerging workforce demand (medical services, nursing care, tourism, environment etc)

Ⅳ Competencies to be acquired in higher education, and Expectation of Industry



【Expectation of Industry】

- In general, industry values generic competencies and mindset (positive attitude, independence, cooperativeness etc)
  ⇒ expect university to foster these competencies
- In some fields, needs of specific knowledge and skills (mostly in science and engineering, such as IT, chemistry etc)

【Government attempts to specify competencies】

- MEXT・・・ “Competencies to be acquired through undergraduate program (bachelor’s abilities)”
- METI・・・ “Fundamental Competencies for Working Persons”
- Also, a lot of discussions on global human resource

“Competencies to be acquired through bachelor’s abilities” (The Central Council for Education)

- In December 2008, the Central Council for Education (an advisory body for Minister of MEXT) submitted a report titled “Towards the enhancement of undergraduate education,” aiming to realize internationally competitive undergraduate education. The report indicates **“competencies to be acquired through undergraduate programs (bachelor’s abilities)” for reference to university in clarifying policies of undergraduate programs.**

< Policies to be clarified in every university >

Policy for awarding academic degrees

・ To clarify the policy for awarding academic degrees and education and research purposes

Policy for curriculum

・ To work out systematic educational content and instruction

・ To secure students’ learning activity and appropriately evaluate their performance

Policy for acceptance of admitted students

・ To clarify the criteria for selecting students

・ To conduct admission process properly, especially in the case of recommendation

< Competencies to be acquired through undergraduate abilities >

Reference guideline for learning results common among bachelor courses – it is recommended that university clarify its policy for awarding academic degrees based on each item in such reference guidelines.

1. **Knowledge / Understanding** – in addition to systematic understanding of the basic knowledge of a specific field of major, understanding of many different cultures, human culture, society and nature
2. **General-purpose skills** – skills for intellectual activities as well as professional and social life Communication skills, numerical competence, IT literacy, logical thinking, and problem solving skills
3. **Comprehensive learning and its application** – the ability, with which a person can comprehensively utilize the knowledge, skills, behaviors and other experience acquired to date to successfully apply such experience new issues

Common Verbalization as "Fundamental Competencies for Working Persons"

- In February, 2006, the Ministry of Economy, Trade and Industry defined **the basic abilities required in working together with various people in the workplace and in the local communities** as **"Fundamental Competencies for Working Persons"** which consist of the following three competencies (12 competency factors) at a committee comprising of intellectuals in the businesses and universities (Chaired by Prof. Yasuo Suwa of Hosei University Graduate School).

< 3 Competencies / 12 Competency Factors >

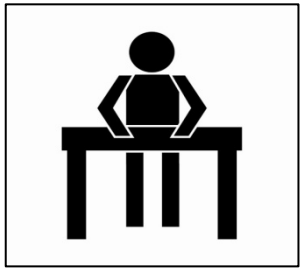
Ability to step forward (action)

—Ability to step forward and act persistently even if you fail—

- **Initiative**
  Ability to initiate things proactively
- **Ability to influence**
  Ability to influence and involve others
- **Execution skill**
  Ability to set goals and execute with conviction

Ability to think through (thinking)

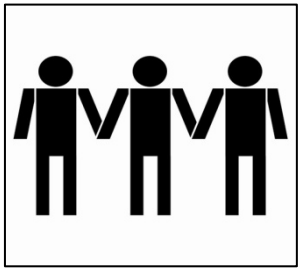
—Ability to question and think through—



- **Ability to detect issues**
  Ability to analyze status quo and clarify issues
- **Planning skill**
  Ability to clarify procedures to solve issues and prepare
- **Creativity**
  Ability to create new values

Ability to work in a team (teamwork)

