



# RASIONAL REVISI KURIKULUM

## Pada Era Revolusi Industri 4.0

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# MENGAPA HARUS REVISI KURIKULUM ??



A

ISU REVOLUSI  
INDUSTRI 4.0

# Revolusi Industri 4.0:

“Sebagai Peluang dan sekaligus Tantangan”

- Muncul pekerjaan baru yang “sulit” diprediksi  
→critical thinking (nalar), adaptasi, pembelajar sepanjang hayat
- Internet of Thing
- Literasi Baru : Literasi Data, Literasi Teknologi dan Literasi Manusia
- Artificial Intelligence
- Big Data
- Desruptive Innovation

# Revolusi Industri 4.0:

## “Sebagai Peluang dan sekaligus Tantangan”

- Era Industri 4.0 = transformasi digital pada banyak bidang (manufaktur, pertanian, jasa, pendidikan, dan lainnya). Contoh digitalisasi manufaktur menerapkan teknologi digital seperti *intelligent robots, drones, teknologi sensor, artificial intelligence, teknologinano*, dan 3D printing
- Era transformasi digital mengakibatkan perubahan struktur pasar kerja, akan mengancam *low-skilled* tenaga kerja dan 40 % pekerjaan yang ada saat ini
- Transformasi pasar kerja membutuhkan **lulusan perguruan tinggi disertai oleh perubahan struktur posisi pekerjaan. Banyak jenis pekerjaan muncul dibandingkan yang hilang**
- Implikasi era digital mengancam tataran sosial masyarakat (*social atomization*, individual, turunnya solidaritas,

- **Economy:** today's globalised economy faces continuous and unpredictable change. Flexibility is a must to cope with volatility and stay competitive



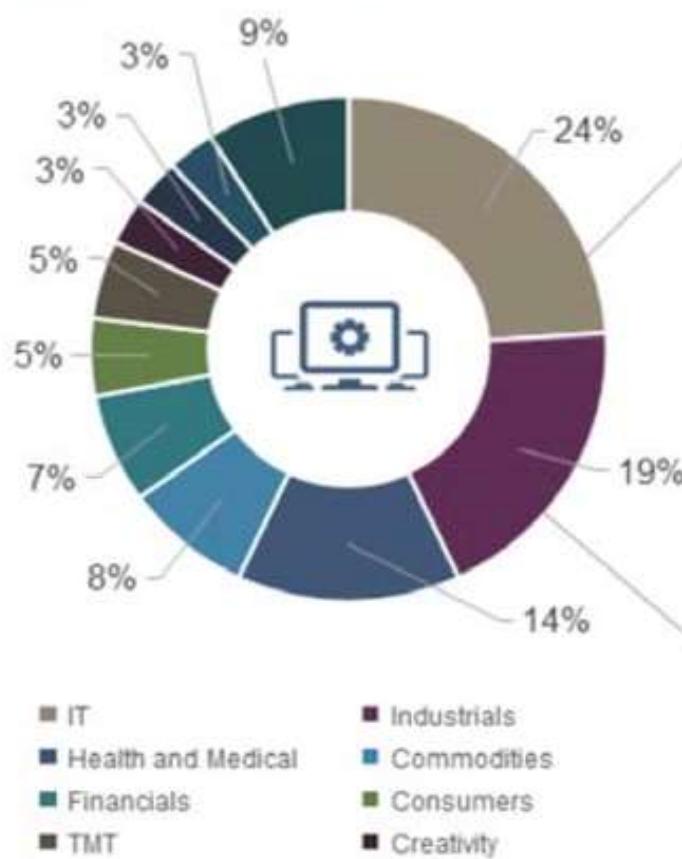
- **Technology: 1 in 2 jobs under threat from computerization by 2030**

- 47% of US jobs are at risk from automation, but not all cities have the same job risk, Malaysia 67%, China 77%, Thailand 72%, Cambodia 78%, Ethiopia 85%
- Million of new job profiles created and skills needed
- **60% of young people** entering the world of work by **2025** will perform **jobs not existing today**

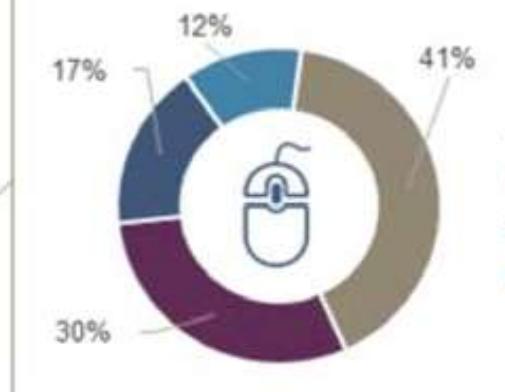
# Technology: millions of new job profiles created and skills needed

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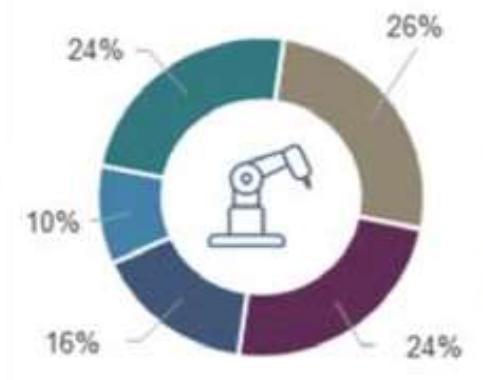
'What are the most promising industries and/or technologies you see ahead for new job creation?'



## IT sector



## Industries



## Job opportunities for today and tomorrow

### IT/Digital/Robotics

- Security analysts
- Data scientists
- Cloud architects
- Gamification designers
- Avatar managers
- Community managers

### Green Jobs

- Wind energy operations managers
- Automotive engineers

### Healthcare/Personal Care

- Bioinformatic technicians
- Informatics nurse specialists
- Nuclear medicine technologists
- Medical equipment repairers
- Health and wellness educators
- Personal trainers

(Sources: TECHNOLOGY AT WORK v2.0 - The Future Is Not What It Used to Be, Citi and Oxford Martin School, 2016)

- Demographics: the era of aging  
**2035 young generation predicted to halve**  
differences in labour supplie and demand across geographies



- Sociology : Three generations at work
  - Boomers 8%
  - Gen X/Y 76%
  - Gen Z 16%
- Regulation: boost talent competitiveness  
to be “Talent Champions” Countries:
  - Flexible labour markets
  - Talent mobility
  - Top level education
  - Vocational training

# Global Trends

(Adapted from: Roger C.Y. Chen – The Transformation into an Entrepreneurial University: The Experience of First Tech, 2016)



## UNESCO

### World Declaration on Higher Education in 1988

- Developing **entrepreneurial skills and initiative** should become major Concerns of higher education

## U.S.

### Obama's Presidential Proclamation in 2012

- November is the National **Entrepreneurship Month**
- November 16th is the National **Entrepreneurs' Day**

## European Union

### Lisbon Strategy in 2000

- **Entrepreneurship** is one of the **new basic skills** to be provided through **lifelong learning**

## Malaysia

### National Higher Education Action Plan (2007-2010)

- To create an **ecosystem of entrepreneurship education** in higher learning institution is a must

# Global Trends

(Adapted from: Roger C.Y. Chen – The Transformation into an Entrepreneurial University: The Experience of First Tech, 2016)



## China

### Mass Entrepreneurship and Innovation

- Chinese Premier Li Keqiang first public call for “mass entrepreneurship and innovation” – September 2014
- Encourages mass entrepreneurship and innovation to foster a new engine of growth for greater social mobility, equity and justice
- January 2015, China created a 40-billion-yuan venture capital fund to help innovative firms in their early stages, especially in emerging industries

## Taiwan

### Promotion of Innovation and Entrepreneurship

- “Innovation & Startups” Project (2013) by the

Ministry of Science and Technology (NT\$ 1 billion fund)

- Reform of Technological and Vocational Education”

Project (2013) by the Ministry of Education

(NT\$500 million fund)

- “Taiwan Silicon Technology” Project (2015) by the Executive Yuan (NT\$ 3 billion fund)

# Recommendation for Student:

**Focus on emerging sectors, soft skills and mobility**

**Capitalize on the opportunities of the global economy:**

- Focus on STEM, Healthcare and creative disciplines
- Skill up for the digital age
- Search for work experience to develop soft skills: stay flexible
- Focus on multilingualism
- Search for international experience
- Nurturing international networks

# Recommendation for Education Systems:

## Alignment with business and focus on new skills

### Evolution need:

- Enhance cooperation and alignment with business
- Direct students toward the fastest developing sectors
- Focus on digital skills
- Focus on development of specific “human skills”
- Fight gender gap in STEM
- Foster development of soft skills and experience:  
internship/apprenticeship schemes
- Foster international mobility
- Focus on multilingualism

# Recommendation for Regulators:

## Education system reform, simple labour markets, and private-public cooperation

### Demographic and skill shortage

- Education reform to develop employable skills & match business needs:
  - apprenticeship model
- Promotion of STEM career and disciplines
- Cooperation with private parties
- Boost openness

### Economic growth and job creation

- Simplify labour regulation
- Reduce tax on labour
- Develop knowledge hubs

# Recommendation for Companies:

## Long life learning, inclusive and diverse flexibility

Global competitiveness and economic instability

- Contingent workforce based on economy and life-cycle
- Foster mobility
- Invest in technology and hyper connectivity

3 generations at work

- Boost diversity
- Flexible schemes for different ages
- Internship/apprenticeship schemes
- Support mentorship schemes
- Training and lifelong learning

# Industrial Rev 4.0 & University 5.0

(Pratikno, 2018)

## INDUSTRIAL REVOLUTION 4.0

(Digitization, Computing Power,  
Data Analytics)

### Technology:

- Cyber-physical
- Internet of Things
- Bio-technology

### Application:

- Agricultural
- Logistics
- Manufacturing
- Etc

Content

Content

Character

Multi → Inter → Trans-Disciplinary

## DISRUPTION:

(Uncertain, Unpredictable  
Future; Constant Change)

