

DENSO

Crafting the Core

Industry-Academia-Government Collaboration from an International Perspective

The 12th APAC DA-EWG session

Masato Nakagawa

DENSO Corporation, Fellow

JST, Senior Fellow

Hiroshima University, Guest Professor

Date: 18 April, 2023

Place: Muromachi Mitsui Hall & Conference, Tokyo



Agenda

1. Self-introduction

2. Industry-Academia-Government Collaboration
in Germany 

- Fraunhofer Institute Activities  Fraunhofer

3. Automotive Industry Activities in Germany

4. Lessons and Learn from Germany

Self-introduction

- 1956.12.30 born in Aichi, Japan
- Graduate from Hiroshima University in 1980
- Joined DENSO Coloration: Powertrain Engineering
- Long Experiences in overseas
 - Iowa, US : 1988-1993 Engineer **Today's Speech**
 - London, UK : 2003-2004 Chief Engineer
 - Düsseldorf, DE : 2005-2014 Engineering Head
 - Amsterdam, NL : 2014-2015 EU President & CEO
 - Munich, DE : 2016-2017 EU CTO
 - Tokyo, JP : 2017-2019 Global Technology Affairs Officer
Hiroshima University
Guest Professor
DENSO Fellow
- FEV Japan : 2019-2020 Director & CTO
- JST : 2020 Senior Fellow



**Masato
Nakagawa**

**DENSO Corporation,
Fellow**

JST, Senior Fellow

**Hiroshima University,
Guest Professor**

Note: JST = Japan Science and Technology Agency

Self Introduction-2



Masato(Max) Nakagawa

Fellow
Guest Professor HIROSHIMA UNIVERSITY



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Industry Field

DENSO Corporation / Fellow
Automotive Sector, Engineering



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Hiroshima University / Guest Professor
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Government Field

JST / Senior Fellow
Moonshot Program
COI-NEXT Program Officer



Agenda

1. Self-introduction

2. Industry-Academia-Government Collaboration
in Germany 

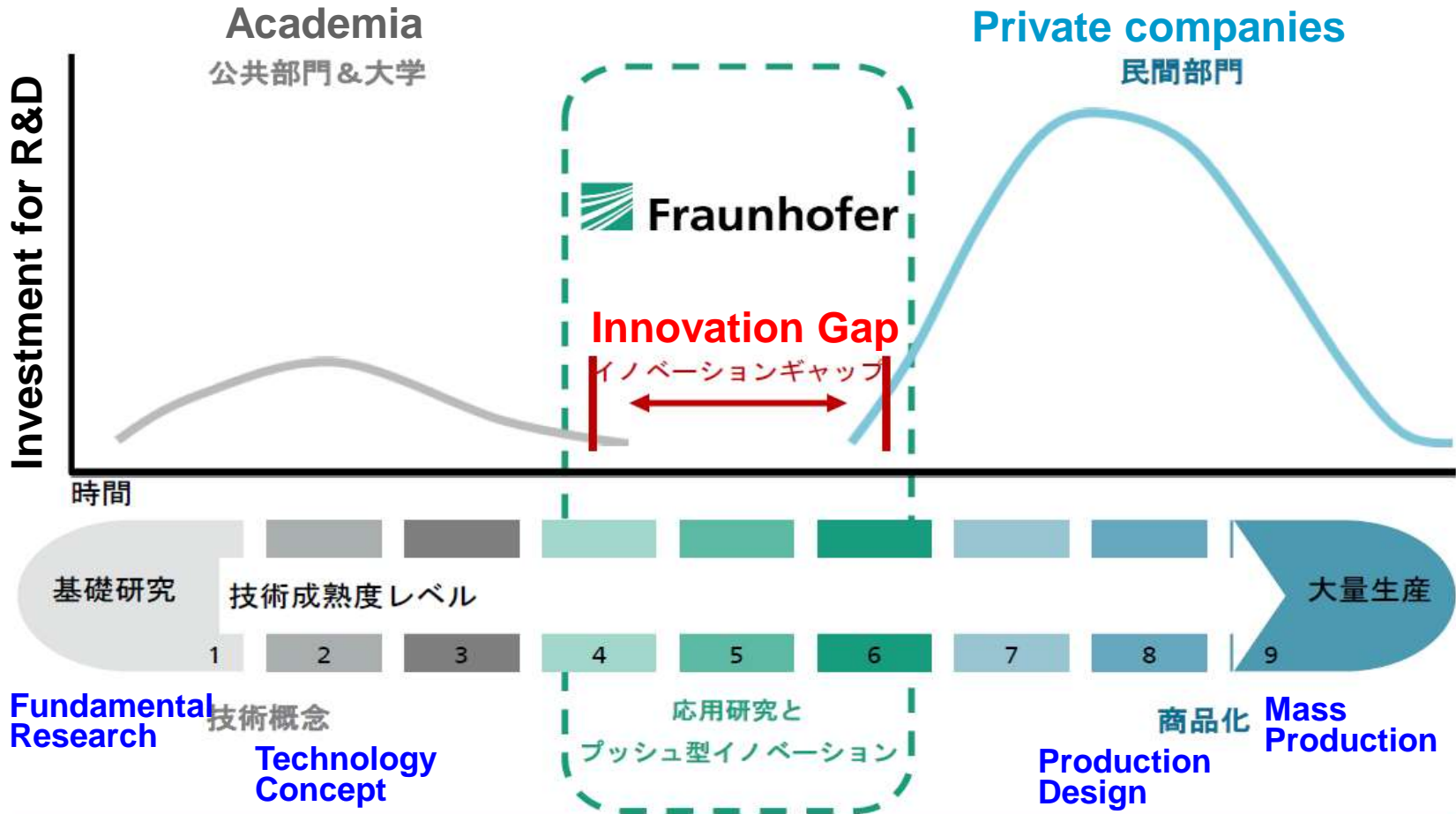
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4. Lessons and Learn from Germany