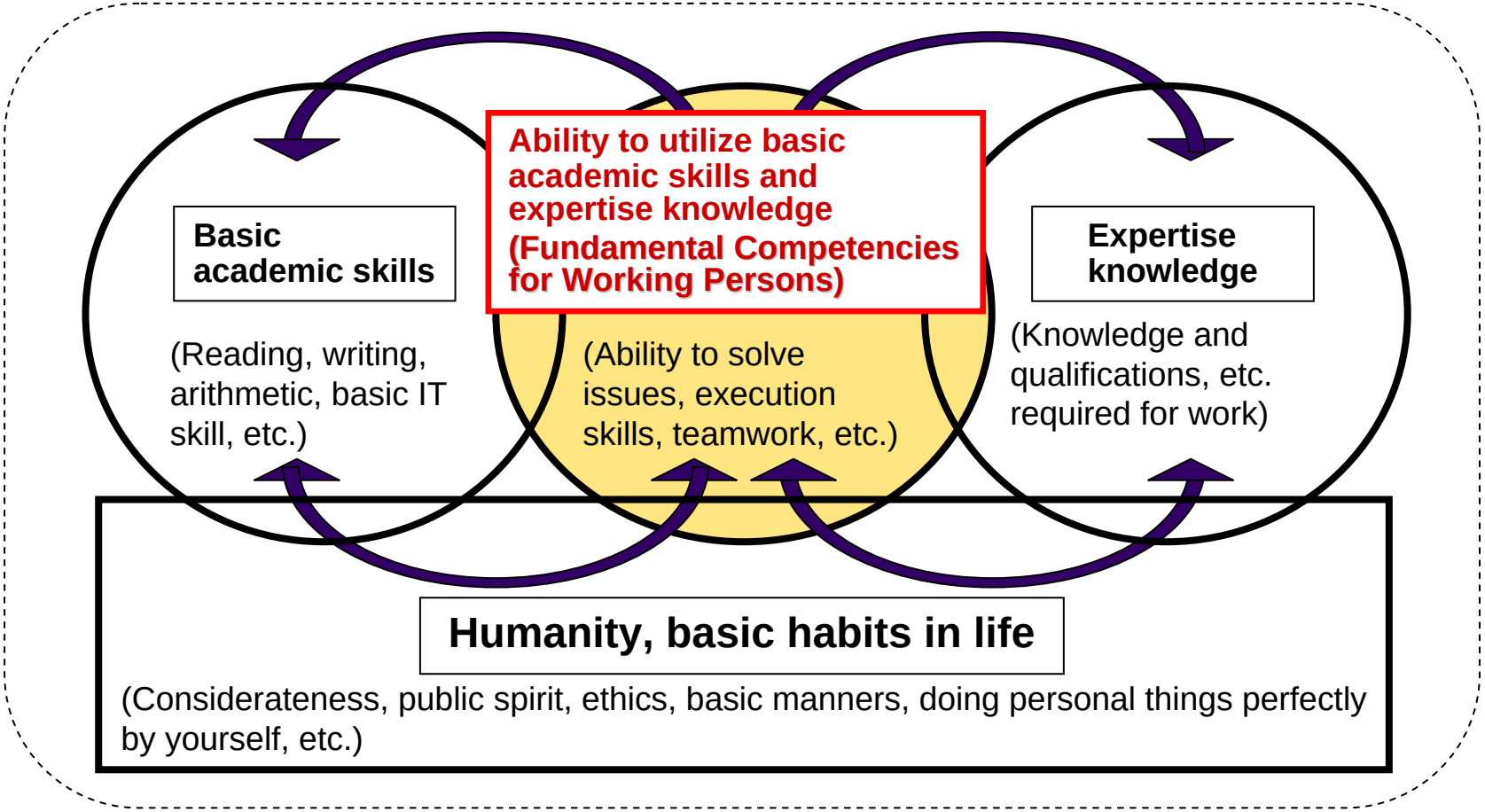
—Ability to collaborate with various people to achieve goals—



- **Ability to deliver messages** — Ability to delivery own opinions clearly
- **Ability to listen closely and carefully** — Ability to listen to other peoples' opinions carefully
- **Flexibility** — Ability to appreciate different opinions and perspectives
- **Ability to grasp situations** — Ability to comprehend relationship between yourself and other people as well as things surrounding you
- **Ability to apply rules and regulations** — Ability to comply with social rules and keep promises with others
- **Ability to control stress** — Ability to deal with the original cause of stress

Importance of "Fundamental Competencies for Working Persons"

- In light of the changes in the environment surrounding companies and young people, in addition to "basic academic skills" and "expertise knowledge," the ability to utilize such skills and knowledge as well as conscious development of the basic abilities required in working together with various people (Fundamental Competencies for Working Persons) will become more important than ever.