### The Deep Shift:

- Physical → Virtual
- Human → Automation & Robotics
- Intermediary → Disintermediary

### The Paradox:

- Voice vs Surveillance
- Empowerment vs Agglomeration
- Jobs Lost vs Jobs Gained
- Abundance Scarcity

## BE THE CHAMPION:

(Disruptor instead of disrupted,  
taking benefit from unpredictable  
future; Drive the future)

### Organiz Ecosystem:

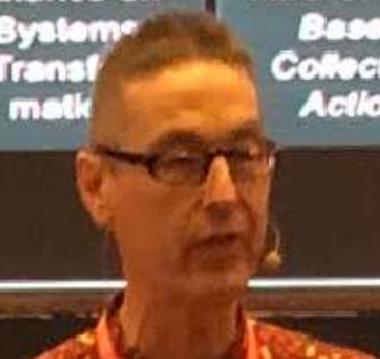
- Flexibility & Agile
- Talent Pooling
- Goals oriented
- Collaboration & Sharing

### Powerful Agile Learner:

- Empathy
- Curiosity & Creativity
- Complex Problem Solving
- Determination

## Four Stages of Systems Evolution, Four Operating Systems

OS	Health	Learning	Farm & Food	Finance	Governance
1.0: Input and authority-centric	Traditional doctor-centric medicine	Traditional teacher-centric	Traditional farmer-centric	Traditional Financial Capital	Visible Hand: Centralized
2.0: Output and efficiency-centric	Evidence based medicine	Testing: Bureaucratic learning: "fast in, fast out"	Industrial agriculture: monoculture	Extractive Capital: externality blind	Invisible Hand: Competition
3.0: Outcome- and user-centric	Patient-centric medicine	learner-centric	Organic Ag: reduce negative footprint	Impact Investing: externality aware	Dialogue: Stakeholder Groups
4.0: Co-creative and eco-system-centric	Strengthening sources of well-being	Activate deep sources of learning	Food as medium for healing planet and people	Blended Finance on Systemic Transformation	ABC: Awareness-Based Collective Action



# Versi ITS untuk Mendukung R.I. 4.0

Penyelarasan antara:

- *Digitalpreneurship*;
- *Distance Learning*;
- *IT Infrastructure/E-services/Smart Campus*;
- *Lifelong Learning*;
- *Global Network for Academic*,
- *Research and Innovation*;
- *IOT/Big Data/Intelegence Machine*;
- *Character Building 4.0*;
- *Teaching Industry; Allignment to Industry and Public Needs*; dan
- *Adaptive Environment*.

# 2022 Skills Outlook

## Growing

- 1 Analytical thinking and innovation
- 2 Active learning and learning strategies
- 3 Creativity, originality and initiative
- 4 Technology design and programming
- 5 Critical thinking and analysis
- 6 Complex problem-solving
- 7 Leadership and social influence
- 8 Emotional intelligence
- 9 Reasoning, problem-solving and ideation
- 10 Systems analysis and evaluation

## Declining

- 1 Manual dexterity, endurance and precision
- 2 Memory, verbal, auditory and spatial abilities
- 3 Management of financial, material resources
- 4 Technology installation and maintenance
- 5 Reading, writing, math and active listening
- 6 Management of personnel
- 7 Quality control and safety awareness
- 8 Coordination and time management
- 9 Visual, auditory and speech abilities
- 10 Technology use, monitoring and control



**B**

**PERGESERAN PARADIGMA  
PEMBELAJARAN**

# Tantangan: Pergeseran Paradigma Belajar Abad 21

## Ciri Abad 21

**Informasi** (Kurtzweil)  
(tak dibatasi jumlah, lokasi, dan waktu)

**Komputasi** (Moore-Koomey)  
(lebih cepat & hemat memakai mesin)

**Otomasi** (Ford)  
(pekerjaan rutin dapat diotomasi)

**Komunikasi** (Metcalfe)  
(dari mana saja, ke mana saja)

**Pengetahuan** (Ackoff)  
(dibentuk melalui data → informasi)

**Diseminasi** (Horowitz)  
(Nilai informasi = sebarannya)

## Model Pembelajaran

Pembelajaran diarahkan untuk mendorong peserta didik **mencari tahu** dari berbagai sumber observasi, bukan diberi tahu

Pembelajaran diarahkan untuk mampu **merumuskan masalah [menanya]**, bukan hanya menyelesaikan masalah [menjawab]

Pembelajaran diarahkan untuk melatih berfikir **prosedural dan metakognitif** bukan melaksanakan kegiatan mekanistik [rutin]

Pembelajaran menekankan pentingnya membentuk jejaring untuk **bekerjasama dan berkolaborasi** dalam menyelesaikan masalah

Pembelajaran **berbasis aktivitas** melalui pengamatan dan pengolahan hasilnya

Pembelajaran menekankan pentingnya kemampuan **komunikasi** lisan, tulis dan penyebarannya

# Powerful Agile Learner: Skillset Needed

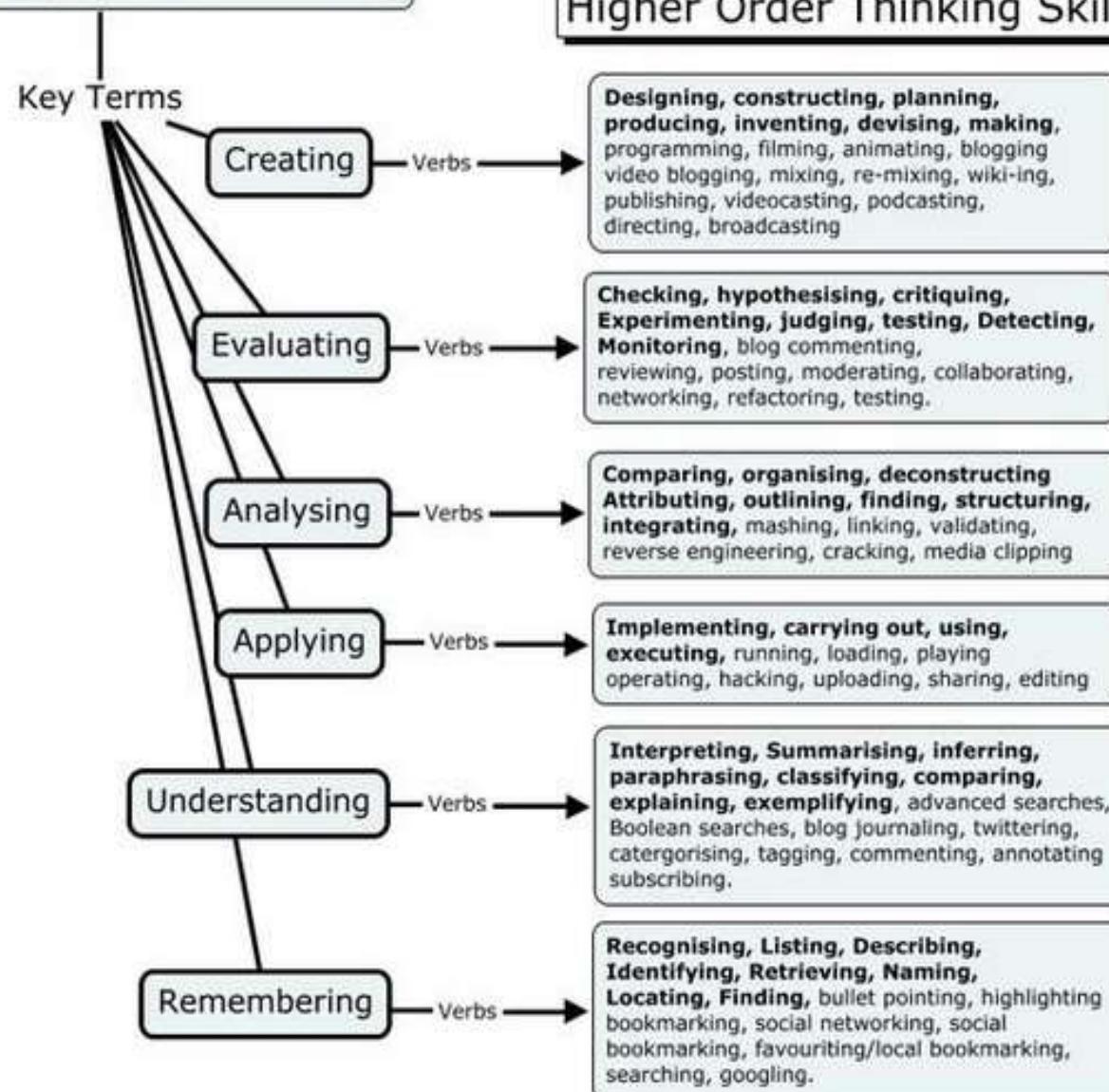
**10 TOP SKILLS  
NEEDED  
IN 2020**  
(that could not  
be replaced by  
automation) (WEF,  
2017)



- |                        |                               |                                      |                                    |   |                                 |
|------------------------|-------------------------------|--------------------------------------|------------------------------------|---|---------------------------------|
| <b>3</b><br>Creativity | <b>4</b><br>People management | <b>5</b><br>Coordinating with others | <b>6</b><br>Emotional Intelligence | <b>7</b><br>Judgement and decision making | <b>8</b><br>Service orientation |
|                        |                               | <b>9</b><br>Negotiation              | <b>10</b><br>Cognitive flexibility |   |                                 |



## Bloom's Digital Taxonomy



## HOTS Higher Order Thinking Skills

## LOTS Lower Order Thinking Skills

### COMMUNICATION SPECTRUM

- Collaborating
- Moderating
- Negotiating
- Debating
- Commenting
- Net meeting
- Skyping
- video-conferencing
- Reviewing
- Questioning
- Replies
- Posting & Blogging
- Networking
- Contributing
- Chatting
- e-mailing
- Twittering/Microblogging
- Instant messaging
- Texting