< Mission > Bridge between Academia and Industry(Private companies)



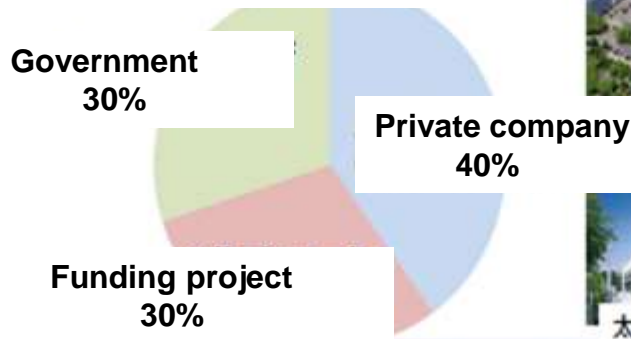
< Source > Fraunhofer Japan presentation material



< Mission > Bridge between Academia and Industry(Private companies)

1. Number : **75** facilities in Germany
2. Staff member : 29,000(**students:7,300人, 26%**)
3. Location : at the **University site**
4. Working : **Concurrent job** w/Professor
5. Funding : accordance w/revenue
6. Contribution : **Fraunhofer Academy** (2006~)
 Training course for private company
 Open to testing equipment for private companies
7. Cluster : Collaborate w/private companies, university
 →Start-up companies born from Cluster

