

---

# **INTRODUCTION**

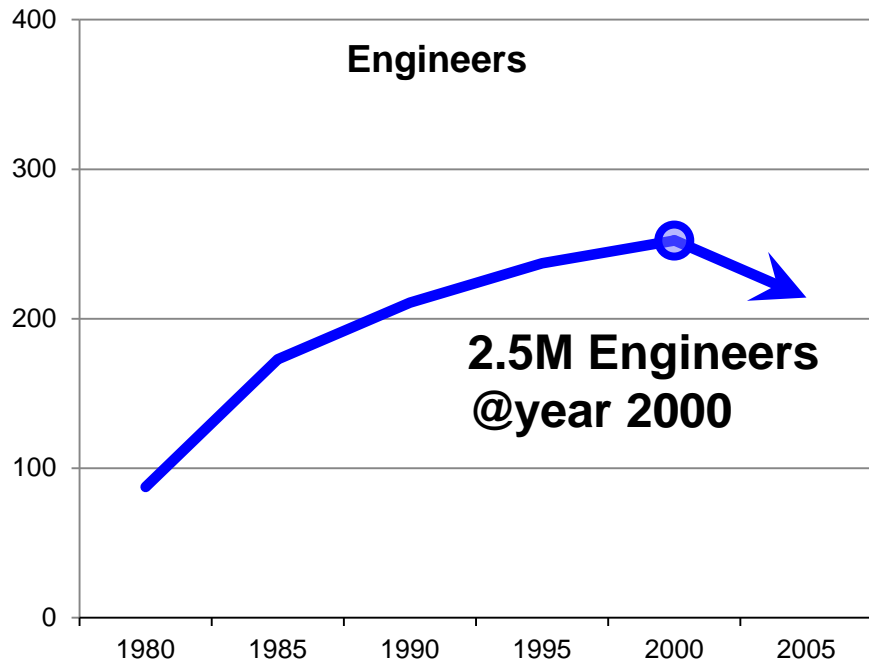
# **METI “WORK & LIFE OF ENGINEER IN 21<sup>ST</sup> CENTURY” RESEARCH**

**TAKASHI YOSHIMORI**

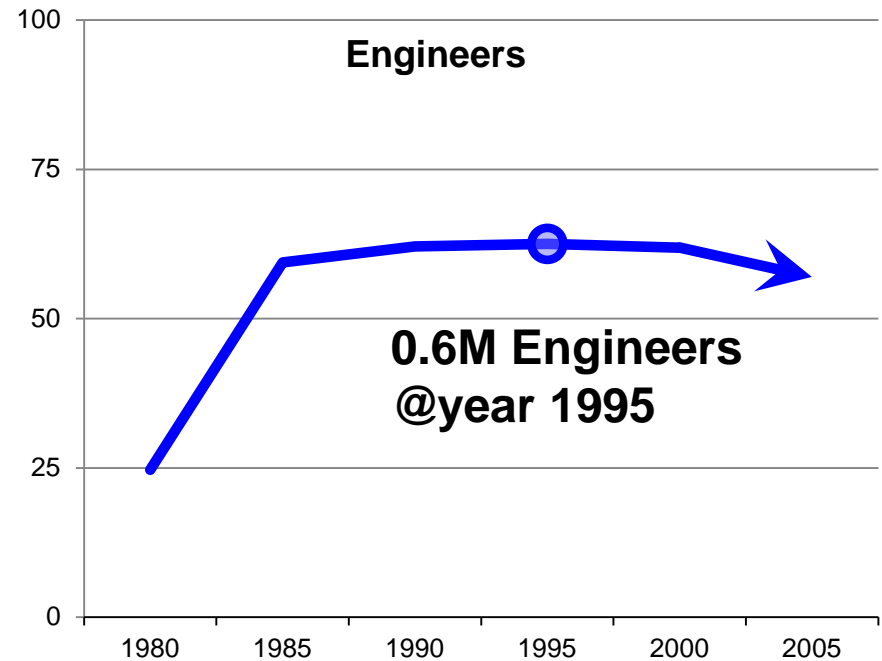
**TOSHIBA SEMICONDUCTOR & STORAGE PRODUCTS COMPANY  
CO-CHAIR :WORK & LIFE OF ENGINEER RESEARCH PROJECT, METI**

# Population of the Engineers in Japan

## All industries



## Manufacturing industry



**2.5M engineers in Japan @ year 2000**  
**Begin to decline now**

# Work & Life of Engineer Research Project, METI

---

## Trigger

- Engineers are recognized to be quite valuable resources in Japan
- As a fact ,many engineers in semiconductor industry is now losing their jobs and facing difficulties to find reasonable next place. These bad trend has to be recognized as ‘Nation level damage’