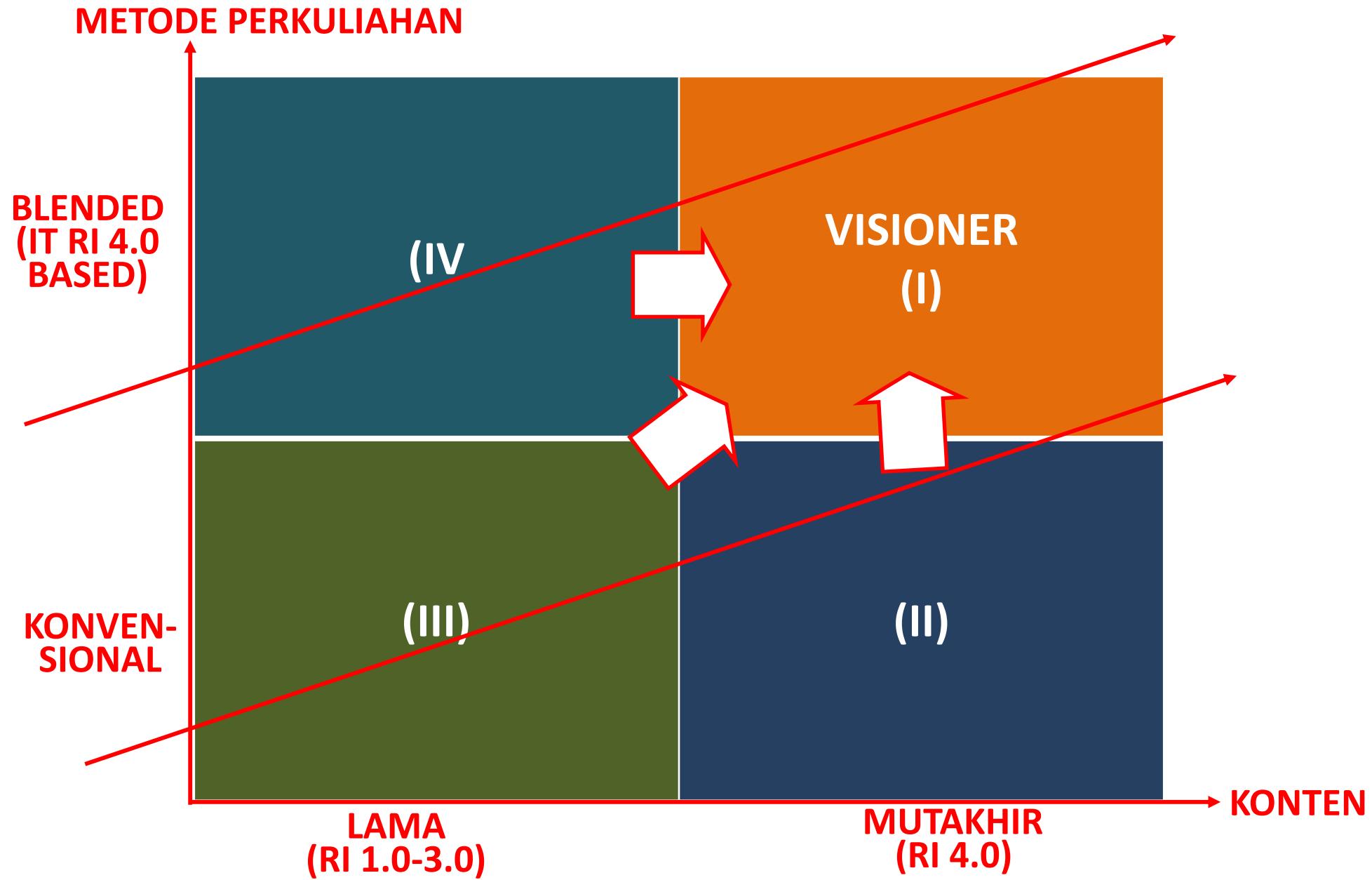
<b>Learning and Innovation</b>	<b>Inventive Thinking</b>	<b>Ways of Thinking</b>
Creativity and Innovation Critical thinking and Problem Solving	Creativity High-Order Thinking and Sound Reasoning Curiosity Risk-Taking	Creativity and Innovation Critical thinking Decision Making Leaning to Learn Metacognition
Communication Collaboration	<b>Effective Communication</b> Interactive Communication Teaming and Collaboration	<b>Ways of Working</b> Communication Collaboration
<b>Life and Carrer</b>		<b>Living in The World</b>
Social and Cross-Cultural Skills Leadership and Responsibility	Interpersonal Skills <b>Personal, Social, and Civic Responsibility</b>	Life and Carrer Personal and Social Responsibility
Flexibility and Adaptability Initiative and Self-Direction	<b>Inventive Thinking</b> Adaptability and Managing Complexity Self-Direction	
Productivity and Accountability	<b>High Productivity</b> Prioritizing, Planning, and Managing Results Effective Use of Real-World Tools Ability to Produce Relevant, High-Quality Products	
<b>Information, Media, and Technology</b>	<b>Digital-Age Literacy</b>	<b>Tools for Working</b>
Information Literacy Media Literacy Technology Literacy	Information Literacy Technological Literacy Visual Literacy Basic Literacy Scientific Literacy Economic Literacy Multicultural Literacy Global Awareness	Information Literacy ICT Literacy (information, media, and technology)
		Diadopsi dari : Paparan Sajidan, 2019



C

INOVASI PEMBELAJARAN  
ERA RI 4.0

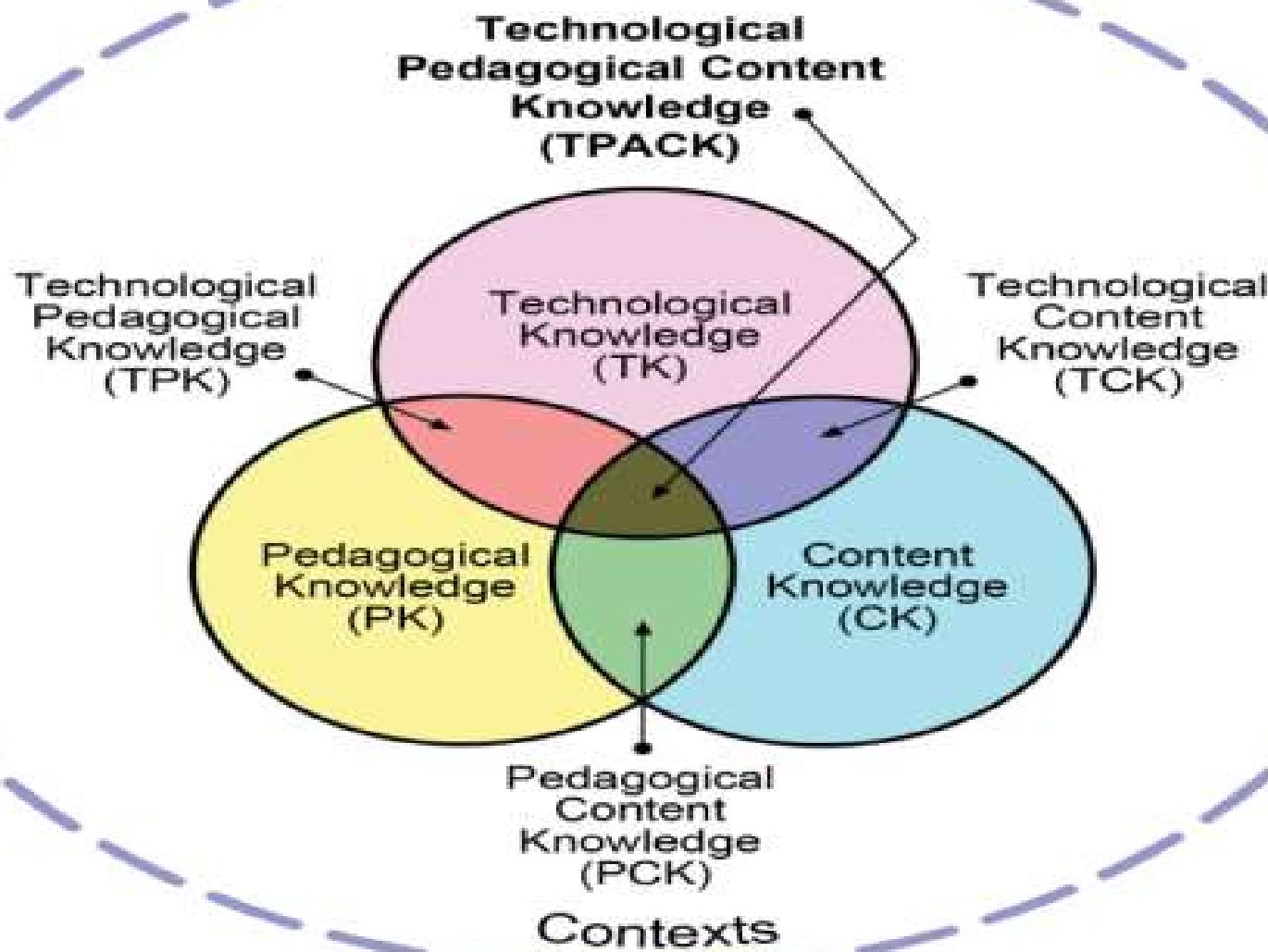
# DILEMA: KONTEN VERSUS METODE



# INOVASI PEMBELAJARAN



# 1. TPACK:



# Keterkaitan SN Dikti/KKNI, UUGD-Standar DikGu dan Kompetensi Abad 21



## PROFIL LULUSAN PROGRAM STUDI PPG

Guru profesional yang menguasai materi ajar, berkarakter dan berkepribadian Indonesia, menginspirasi dan menjadi teladan, memiliki penampilan memesona, berwibawa, tegas, iklhas, serta disiplin yang mampu mendidik, membelaarkan, membimbing, mengarahkan, melatih, menilai, dan mengevaluasi peserta didik sesuai dengan tuntutan perkembangan teknologi informasi dan komunikasi terkini dan masa depan.