Budget structure



久住研究所



太陽エネルギー研究所



Agenda

1. Self-introduction

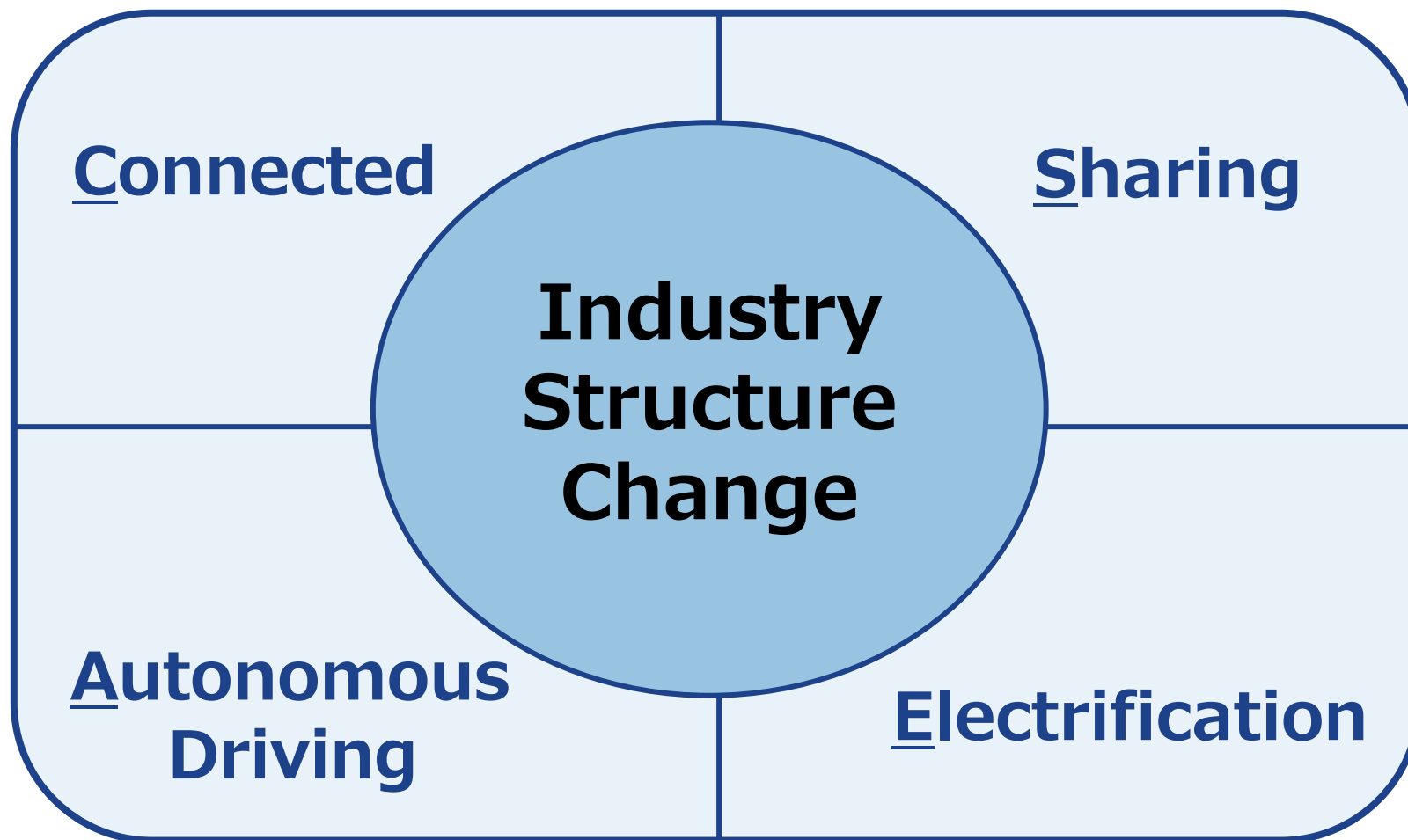
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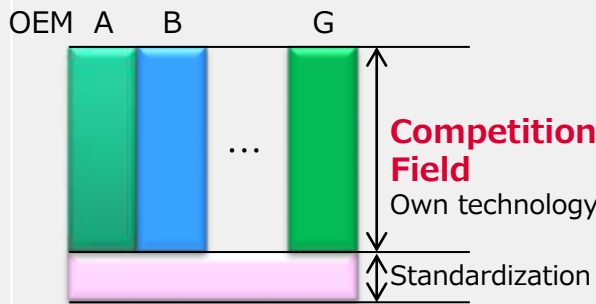
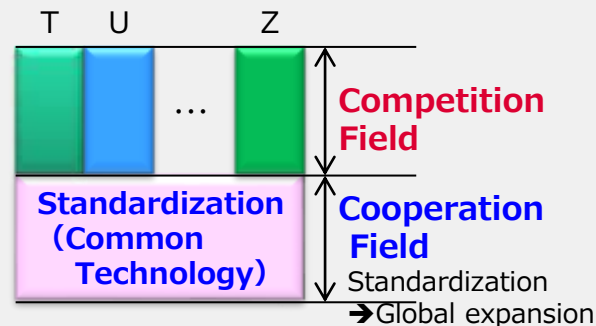
4. Lessons and Learn from Germany