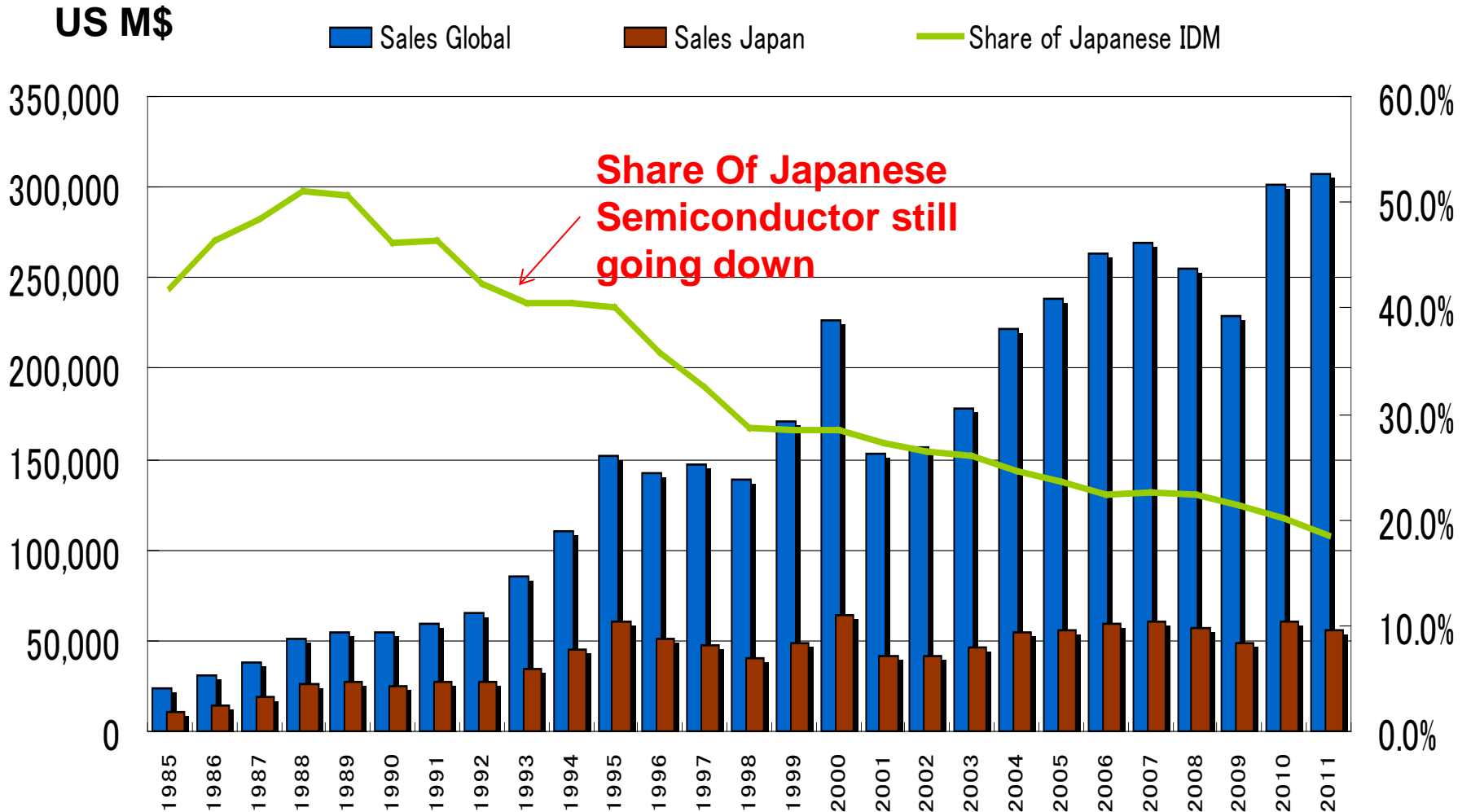
## Objectives

- Analyze ‘What has happened on semiconductor engineers’
- Analyze and discuss ‘Environment around the engineers’ and ‘Preferable ways of individual engineer’s growth’.
- Define ‘Effective directions to improve current situation’

## Activities (2014 Jan - Mar)

- Discussion among the committee members
- Conduct Interviews and questionnaire toward management & individual engineers
- 1<sup>st</sup> Report will be compiled till end of the March 2014