# 7 Dimensi CPL Program PPG : ...1

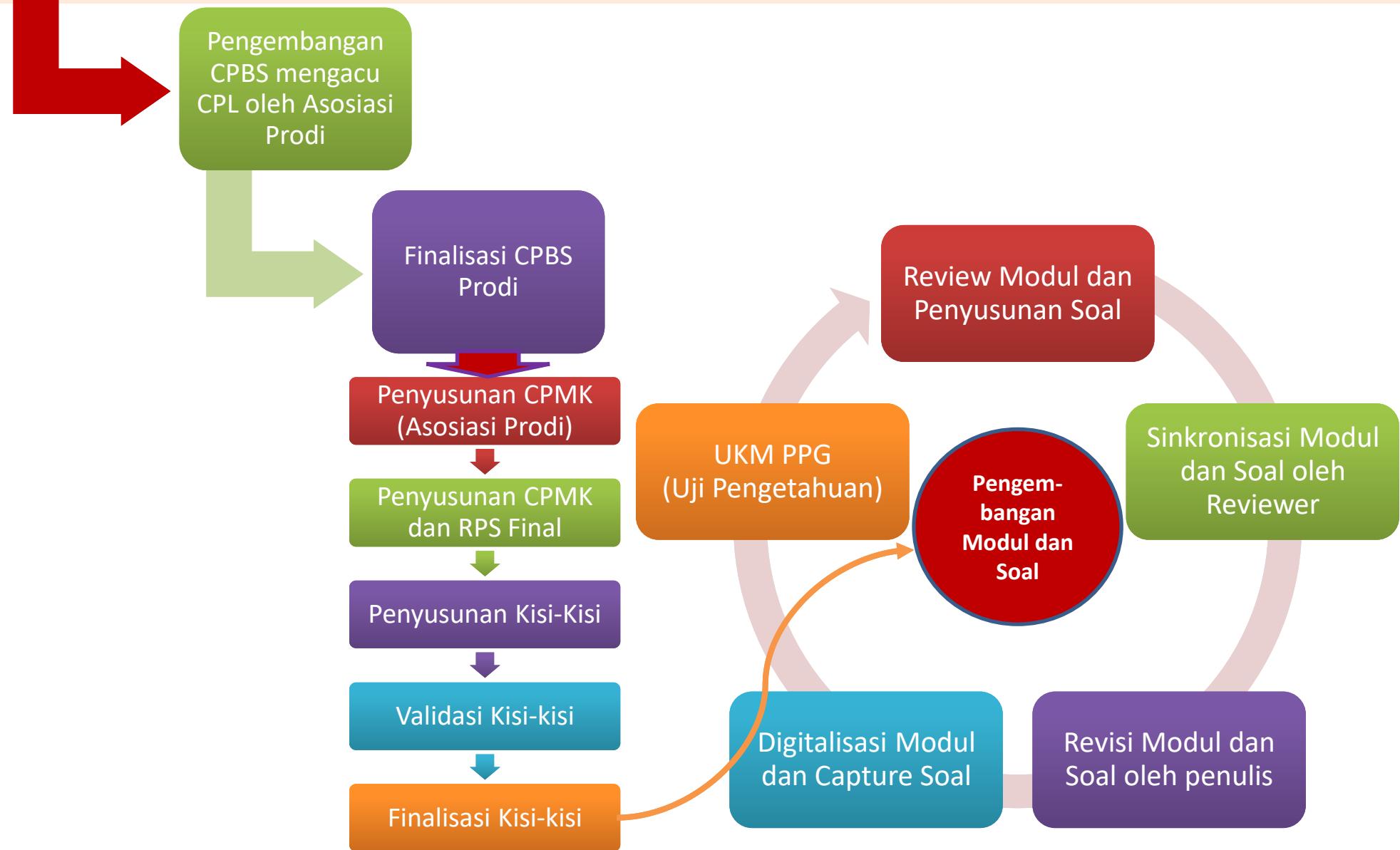
1. mampu melaksanakan tugas keprofesian sebagai pendidik yang memesona, yang dilandasi sikap cinta tanah air, berwibawa, tegas, disiplin, penuh panggilan jiwa, samapta disertai dengan jiwa kesepenuhhatian dan kemurahatian;
2. mampu merumuskan indikator capaian pembelajaran berfikir tingkat tinggi yang harus dimiliki peserta didik mencakup sikap, pengetahuan dan keterampilan secara utuh (kritis, kreatif, komunikatif dan kolaboratif) yang berorientasi masa depan (adaptif dan fleksibel);
3. menguasai materi ajar termasuk *advanced materials* secara bermakna yang dapat menjelaskan aspek "apa" (konten), "mengapa" (filosofi), dan "bagaimana" (penerapan) dalam kehidupan sehari-hari;
4. mampu merancang pembelajaran dengan menerapkan prinsip memadukan pengetahuan materi ajar, pedagogik, serta teknologi informasi dan komunikasi atau *Technological Pedagogical and Content Knowledge* dan pendekatan lain yang relevan;

## 7 Dimensi CPL Program PPG : ...2

5. mampu melaksanakan pembelajaran yang mendidik dengan menerapkan teknologi informasi dan komunikasi untuk membangun sikap (karakter Indonesia), pengetahuan, dan keterampilan peserta didik dalam memecahkan masalah secara kritis, humanis, inovatif, kreatif, kolaboratif, dan komunikatif dengan menggunakan model pembelajaran dan sumber belajar yang didukung hasil penelitian;
6. mampu mengevaluasi masukan, proses, dan hasil pembelajaran yang mencakup sikap, pengetahuan, dan keterampilan peserta didik dengan menerapkan asesmen otentik, serta memanfaatkan hasil evaluasi untuk perbaikan kualitas pembelajaran; dan
7. mampu mengembangkan diri secara berkelanjutan sebagai guru profesional melalui penelitian, refleksi diri, pencarian informasi baru, dan inovasi.

Penetapan  
Capaian  
pembelajaran  
Lulusan (CPL)  
PPG

# Alur Penyusunan CP Hingga Modul/Bahan Ajar dan Penilaian



# **Keterangan : Academic Achievement : 21 st Century Learning**

## **1. Digital Age Literacy**

- a) Basic, Scientific, Economic and Technological Literacy
- b) Visual and information literacy
- c) Multicultural literacy and global awareness

## **2. Inventive Thinking**

- a) Adaptability, Managing Complexity and self direction
- b) Curiosity, Creativity and risk taking
- c) Hgh order thinking and sound reasoning

## **3. Effective Communication**

- a) Teaming, Collaboration and interpersonal skill
- b) Personal, social and civic responsibility
- c) Interactive Communication

## **4. Hgh Productivity**

- a) Prioritizing, Planning and Managing for result
- b) Effective Use of Real World Tools
- c) Ability to prduce relevant and high quality product

# Keterangan : 21 st Century Learning

## 1. WAYS OF THINKING

- a) Creativity And Innovation
- b) Critical Thinking; Problem Solving; Decision Making
- c) Learning To Learn; Metacognition

## 2 WAYS OF WORKING

- a) Communication
- b) Collaboration

## 3. TOOLS OF WORKING

- a) Information Literacy
- b) Ict Literacy

## 4. LIVING IN THE WORLD

- a) Citizenship (Local And Global)
- b) Life And Career
- c) Personal And Social Responsibility; Cultural Awareness And Competencies