Automobile Industry <CASE>



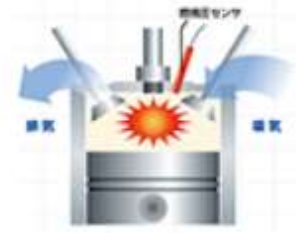
Big change for automotive industry once a 100 years

Development Approach: Japan vs Germany

	 Japan	 Germany
Business model	Japan way oriented	EU → Global expansion
Circumstances	Uniformity	Diversity
Working style	Teamwork	Individualism
Technology Development Style	<h2 style="color: #e91e63;">Self-Development</h2>  <p>OEM A B G</p> <p>Competition Field Own technology</p> <p>Standardization</p>	<h2 style="color: #0070c0;">Cooperation & Competition</h2>  <p>T U Z</p> <p>Competition Field</p> <p>Cooperation Field Standardization → Global expansion</p>



Cooperation Field & Competition Field



Ex) Internal Combustion Engine



	Key Points	Example
Cooperation Field (non-competition)	<p>The field of "WHAT"</p> <ul style="list-style-type: none"> • What to measure the in-cylinder pressure • What function is required • What to prove the accuracy 	<p>Definition of CPS</p> <ul style="list-style-type: none"> • Sensing accuracy <p>Testing method</p> <ul style="list-style-type: none"> • Way of testing with high accuracy
Competition Field	<p>The field of "HOW"</p> <ul style="list-style-type: none"> • How to built-up the elements • How to utilize each components/elements • How to promote the CPS and sale CPS 	<ul style="list-style-type: none"> • Which elements/ components are the best • How to use CPS • How to design CPS • Cost

Note) CPS : Cylinder Pressure Sensor (Engine in-cylinder pressure sensor real-time)

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 4. **Lessons and Learn from Germany**
- 



Germany Working Style

Highly labor efficiency (short labor time, but high output)

- Yearly average labor time : Germany=1,371h vs Japan=1,719h
- Labor productivity : Germany=66.6 \$ vs Japan : =45.5 \$

note) Labor productivity=GDP by one person/one hour

<Reason>

- At the beginning of Development phase, **Competition Field** and **Cooperation Field** (non-competition)
- Labor time regulation(ex: 40 hours maximum/week, 10 hours maximum/day)

[Issues in Japan]

1. From Industry/Society

- Less “cooperation” business model ➡ extend *Cooperation Field*
- Immediate power of power ➡ consider the *Education System*
ex) **Germany internship system**

2. From individual/company(management viewpoint)

[individual] mind-set: short working time, **maximum output**
[company] **strategic human development**



German Internship System

1. Two type of Internship System

1) **Compulsory Internship**

Mandatory to join as a curriculum. Full-time job

2) **Voluntary Internship**

Voluntary to join for grasping the professional job.

2. Example of internship system(Long-term working)

Compulsory + Voluntary Internship(4~6 months)

[ex: RWTH Aachen University]

Spring to summer semester : April to July(3.5M)

Fall to winter semester : Oct to Feb(4M)



【Features】 • Less mismatching
• On-hands experiences, ready to work

references) income for student : 300~1,540€/month
(Legally, 8.84€/hour, approx.1,540€/month)