# Position Of Japanese Semiconductor Industry



# Challenges/Changes toward 'Engineers'

---

- **Business target itself of the company changes in short period.**
- **Technology itself changes and progress every year. Each technology area is something like 'Deep- Well'**
- **Above two trend enforce 'Engineers' to change, improve their capability in relatively short period.**
- **Current Japanese environment around 'Engineers especially at the company' is not so comfortable**
- **Because**
  - **No sufficient structure to get education for those engineers**
  - **Basically Japanese engineer is bundled by the each companies**
  - **No sufficient time to learn new area because of lack of time**
  - **There are still various barriers to change companies**

# Discussion with people who is now studying 'Engineers' @ foreign countries

- Is there any new challenges about 'Engineers life and work' in your own countries ?
- Environment around 'engineers'
  - Is there any good service to provide for growth of the engineers who has experience to work for companies as a engineer. DIF at France ?
  - How difficult to find out new ideal work place for the engineer when something occurred on their current organization/company ?
  - Is there any governmental activities to improve engineers circumstances ?

# Our View (Value is shifting)

---

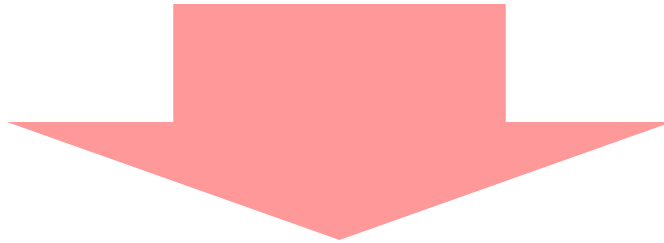
## Legacy Factors to keep competitive industry

Mass production capability itself

Minimum Cost, Shorter schedule

Quality ,Support

Employee(Engineers) 's performance for clear/visible target



**Value is shifting**

**Engineers has to shift also**

## New Value Factors to keep competitive industry

What to provide into demanding market

Unique idea

'Innovator' rather than 'Innovation'

Employee(Engineers)'s performance for invisible target and ability to collaborate with other people/industry

# Who is 'Innovator' ?

---

## **Innovation**

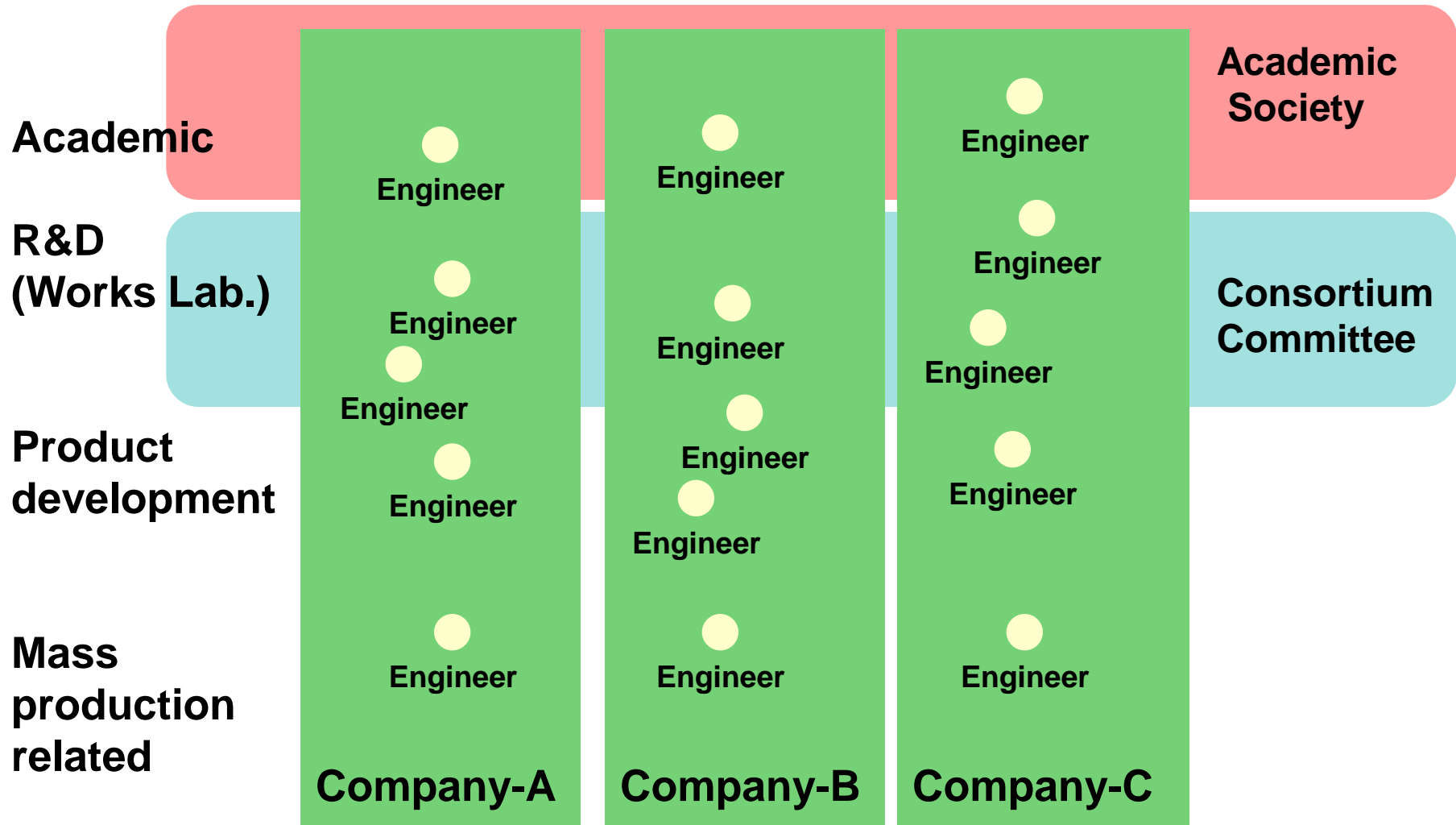
- Innovative each result that was created by innovative persons
- There are 'Process innovation' and 'Product/Service innovation'
- For the engineering field, 'Inventions' are treated as innovation