# Keterangan : Academic Achievement : 21 st Century Learning

## 1. Foundational Literacies

1. Literacy, 2 Numeracy, 3. Scientific Literacy, 4. ICT Literacy, 5. Financial Literacy, 6. Cultural and civic literacy

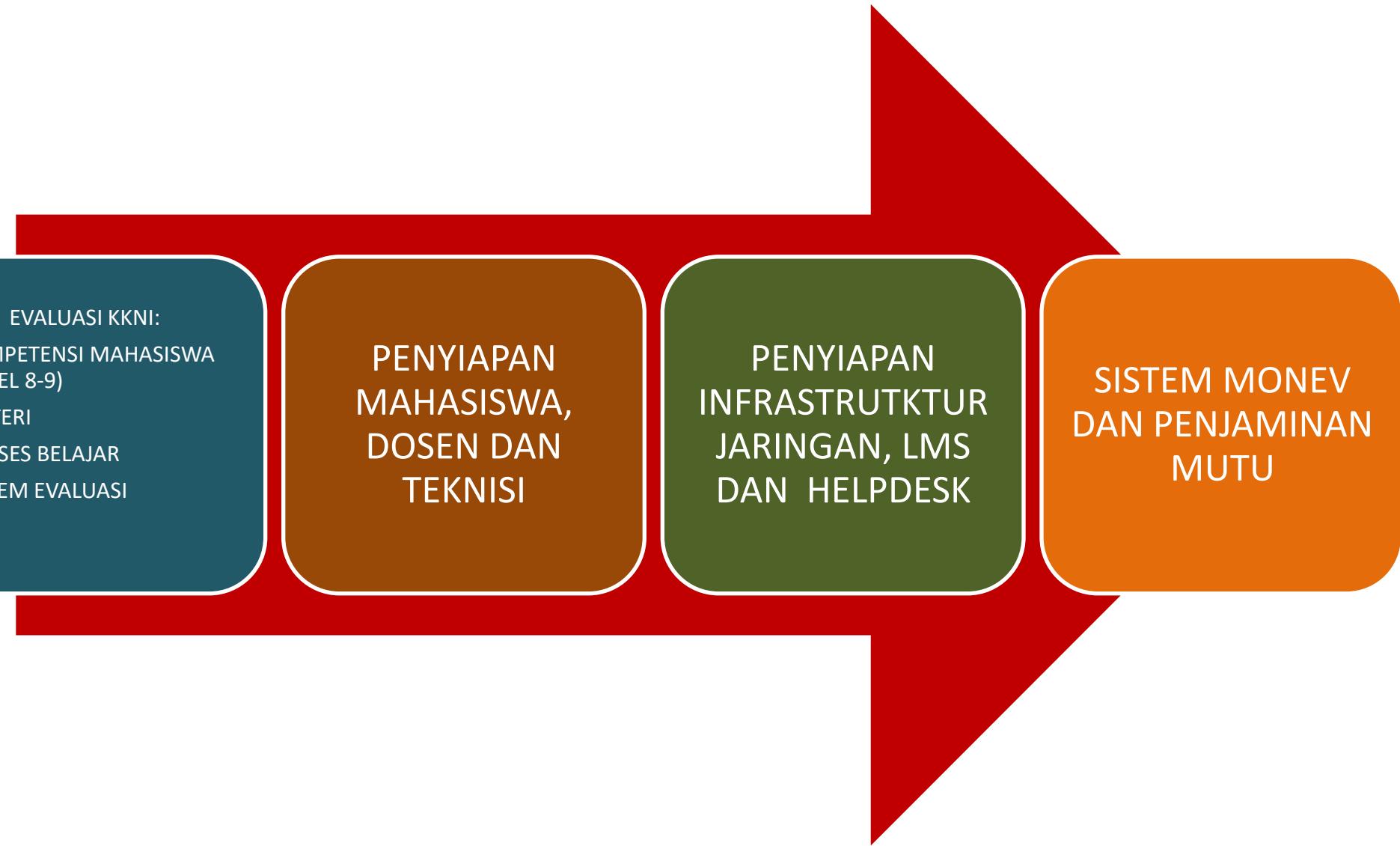
## 2 Competencies

7. Critical Thinking, 8. Problem Solving, 9. Creativity, 10. Communication, Collaboration

## 3 Character Qualities

11. Curiosity, 12 initiative, 13. persistence/grit, 14. adaptability, 15. leadership, 16. social and cultural awareness

# PERSIAPAN IMPLEMENTASI KURIKULUM REVISI:



# PERSIAPAN IMPLEMENTASI KURIKULUM REVISI:



- Uji kualitas seluruh dokumen
- Uji Profil, CPL, CPMK dan Sub CPMK :
  - 1) Cek kesesuaian substansi dengan berbagai pendekatan
  - 2) Cek secara redaksional
  - 3) Cek sesuai kriteria kelayakan implementasi
- Uji kualitas perancangan pembelajaran
- Evaluasi RPS

# PERSIAPAN IMPLEMENTASI KURIKULUM REVISI:



- Mengurai dan menafsir ulang kompetensi lulusan berdasarkan perkembangan kebutuhan masa depan dan ciri RI 4.0

# PERSIAPAN IMPLEMENTASI KURIKULUM REVISI:



- Pemetaan kemampuan dosen dan mahasiswa untuk memanfaatkan blended learning
- Pemilihan treatmen intervensi berdasarkan peta kemampuan mahasiswa dan dosen
- Monev dan evaluasi progres secara berkala

# PERSIAPAN IMPLEMENTASI KURIKULUM REVISI:



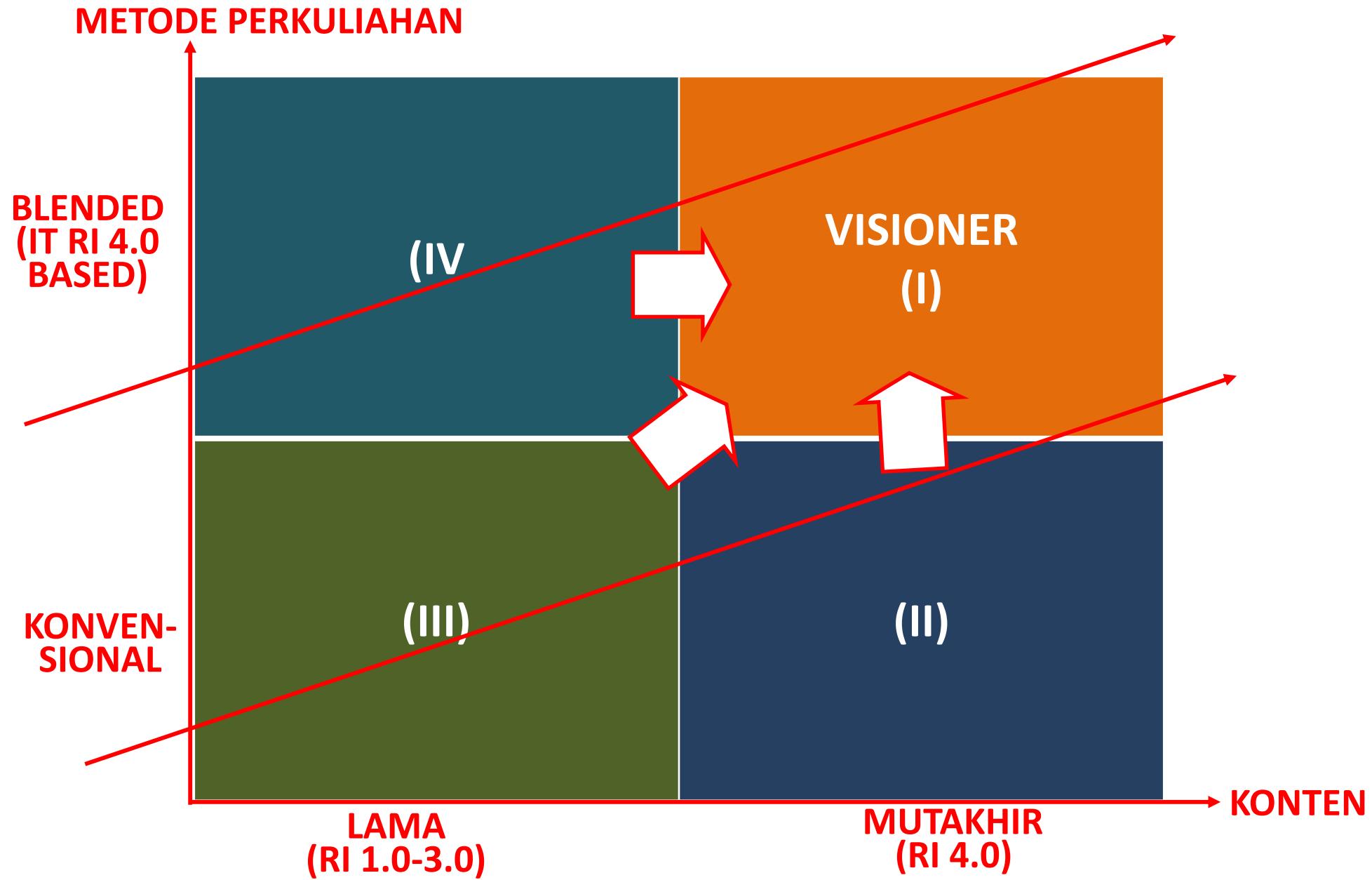
- Pengembangan Manual atau Panduan Pelaksanaan
- Check ulang kapasitas jaringan
- Pemilihan atau pengembangan konten dan LMS
- Penyiapan asistensi oleh help desk

# PERSIAPAN IMPLEMENTASI KURIKULUM REVISI:



- Model dan panduan monev
- Pengembangan instrumen berbasis web
- Monev
- Analisis dan tindak lanjut

# DILEMA: KONTEN VERSUS METODE



# Tantangan: Pergeseran Paradigma Belajar Abad 21

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Pembelajaran **berbasis aktivitas** melalui pengamatan dan pengolahan hasilnya

Pembelajaran menekankan pentingnya kemampuan **komunikasi** lisan, tulis dan penyebarannya



## REVOLUSI INDUSTRI-1

Mekanisasi, Tenaga Air, Tenaga Uap

**1784**



## REVOLUSI INDUSTRI-2

Produksi Massal, Perakitan, Listrik

**1870**



## REVOLUSI INDUSTRI-3

Komputer dan Otomatisasi

**1969**



## REVOLUSI INDUSTRI - 4

Sistem Fisik & Internet

**Sekarang**

**PERKEMBANGAN  
REVOLUSI INDUSTRI**

# SIX DRIVERS OF CHANGE IN IR 4.0



## EXTREME LONGEVITY

PEOPLE ARE LIVING LONGER

By 2025 the number of americans over 60 will increase by 70%.



## THE RISE OF SMART MACHINES AND SYSTEMS

TECH CAN AUGMENT AND EXTEND OUR OWN CAPABILITIES

Workplace automation is killing repetitive jobs.



## COMPUTATIONAL WORLD

INCREASES IN SENSORS AND PROCESSING MAKES THE WORLD A PROGRAMMABLE SYSTEM

Data will give us the ability to see things on a scale that has never been possible.



## NEW MEDIA ECOLOGY

NEW COMMUNICATION TOOLS REQUIRE MEDIA LITERACIES BEYOND TEXT

Visual communication media is becoming a new vernacular.



## SUPERSTRUCTURED ORGANIZATIONS

SOCIAL TECHNOLOGIES DRIVE NEW FORMS OF PRODUCTION AND VALUE CREATION

Social tools are allowing organizations to work at extreme scales.



## GLOBALLY CONNECTED WORLD

DIVERSITY AND ADAPTIBILITY IS AT THE CENTER OF OPERATIONS

The United States and Europe no longer hold a monopoly on job creation, innovation, and political power.

# Era Disrupsi Teknologi

## Revolusi Industri 4.0



Sebagian besar perusahaan menggunakan teknologi untuk menjual produk mereka secara online..” – The Economist, 2017

Indonesia perlu meningkatkan kualitas keterampilan tenaga kerja dengan teknologi digital (Parray, ILO, 2017)

>55 % organisasi menyatakan bahwa **digital talent gap** semakin lebar (Linkedin, 2017)

Perlunya

# LITERASI BARU

Menghadapi Era Revolusi Industri 4.0

Agar lulusan bisa kompetitif, kurikulum perlu orientasi baru, sebab adanya Era Revolusi Industri 4.0, tidak hanya cukup Literasi Lama (membaca, menulis, & matematika) sebagai modal dasar untuk berkiprah di masyarakat.