Germany way collaboration NRW state

Note) NRW: Nordrhein-Westfalen

- 1 / 4 of Germany GDP
- most industrial state in Germany



Aachen Cluster



Private company

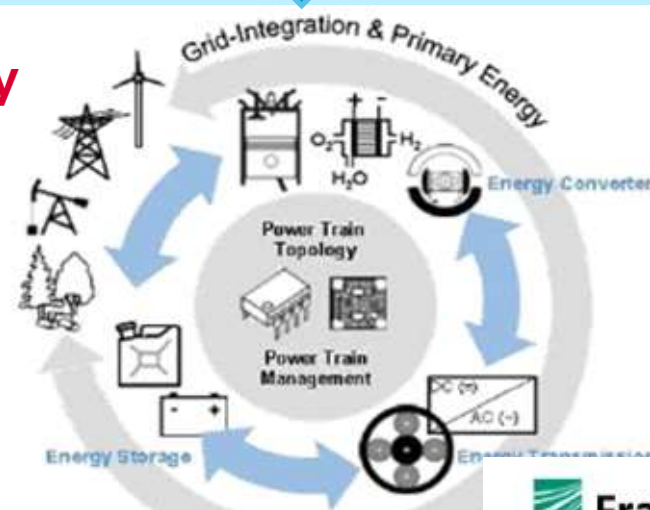
Collaboration

University



Research activity collaboration

Funding support



Institutes





Aachen Cluster

Germany Innovation Strategy(2006-2021)

- The focus points of German Government;
 - ① Basic research reinforcement
 - ② **Industry-Academia-Government Collaboration**
 - ③ Cross-functional activity among Government
- **Expedite Cluster-program from 2006**

25 Clusters operation in Germany



Most of Start-up were born from Cluster operation

Ex) 1,837 start-up raised up. The half of them came from Cluster.

Success story from Aachen Cluster



Deutsche Post DHL Group
"StreetScooter"

Summary

There is still a lot to come on RWTH Aachen Campus



Lessons and Learn from Germany

Global Competition



Asia way

Good points of Asia counties

1. Teamwork Get rid of it
2. Diligent
3. Get rid of it... etc



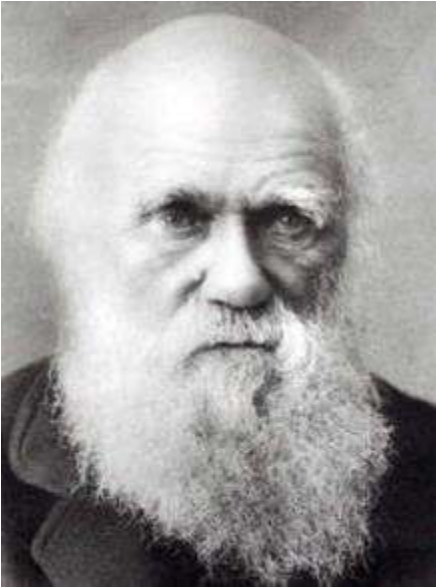
Germany way

To learn DE way

1. Efficiency/Reasonable
2. Standardization
3. Collaboration...etc

Fusion

Guideline for Industry Reforms



“It is not the strongest of the species that survive, nor the most intelligent, but the one most **adaptable to change.”**

Charles Darwin

To meet drastic/dynamic circumstances change,

1. **Chance** :Society, Circumstances change is **Chance**
2. **Change** :Intentionally **Change**
3. **Challenge** :Higher target setting and **Challenge**

Quick Review of Today's Lecture

□ EU Way's Technology is Driven by Unique Development Approach

2-ways approach by **Competition Field** and **Non-competition Field**

- **Competition Field** : promote the differentiated technology
- **Non-competition Field** : collaborate w/other companies to promote the common technology / standardization

□ Germany Innovation Way : **Industry-Academia-Government Collaboration**

Fraunhofer Institute is a key to promote the collaboration



Aachen Cluster is one of typical innovation activities in Germany



< Message to Team APAC DAEWG >

1. Expand the **non-competition field** so that we can focus on the competition field into your resources
2. Promote the collaboration among **Industry-Academia-Government**

<Inquire>

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DENSO

Crafting the Core

Thank you for your attention!

- END -

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