Development Activities of "Fundamental Competencies for Working Persons" by the Ministry of Economy, Trade and Industry

(1) Development and Evaluation Model Activities of Fundamental Competencies for Working Persons (Since FY2007)

- Establishes a systematic educational curriculum for university students to develop and evaluate "Fundamental Competencies for Working Persons" and implement model activities to spread such activities within the school.
- In FY2009, 28 universities applied from all over the country, 12 of which were adopted as model universities.
- **Practical studies to introduce PBL (Project Based Learning)** which provide issues in collaboration with the businesses and government as well as development and evaluation using seminars and general subjects have been implemented.
- It is also important to develop an **effective evaluation system (competency)**.
- The curriculum to develop "Fundamental Competencies for Working Persons" conducted by model universities and their innovative ideas will be summarized to **crease a "Reference Book"** to promote such activities to universities nationwide **(the book was published in 2010 .)**

(2) Holding the Research Group (Competition) for Development of Fundamental Competencies for Working Persons (Since FY2007)

- **Curriculums to develop "Fundamental Competencies for Working Persons" and their achievements are presented by students and the winners are selected.**
- Based on stories that students overcame difficulties and accomplished significant growth, an effective method to develop "Fundamental Competencies for Working Persons" and educational measures are discussed.
- A total of **100 universities** participated in a competition held in March 2011 from all over the country.

Ⅴ Policies to promote university-industry collaboration in education (1)

MEXT and METI jointly launched policy initiatives to provide venue for university-industry dialogue

1. The Industry-Academia Partnership for Human Resource Development (launched in October 2007)

- consists of representatives of business and university organizations
- establishes sub-committee to discuss the issues of specific fields

2. The Roundtable for Human Resource Development through Industry-University Collaboration (launched in July 2011)

- consists of top executives of 20 global companies (ex. Toyota, Hitachi, Panasonic etc) and 12 top-level research universities
- aims at fostering high-end global / innovative human resource
- expected to map out action plan in the summer 2011

The Industry-Academia Partnership for Human Resource Development

➢ This partnership is a policy initiative that provides venue for discussion and activities , in order to strengthen collaboration between industry and university in human resource development. Through discussions, both industry and university are expected to build mutual understanding, and take concrete measures.

＜General Meeting＞

General Meeting Members

Industry : Representatives from economic organization (Keidanren, Japan Association of Business Executives, Japan Chamber of Commerce and Industry

University : Representatives from university organizations (associations of national, public, and private universities)