Bagaimana caranya meyakinkan mahasiswa bahwa literasi baru ini akan membuat mereka kompetitif



**Sudah siapkah kita?**  
Menyiapkan lulusan lebih kompetitif

## Literasi Baru:



(Aoun, MIT, 2017)



### Literasi Data

Kemampuan untuk membaca, analisis, dan menggunakan informasi (*Big Data*) di dunia digital.



### Literasi Teknologi

Memahami cara kerja mesin, aplikasi teknologi (*Coding, Artificial Intelligence, & Engineering Principles*).



### Literasi Manusia

*Humanities*, Komunikasi, & Desain.

# LITERASI MANUSIA



Universitas perlu mencari metoda untuk mengembangkan kapasitas kognitif mahasiswa: *higher order mental skills*, berpikir kritis & sistemik: **amat** penting untuk bertahan di era revolusi industri 4.0.



Agar manusia bisa berfungsi dengan baik di lingkungan manusia: ***Humanities, Komunikasi, & Desain.***

## Keterampilan:

1. Kepemimpinan (*leadership*)
2. Bekerja dalam tim (*team work*)

## Kelincahan dan kematangan budaya (*cultural agility*):

Mahasiswa dengan berbagai latar belakang mampu bekerja dalam lingkungan yang berbeda (dalam/luar negeri).

## *Entrepreneurship* (termasuk *social entrepreneurship*):

Harus merupakan kapasitas dasar yang dimiliki oleh semua mahasiswa.

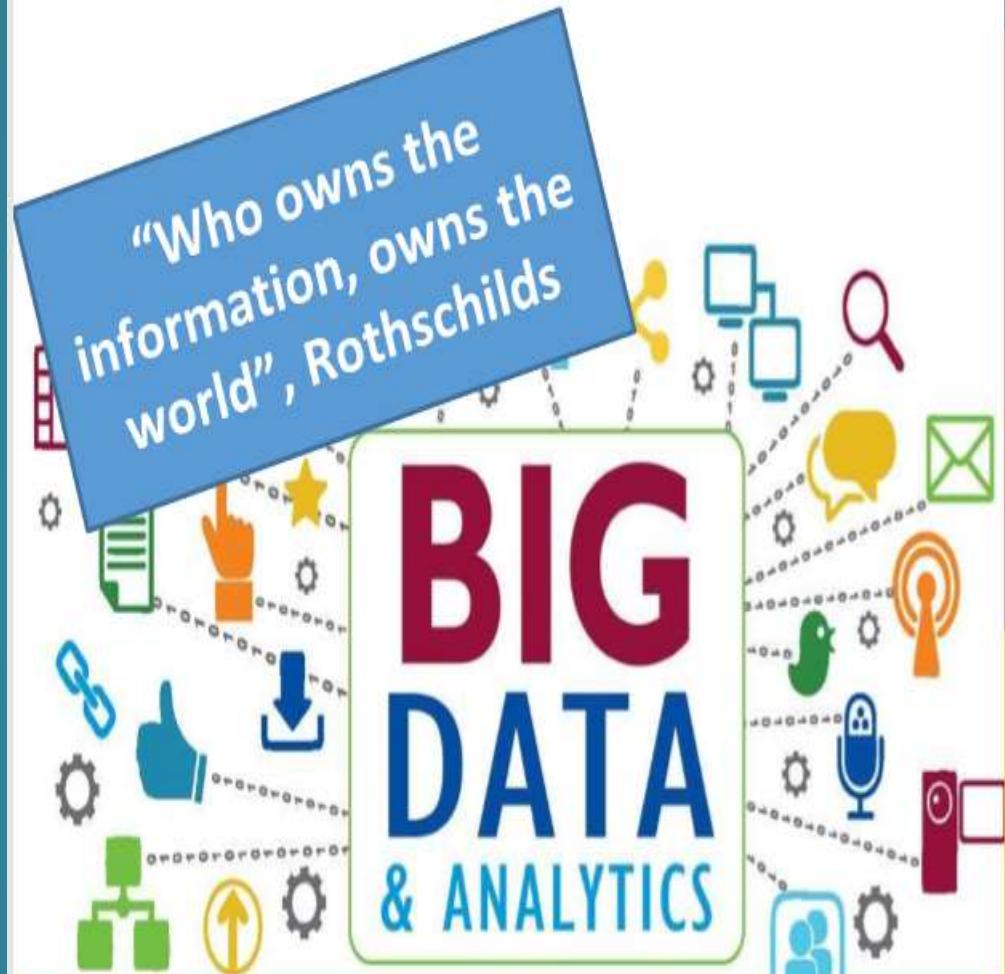
## Bagaimana mengajarnya?

(Aoun, 2017)

- Studi tematik berbagai disiplin, hubungkan dengan dunia nyata, *project based-learning*.
- Melalui *General Education*, Ekstra-kurikuler.
- Magang/kerja praktik/*co-op program* (al. *higher order skills, leadership, team work*)

(Northeastern, 2014)

## B. Internet of Things



**"The world most valuable resource is no longer oil, but DATA"**

## Data Analytics



# Kecakapan Abad 21

## 21<sup>st</sup> Century learning:

- To know
- To do
- To be
- To live together



Learning  
and  
Innovation  
Skills

Critical thinking  
Creativity  
Communication  
Collaboration



Information  
Media, and  
ICT literacy



Digital  
literacy

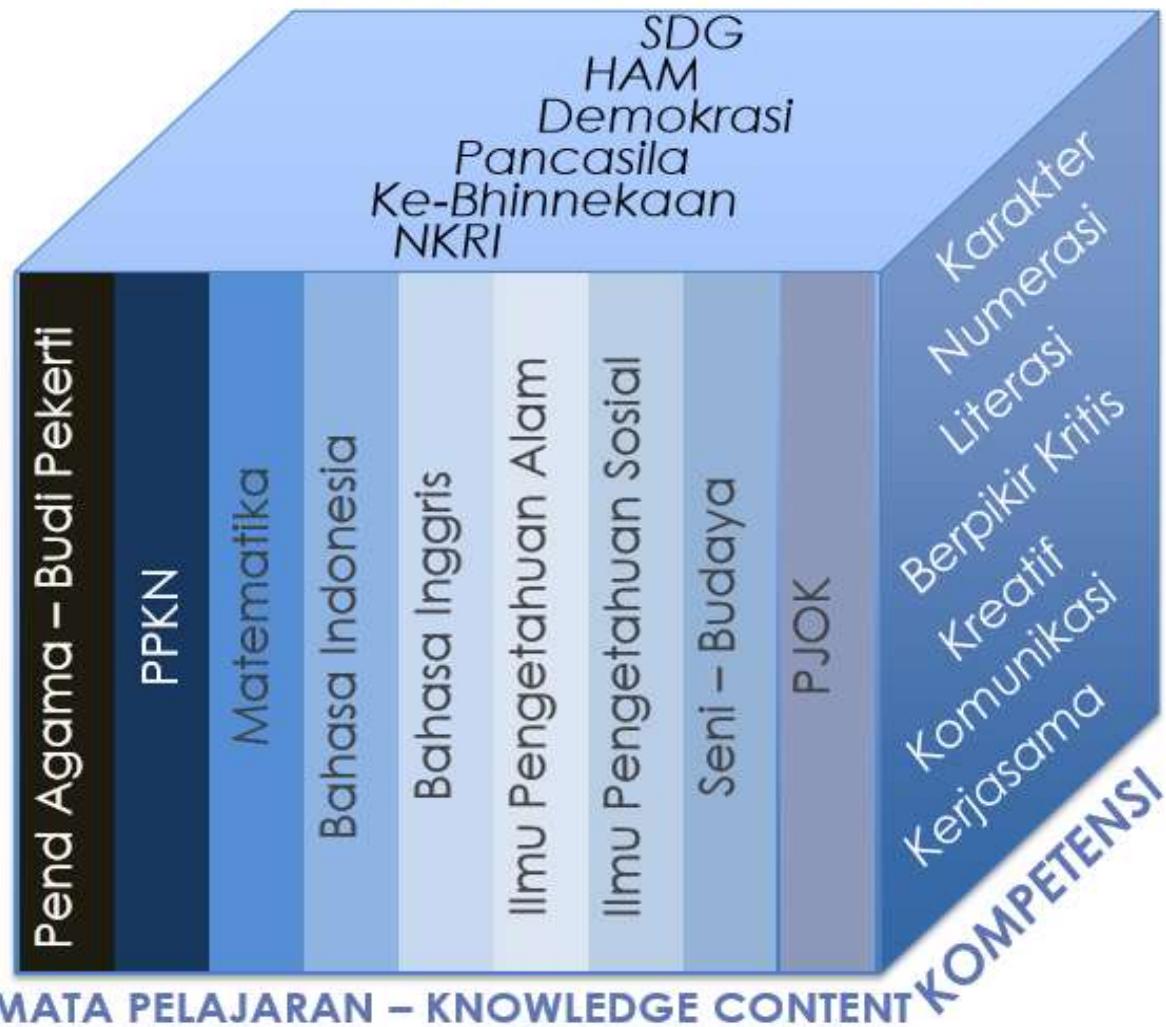
Spiritual  
Sosial  
Skills  
Core  
subjects  
21<sup>st</sup>  
Century  
Context

Knowledge  
Life and career skills

Flexibility  
Initiative  
Leadership  
Social-skills  
Cross cultural  
Productivity  
Accountability  
Life-long learner