## **Innovator**

- People who can integrate many existing capabilities and innovations for realizing new product or services
- Innovator is more like 'Producer' with unique vision and enthusiasm.



# Historical Environment of Japanese Engineers

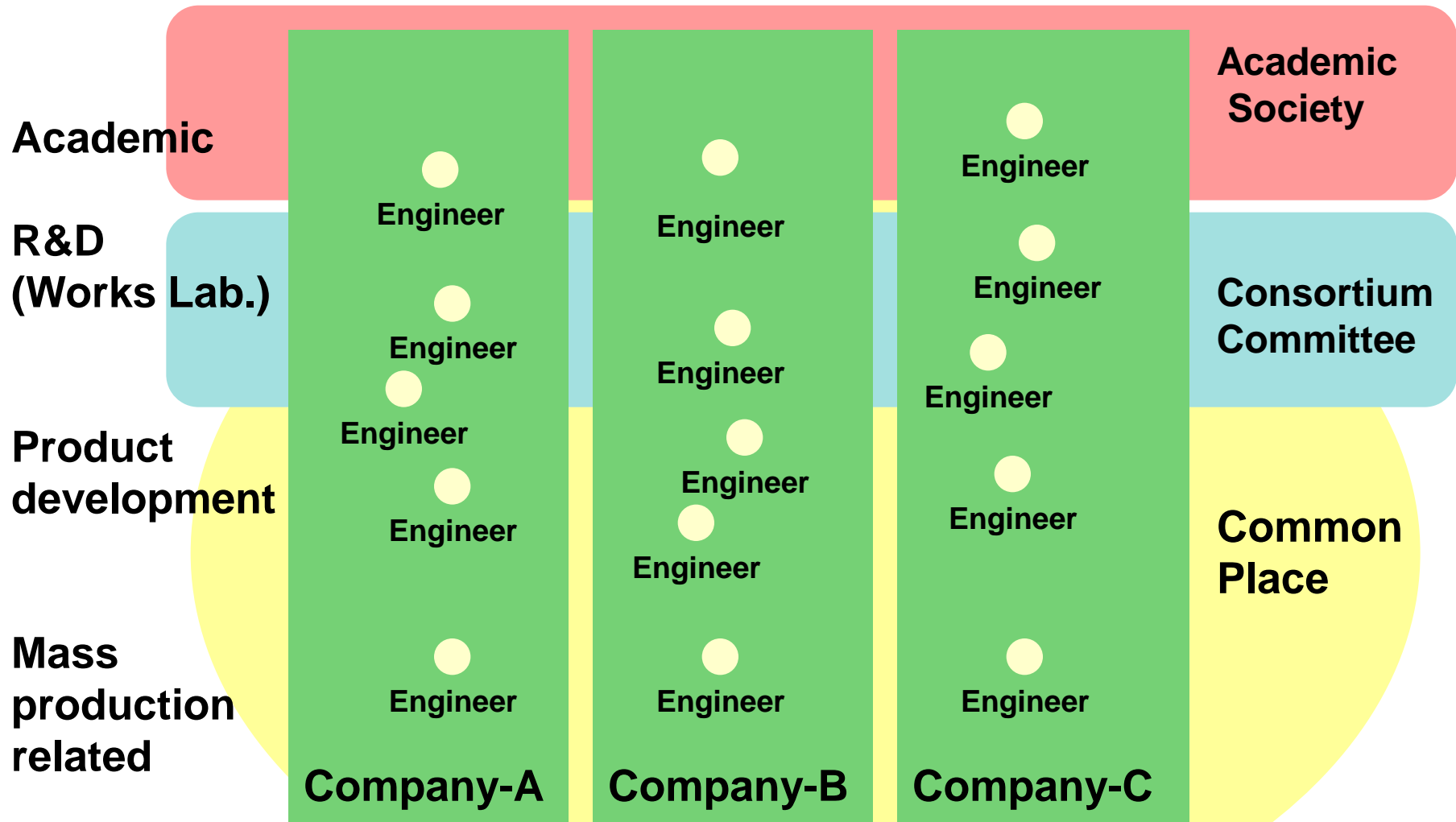


**Individual Engineer is Vertically bundled**

Reasonable model for manufacturing oriented companies

Committee : 'Life and Work of Engineer' 2014

# Improvement to fit 'Creative Activities'



**Field of 'Common' for the engineer is required to fit new trends**

# Tentative idea (Committee now in discussion)

---

- ✿ Better functions or services which enable individual engineers to use existing knowledge/skills more
- ✿ Better functions or services to improve engineers skill in industry both current area and new area.
- ✿ Do something against 'Rigid culture' on industries and engineers
  - From 'How' culture to 'What' culture
  - More Individual triggered act rather than organization-wise visible target
  - Tolerance to handle other cultures and ideas
- ✿ Social barriers (If any)
  - Annuity system , etc

---

**END**

# Engineers In Japan

**Table 1: Changes in the number of natural scientists, engineers and all other workers**

**A) All industries**

Year	All other workers	Index	Natural Scientists and engineers			
			Total	Index	Engineers	Natural scientists
1980	55,778,234	100	937,871	100	874,142	63,729
1985	58,336,129	105	1,824,045	194	1,729,536	94,509
1990	61,679,338	111	2,218,603	237	2,108,239	110,364