Sectional Committee Members

Chars of each sectional committee : both from industry and university

＜Sectional Committees＞

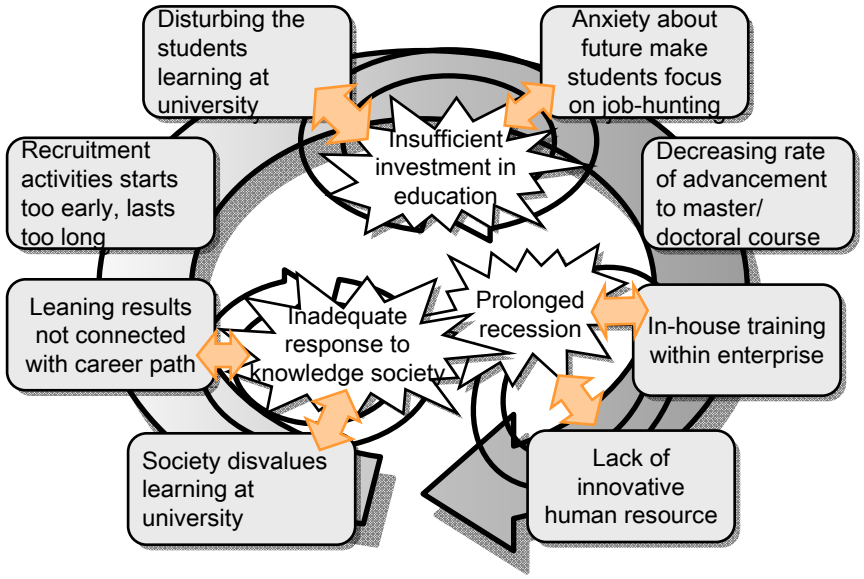
Global Human Resource Development

- Chemistry
- Machine
- Material
- Natural Resource
- IT
- Electrical Electronics
- Nuclear Energy
- Management Operation
- Bio

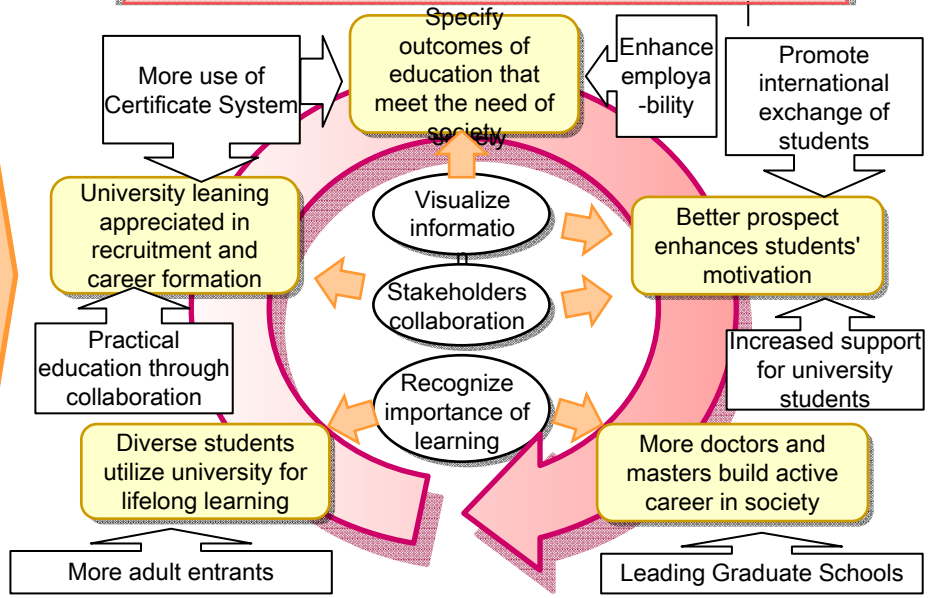
Agenda of "The Roundtable for Human Resource Development through Industry-University Collaboration"

From vicious Cycle to Virtuous Cycle through industry-university collaboration

Vicious Cycle – society depreciating the learning in higher education



Virtuous Cycle – learning matters in lifelong career development



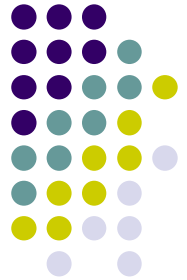
○Expectations for University Actions

1. Enhance education which reflects the practical need of society
2. Foster human resource with skills necessary in globalized society
3. Assure the quality of university graduates
4. Invest in faculty development, and establish evaluation mechanism which values faculty's effort to improve education

○ Expectations for Industry Actions

1. More recruitment of doctors (science / engineering) and masters (arts, social science)
2. Correct problematic recruitment activities (too early, too long disturbing university education)
3. Accept more interns, collaborate in practical education such as PBL
4. Recognize the importance of academic learning
5. Develop career models of high-skilled huma resource (doctors)