# Kerangka Kurikulum 2013

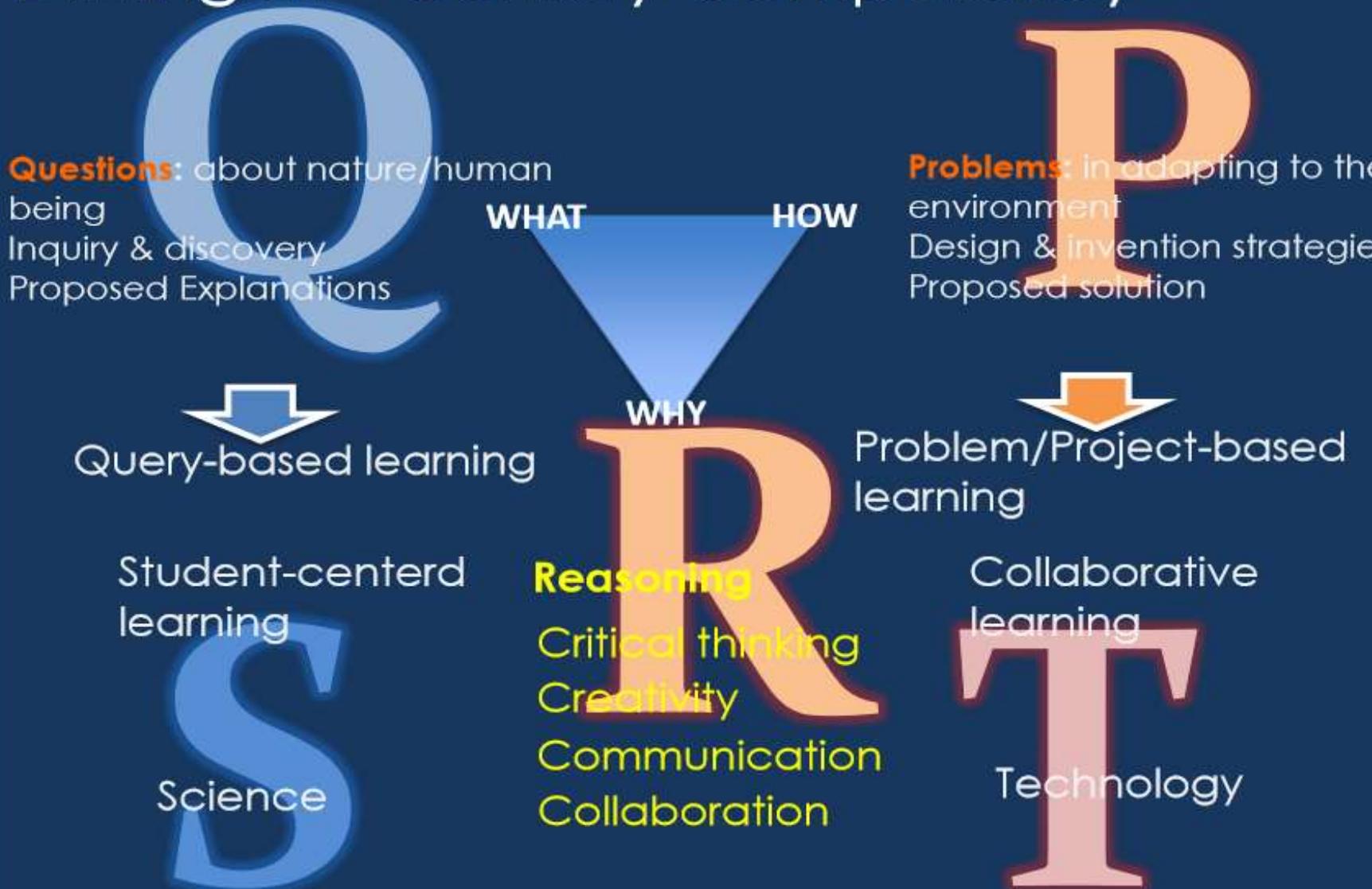
## KONTEKS - SOCIAL CONSTRUCT



MATA PELAJARAN – KNOWLEDGE CONTENT

Sumber : Nizam, Puspendik Balitbang Kemdikbud

# Driving 21<sup>st</sup> Century Competency



Nizam, 2016

Sumber : Nizam, Puspendik Balitbang Kemdikbud

# Kerangka Sistem Penilaian Pendidikan



- Kompetensi dasar
  - Kelas 4, 9
  - Survei
  - PISA, TIMSS
- Sumatif
  - Kelas 9, 12
  - Sensus
  - Oleh pemerintah



Ujian  
Terstandar  
Nasional

siswa  
**SKL**  
21<sup>st</sup> cs

Penilaian  
eksternal  
(PMTK)

- Formatif – diagnostik
- Harian oleh guru
- Penekanan qualitative feedback

Penilaian  
Sekolah

- Formatif
- Summative
- Semua kelas
- Semesteran
- Akhir tahun
- Akhir jenjang
- Oleh sekolah
- PTK 4,8,11

spiritual      Sosial  
Pengembangan  
Ketrampilan

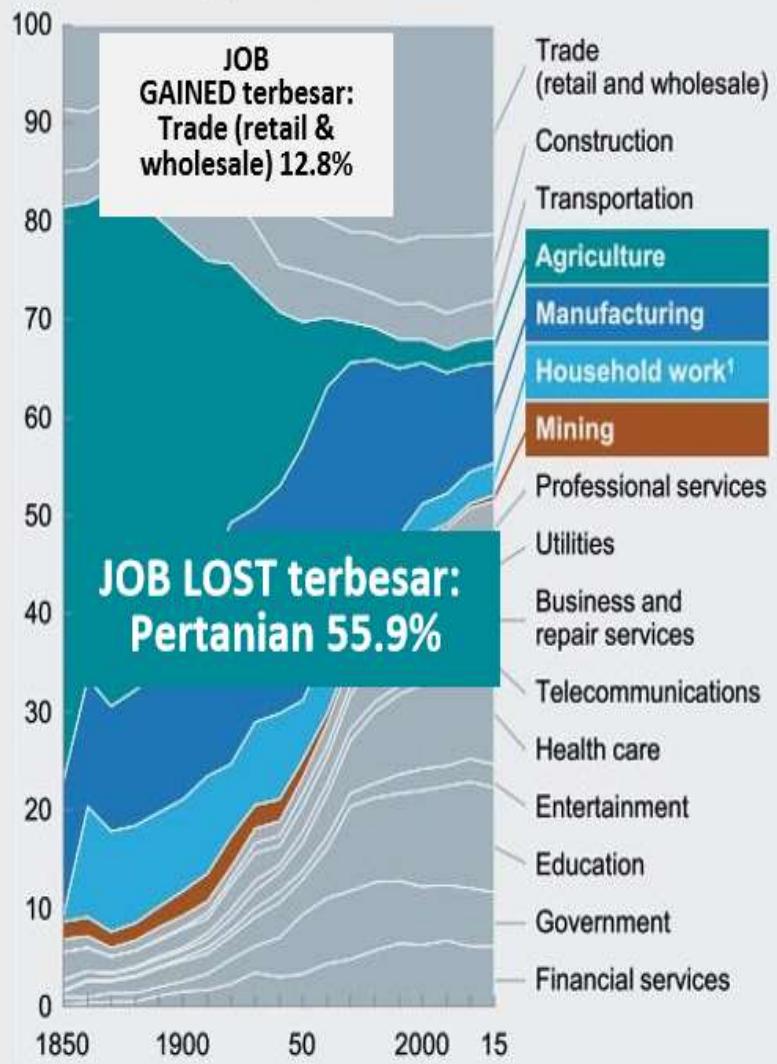
- Progress monitoring & evaluasi
- Kelas 4,8,11
- Survey atau sensus
- Tahunan
- Oleh pemerintah

Sumber : Nizam, Puspendik Balitbang Kemdikbud

# Disrupt the Existing Jobs

Large-scale sector employment declines have been countered by growth of other sectors that have absorbed workers

Share of total employment by sector in the United States, 1850–2015



Source: IPUMS USA  
2017; US Bureau of  
Labor Statistics;;  
McKinsey Global  
Institute analysis ,  
McKinsey 2017



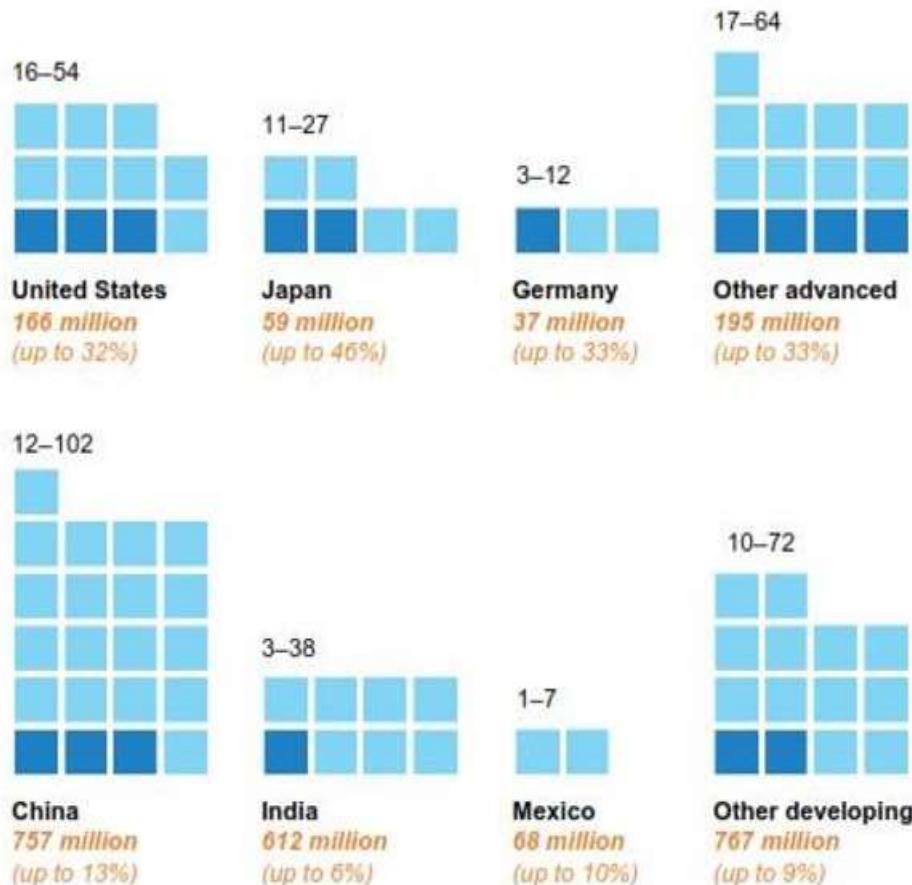
(Sumber : Pratikno, 2018)