1995	64,181,893	115	2,537,927	271	2,370,303	167,624
2000	63,032,271	113	2,676,227	285	2,523,885	152,342
2005	61,530,202	110	2,283,097	243	2,140,612	142,485

**Approx 2.5M engineers in Japan (All Industries)  
Population of Engineers decline after year 2000**

# Engineers In Japan

## B) Manufacturing industry

Year	All other workers	Index	Natural Scientists and engineers			
			Total	Index	Engineers	Natural scientists
1980	13,041,563	100	258,404	100	246,692	11,712
1985	13,837,254	106	617,195	239	593,979	23,216
1990	14,502,665	111	643,056	249	621,076	21,980
1995	13,374,189	103	668,915	259	625,329	43,586
2000	12,202,064	94	657,603	254	618,804	38,799
2005	10,485,635	80	602,396	233	569,666	32,730

Source: Population Census (Statistics Bureau of MIC)

**Approx 0.6M engineers in Japan (Manufacturing)**  
**Population of Engineers decline after year 1995**

# Biography Takashi Yoshimori

---

- ❖ **Master Degree (Osaka Univ.Computer Science) 1982**
- ❖ **Join Toshiba Semiconductor in 1982**
- ❖ **EDA development (Static Timing Analysis) 1983**
- ❖ **RTL design for Toshiba midrange computer 1984**
- ❖ **DFT (Scan,JTAG) 1985**
- ❖ **Project Leader for many ASIC/SoC in TOSHIBA  
(Mainly computer related LSI) 1986 –1998**
- ❖ **Senior Manager of IP development section in TOSHIBA 1999**
- ❖ **TOSHIBA corporate IP center at TSB hq. 2000**
- ❖ **CTO of IPTC (IP Trade Center) 2000 – 2001**
- ❖ **TOSHIBA semi. General Manager System LSI Design Div. 2002**
- ❖ **Technology Executive (SoC Design) 2003 -**
- ❖ **Assistant chief Technology Executive 2009 -**