Policy measures (1)
– Promotion of Internship

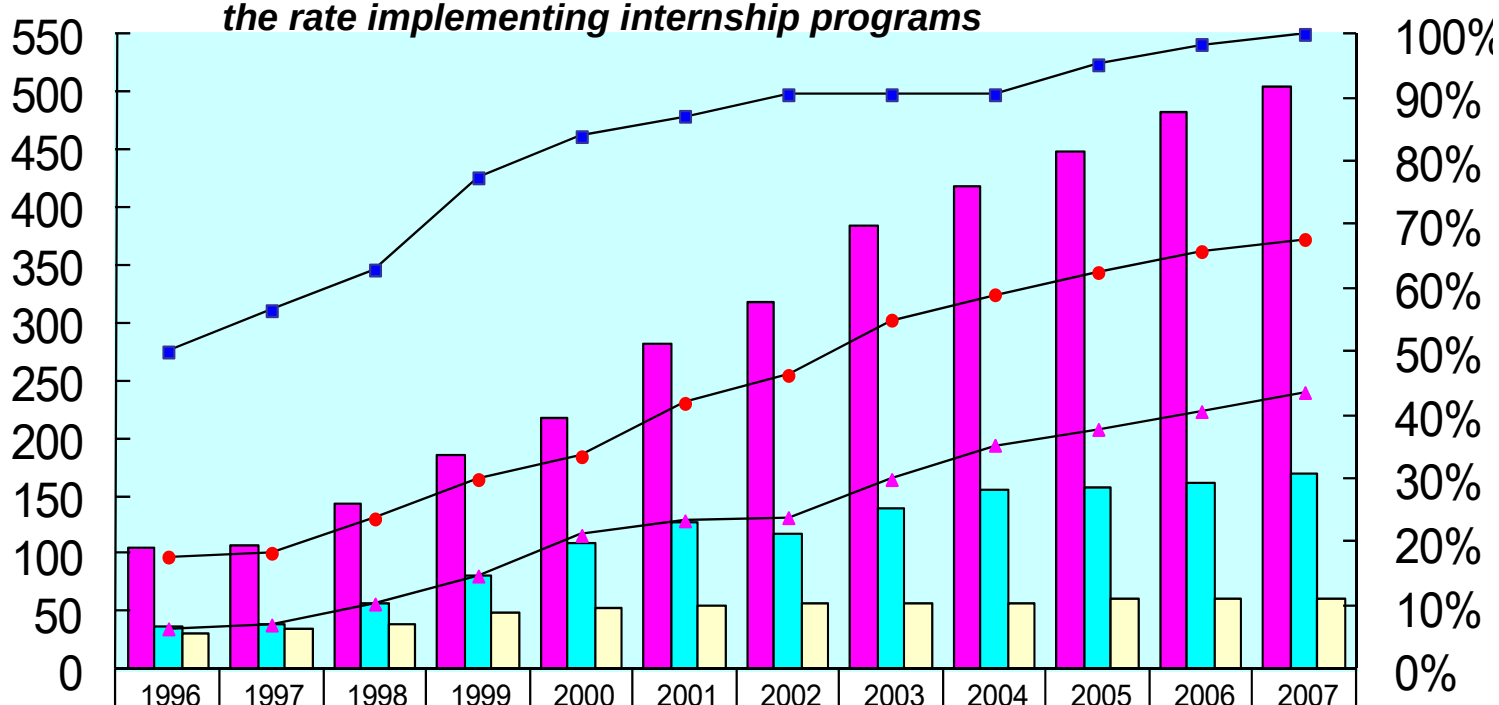


- Distribute the guideline of internship explaining procedure and important points in implementing internship program, provide information of good practices
- Selective financial support to universities for developing long-term internship programs (2005-2010)
- “The New Growth Strategy” (Cabinet decision in June 2010) sets the target by 2020 “*the rate of universities providing internship to 100%*”

The number / the rate of universities implementing internship (※) has steadily increasing. About 90% of internship programs take less than 3 weeks, while only 6.6% takes more than 1 month.