# Disrupt the Existing Jobs

Globally, up to 375 million workers may need to switch occupational categories

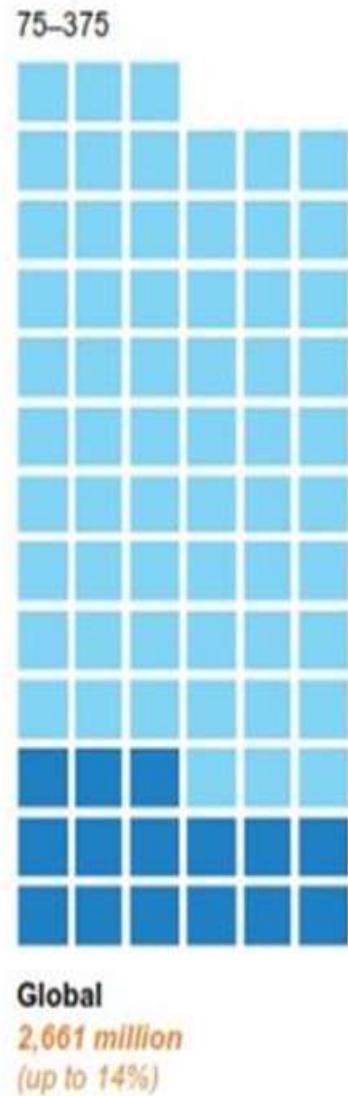
Number of workers needing to move out of current occupational categories to find work, 2016–30 (trendline scenario)<sup>1</sup>

Million (1 block = ~5 million)



- Additional from earliest adoption scenario
- Midpoint automation scenario
- 2030 workforce (% transitioning)**

**75 to 375 million workers need to SWITCH occupational categories and LEARN new skills**



<sup>1</sup> Some occupational data projected into 2016 baseline from latest available 2014 data.

SOURCE: U.S. Bureau of Labor Statistics; McKinsey Global Institute analysis

# The Deep Shift: Big Data Analytics, Machine Learning, AI...

## Dampak *bagi* mitra GO-JEK



## WAKTU TEMPUH

2X PINDAH ANGKUTAN VS LANGSUNG

Dari Kemanggisan ke Gedung WTC  
source: pagelaran



**54**  
MENIT



**15**  
MENIT

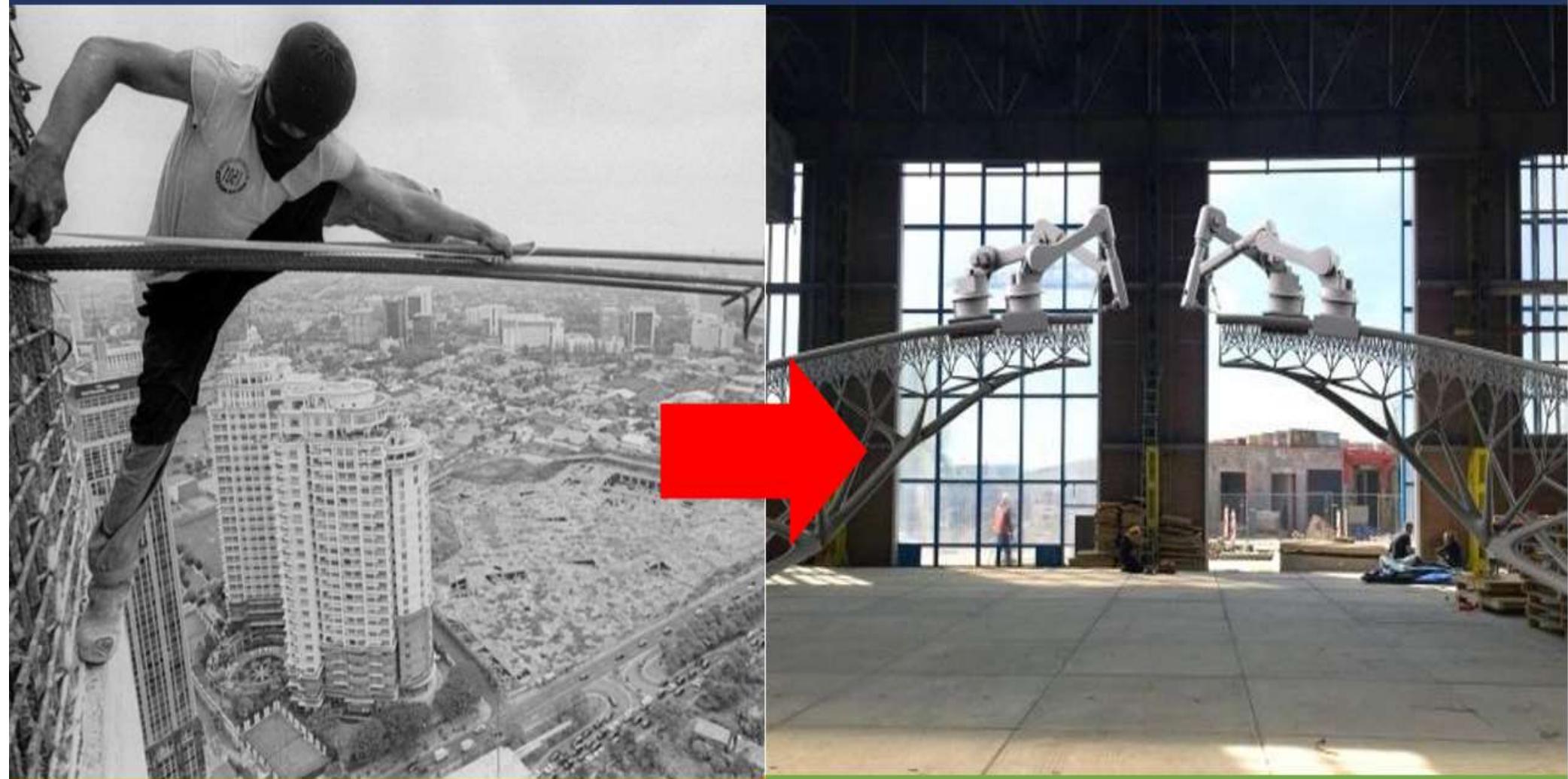
**PENDAPATAN MITRA GO-FOOD**  
dari pesanan di sekitar Jl. Jendral Sudirman



## Gojek: Big Data, Machine Learning, AI, Alghorithm

- Menganalisis dampak larangan motor di Sudirman: cepat, efisien → normalnya perlu survei beberapa bulan
- Membuat proyeksi
- Bisa untuk laporan cuaca, real time
- Bahkan risk profiling
- dll

# The Deep Shift: Human to Automation & Robotics



**Tukang Bangunan**

**3D printing devices  
misal, membangun jembatan**

# The Deep Shift: Learning Environment, Methods, & Delivery



## **Massive Open Online Courses/MOOC:**

1. kursus dan kuliah *online* gratis (sebagian bayar murah)
2. terbitkan sertifikat yang mulai diakui industri
3. akses kapan saja, tanpa harus hadir

## **Makin diminati:**

1. Coursera → 2,7 juta siswa terdaftar, 50-100ribu siswa mengakses materi dari professor terbaik dunia;
2. Udacity → salah satu kursus 'Bahasa pemrograman' diikuti 200ribu siswa dari berbagai dunia

**Perush besar mulai tidak  
bertanya ijazah,  
melainkan: *portfolio,*  
*competency based***



**Perusahaan ternama dunia semakin  
mengakui lulusan MOOC  
Bahkan Harvard, MIT, Stanford,  
Princeton, dll telah bergabung...**

# STRUKTUR DAN ISI KURIKULUM SAAT INI

# KONSTRUKSI KOMPETENSI BEKERJA PADA ERA >2025

KOMPETENSI/ LO/CP	<ol style="list-style-type: none"><li>1. CONTENT BASED</li><li>2. BELUM BERORIENTASI MASA DEPAN</li></ol>	CARA BERPIKIR	<ol style="list-style-type: none"><li>1. HOTS</li><li>2. CRITICAL</li><li>3. PROBLEM SOLVING</li><li>4. INVENTIVE</li><li>5. META KOGNITIF</li><li>6. PEMBELAJAR SEPAGANG HAYAT</li></ol>
ISI/CONTENT	<ol style="list-style-type: none"><li>1. TIDAK MEMENUHI ASPEK KECUKUPAN DAN KESESUAIAN</li><li>2. BELUM BERBASIS RISET</li><li>3. MINIM DIGITAL RESOURCES</li></ol>	CARA BEKERJA	<ol style="list-style-type: none"><li>1. KOMUNIKASI</li><li>2. KOLABORASI</li><li>3. PARADIGMA KEKINIAN</li></ol>
PROSES	<ol style="list-style-type: none"><li>1. BELUM BLENDED LEARNING</li><li>2. BELUM TERINTEGRASI DGN DUDI</li><li>3. BELUM BERBASIS PRODUK</li><li>4. BELUM MENGGUNAKAN DIGITAL RESOURCES</li></ol>	TOOLS BEKERJA	<ol style="list-style-type: none"><li>1. LITERASI (DASAR, DATA, TEKNOLOGI DAN MANUSIA)</li><li>2. KOLABORASI DAN JARINGAN</li></ol>
PENILAIAN	<ol style="list-style-type: none"><li>1. TIDAK OTENTIK</li><li>2. BELUM MENGGAMBARKAN KOMPETENSI SECARA KOMPREHENSIF</li><li>3. MASALAH AKUNTABILITAS, OBJEKTIVITAS, DAN FAIRNESS</li></ol>	TATA HIDUP SEBABAGI WN	<ol style="list-style-type: none"><li>1. TANGGUNG JAWAB (PERSONAL, SOSIAL EKONOMI, POLITIK, BUDAYA)</li><li>2. KARIR DAN REPUTASI (LOKAL, NASIONAL, REGIONAL DAN INTERNASIONAL)</li></ol>