Overview of Education, Research, and Innovation in Germany

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A black and white photograph of two scientists, a woman and a man, both wearing safety glasses and lab coats. The woman is holding a rack of test tubes. The image is partially obscured by a large black triangle with a gold outline that points towards the bottom left.

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- A small gold triangle composed of horizontal lines, located in the upper right area of the slide.
- I. Overview of Cooperation between Higher Education and Industry in Germany
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► Mentimeter Quiz

Apakah profesi Anda saat ini?

► Mentimeter Quiz

Apa yang terbayangkan oleh Anda jika mendengar kata Jerman?

I. Overview of Cooperation between Higher Education and Industry in Germany

Types of Higher Education in Germany

University/Technical
University

University of
Applied Sciences (FH)

University of Cooperative
Education (Dual System)

School of Education (PH)

Theologische Hochschule

Fachhochschulen für öffentliche
Verwaltung (FHöV) and
DHV Speyer

➤ Mentimeter Quiz

Program studi apakah yang tidak ditawarkan di University of Applied Science/Fachhochschule/Politeknik di Jerman?

University

- Offer almost all study programs
- Offer PhD programs
- Focuses on research, theories, and sciences
- Learning in large classes
- Minimum student supervision
- Professors have experiences in research

University of Applied Sciences

- Do not offer medicine, teacher education, law, and natural sciences
- No PhD programs, except in cooperation with universities
- Focuses on the applications of sciences
- Learning in smaller classes
- Intensive student supervision
- Professors have experiences in industry

Bidirectional Relationship between Industry and Higher Education

Comparison between Indonesian and German Lecturer

Qualification	S2 or S3	++ S3 ++
Linearity vs. transdisciplinary	Linearity is important	Transdisciplinary is strength
Decision maker in recruitment	Policy makers	Users: colleagues, industry, students, ...
Authority	According to rules from government/policy makers	<i>Freedom of teaching and research</i>
Access to resources	Resources are managed by „home base“, e.g. study program, faculty	Resources are managed by the professor
Teaching load	12 SKS?	9/10 SWS (Uni), 18 SWS (FH/UAS)
Performance evaluation	Standardized (nationally)	Based on agreement by considering strengths and weaknesses
Career mobility: industry - academia	Generally not possible	Encouraged

Typical Organization Structure in Universities

➤ Mentimeter Quiz

Institusi pendidikan manakah yang tertua di Jerman?

II. Dual System Model

University of Cooperative Education and
Vocational School

History of Vocational Education in Germany

What is Dual System?

Business/Industry

**3-4 days a week
(± 70%)**

- Students register to the company
- Students get working contract

School/University

**1-2 days a week
(± 30%)**

- No maximum age limit

Education Structure/Focuses

- Practices
- Professional skills e.g. soft skills, work safety, etc.
- Casuistic learning

- Theories
- Structured thinking
- Systematic learning

Source: Bertelsmann Stiftung

Dual System is Public Private Partnership

Regulation and supports:

- Responsible for school/university education
- Support negotiation processes

Government

BBiG

Berufsbildungs
gesetz

Student/employee +
companies

Association/
Chamber of commerce

bibb Bundesinstitut für
Berufsbildung

Research and consulting institution

Qualification exam,
quality assurance

Source: Bertelsmann Stiftung

➤ Mentimeter Quiz

Manakah negara yang kurang berhasil menerapkan pendidikan vokasi sistem dual ala Jerman?

Successful Countries Adapting Dual System

Switzerland

Austria

Denmark

Norway

Netherlands

Luxemburg

Adapt each pillar to suit the local context

Not Successful Countries

- Centralistic social structure
- Lack of a quality control role: professional associations and chambers of commerce
- There is no clear separation between planning and operational work

- The partnership between the government and the private sector is not successful
- Private sector is highly market dependent
- Vocational schools are either fully financed by the government or the private sector

- Public acceptance of vocational graduates is low

► Mentimeter Quiz

Manakah institusi riset Jerman yang berfokus pada riset terapan?

Research in Germany

RESEARCHER RANKINGS

Germany has the highest number of researchers working in science and technology industries and academia in the European Union.

THE GERMAN GOVERNMENT LOVES SCIENCE

In 2016, researchers working across the natural sciences received more funding than those in other academic disciplines.

GERMAN R&D UNDER THE MICROSCOPE

A self-ranked assessment of how public and private research organizations in Germany are funded and their research priorities.

(Boychev 2019)

Triple Helix Innovation Model

Model 1

Model 2

Model 3

(Etzkowitz & Leydesdorff 2000)

Triple Helix Implementation in Germany

1: University Spin-Off

Bundesministerium
für Wirtschaft
und Technologie

eXIST
Existenzgründungen
aus der Wissenschaft

Startup founder scholarship

Grants for transfer from research to start-up

Support of start-up culture in university

Example of
successful startups

OPENEXPERIENCE

SHAREMAC

PHYSEC
security for things

vilisto
einfach Wohlfühlklima

NosoEx[®]
powered by GWA Hygiene

Transformation of University Program

Image: HS Karlsruhe

- Integration of startup programs in university's curricula
- Startup activities substitutes courses credits

2: Open Research and Innovation Projects

Project Examples

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Di kota manakah letak klaster inovasi software di Jerman?

3: Strategic Alliances and Innovation Clusters

Source: BMWi

4: Collaborative innovation labs: Industry 4.0 implementations

- Small and Medium Enterprises
- University Research
- Research Outside University
- Large Companies

Testbeds

Source: Plattform Industrie 4.0

Triple Helix Model 3 Requires Transformation of All Parties

From teaching to **research and innovation** university

From closed to **open innovation**, from one-man show to **ecosystem of global village**

From top-down to **bottom-up** policy making

Indonesia: Quintuple Helix?

(based on Carayannis et al 2012)

IV. Internationalization of Higher Education

Internationalization of Higher Education

Contribution to National Income

- Low national budget allocation for higher education
- Government strategy is commercialization, autonomic implementation at univ. level
- Examples: UK, Australia, New Zealand, US (partially), Canada (partially)

Getting *skilled labour*

- Getting world's *best talents*
- Issuing work and residence permits after graduation
- Equality between local and foreign students
- Examples: Sweden, the Netherlands, Germany, Canada (partially)

Improving Academic Quality

- Scholarship to study abroad to learn *best practices*
- China: bidirectional, recruitment of researchers, world class research facilities
- Rusia: 100,000 scholarships to study abroad in applied sciences
- Outbound mobility: Brazil, Mexico, Kenya, Senegal, South Africa

Internationalization at Home

- International competence improves local competence
- International class rooms and study programs
- Examples: the Netherlands, Jacobs University Bremen

Takeaways for Indonesia

- Link and match required transformation in different sectors in higher education e.g. career mobility, recruitments, curriculum, accreditation
- Adoption of dual system requires contextualization, not just copy-paste
- Balance between standardization and flexibility
- Triple Helix Model 3 requires transformation of all parties
- Internationalization has to base on local needs, not just pursuing the global ranking
- Ranking is an indicator, the local impacts and needs are much more important

Thank You

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