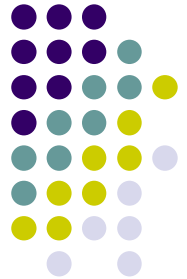
※"implementing" means that internship is incorporated in university education so that students can get course credits

Trend in the Number of higher education institutions and the rate implementing internship programs



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
University	104	107	143	186	218	281	317	384	418	447	482	504
Junior College	36	39	57	81	108	127	117	139	155	157	162	170
College of Technology	31	35	39	48	52	54	57	57	57	60	60	61
Rate(university)	17.7%	18.3%	23.7%	29.9%	33.5%	41.9%	46.3%	55.0%	59.0%	62.5%	65.8%	67.7%
Rate(Junior college)	6.4%	7.0%	10.3%	14.7%	21.1%	23.4%	23.9%	29.9%	35.3%	37.8%	40.6%	43.6%
Rate(College of Technology)	50.0%	56.5%	62.9%	77.4%	83.9%	87.1%	90.5%	90.5%	90.5%	95.2%	98.4%	100%

Policy measures (2)
– GP (Good Practice) projects



- MEXT has implemented various GP projects to financially support universities' effective efforts to improve the quality of education.
- Various programs, some of which focus on university-industry collaboration

<programs>

- Program for Enhancing Students' Employability (2010 ~)
- Program for Training Leading IT Specialists (2006 ~ 2010)

⇒ Strong demand of industry ⇒ currently requesting budget for a renewed project of developing IT specialists

- Program for Training Highly Specialized Professional at Professional Graduate Schools (2007 ~ 2009)
- Leading Program of Doctoral Course (2011 ~) etc

Program for Enhancing Students' Empliyability

The program support activities to enhance students' employability such as PBL in collaboration with industry.
- 180 applications selected out of 441
- Approximately 20 million yen per year for each institution
- 5 years of support

< Examples of Universities joining the program >

Kyoto Sangyo University

Aim at developing courses that integrates theory and practice in collaboration with industry

- Working experience at local SME
- Practical internship and field interview
-"industry-university hybrid course" in which university students and younger employees study together
- PBL

Nagahama Institute of Bio-Science and Technology

In collaboration with local chamber of commerce and industry, start practical classes

- PBL collaborating with local companies and residents in which students present business proposals, city planning etc
- OJT classes in which students learn from real experience of companies (challenges, business negotiations etc)

Development of a program to foster high-end IT Specialist at Tsukuba University

Project Outline

Purpose

Tsukuba University, in collaboration with other universities and industry (Keidanren), aims to become world-class institutions in fostering IT specialist in embedded software and enterprise system.

Specialist to be developed

-Leading specialist in software development in the field of embedded software and enterprise system

- contribute to enhancing global competitiveness of companies

Number of Students etc

-Master's student (43 students enrolled in 2009)

- 50 course credits (2 years)

Collaboration of Industry

Planning of Education Programs

- Appoint specialists dispatched from industry (Hitachi and NTT data) as full-time faculty, and engaged them in planning and developing curriculum
- These fulltime faculty took charge of PBL classes. In addition, industry dispatched 62 specialists as part-time lecturers

Focus on Practical Knowledge / Skills

-Emphasis on practical training
- 7 out of 10 required courses provided in collaboration with lecturers from industry
-In a certain course, students submit deliverable(report,software) instead of academic paper
- Top-level specialists from industry lecture on the trend of IT
-Mid-term / Long-term internship to companies and research instructions at home and abroad (giving credits)
-PBL by lecturers from industry

Results

Learning Outcome

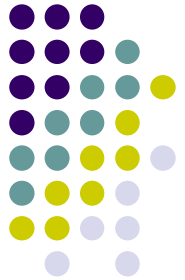
Evaluation of Students at the time of entrance showed that they had low skills in information system and software engineering that industry values.

Post-project evaluation of students found that **students acquired necessary skills and reached the standard of industry demand.**

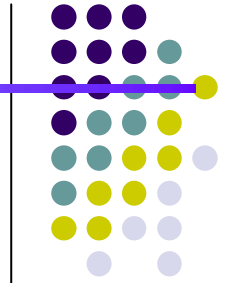
Many graduates got job offer from leading companies.

According to the questionnaires to companies that recruited graduates who finished the course, these graduates are considered to be superior to other graduates in many respects.

VI Issues and Challenges



- Matching of university's interest and demand of industry
- Insufficient incentives of faculty to improve education (evaluation based on research performance, organizational culture)
- Recruitment activities, inflexible labor market
- Education in specialty and career development
- Political constrains



Thank you very much