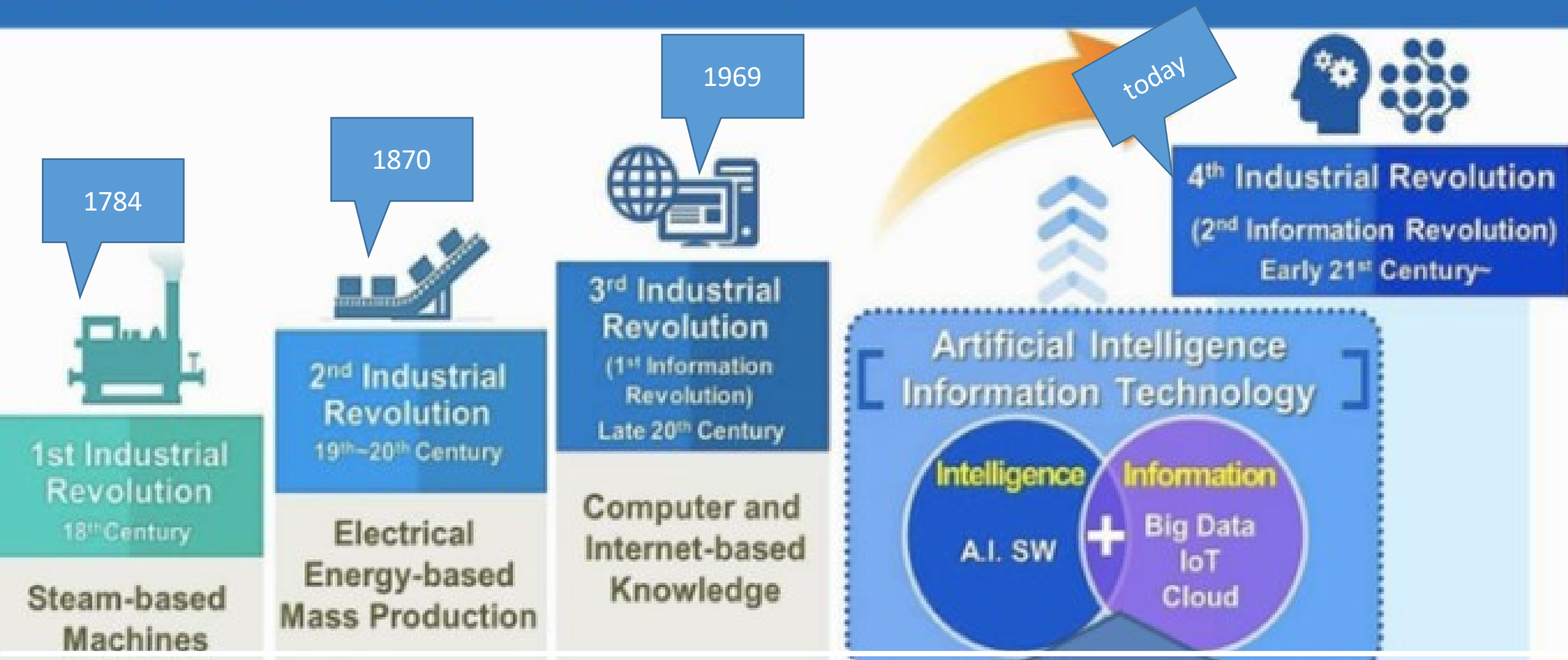


REVOLUSI 4.0 DAN EDUCATION 4.0 — Generasi Millennial

Khatib A. Latief
12 Oct 2019



The Fourth Industrial Revolution

DLT

Perjalanan Revolusi Industri

Industri 1.0: (1784):
Berdasarkan
peralatan produksi
mekanik yang
digerakkan oleh
tenaga air dan uap.

Industri 2.0: (1870):
Berdasarkan produksi
massal yang
dimungkinkan oleh
pembagian kerja dan
penggunaan energi
listrik.

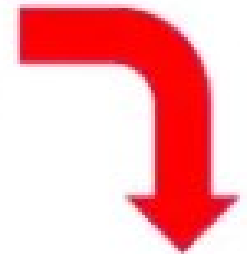
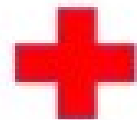
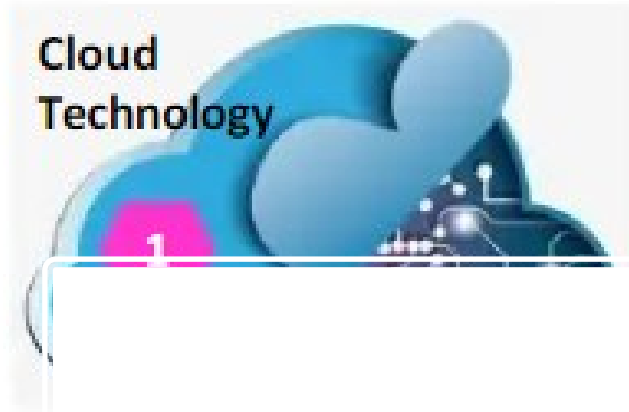
Industri 3.0 (1969):
Berdasarkan
penggunaan
elektronik dan TI
untuk lebih
mengotomatisasi
produksi.

Industri 4.0 (hari ini):
Berdasarkan
penggunaan sistem
cyber-fisik.

OPERATING SYSTEM SHIFTING FROM 1.0 TO 4.0

OS	Health	Learning	Farm/Food	Finance	Management	Governance
1.0: Traditional authority and input-centric	Traditional doctor-centric	Traditional teacher- centric	Traditional farmer- centric	Traditional Financial Capital	Centralize	Hierarchy
2.0: Output and efficiency- centric	Evidence based medicine	Testing driven: bulimia learning (fast in, fast out)	Industrial agriculture: mono- cultures	Extractive Capital (Wall Street)	Decentralize	Competition
3.0: Stakeholder centric: patient, student, ...	Patient-centric pathogenesis	Learner- centric	Organic Ag: eco-centric	Responsible Capital (Impact Investing)	Stakeholder	Networks
4.0: Generative eco-system- centric: presencing	Health 4.0: Salutogenesis → <i>sources of well-being</i>	Learning 4.0: co-shaping the future → <i>sources of creativity</i>	Ag 4.0: → <i>sources of eco-system presence</i>	Generative Capital → <i>Systemic Impact</i>	Innovation eco-system: → <i>generative social fields</i>	ABC: Awareness- Based Collective Action

Industry 4.0 Core Elements





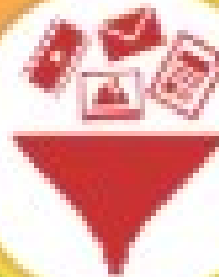
VOLUME

Huge amount of data



VARIETY

Different formats of data
from various sources



VALUE

Extract useful data



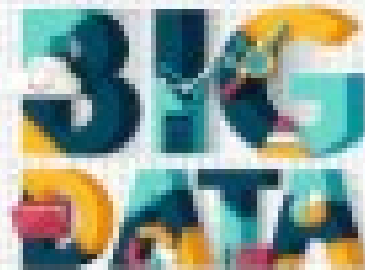
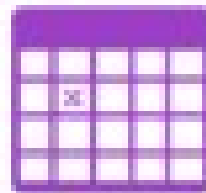
VELOCITY

High speed of
accumulation of data



VERACITY

Inconsistencies and
uncertainty in data

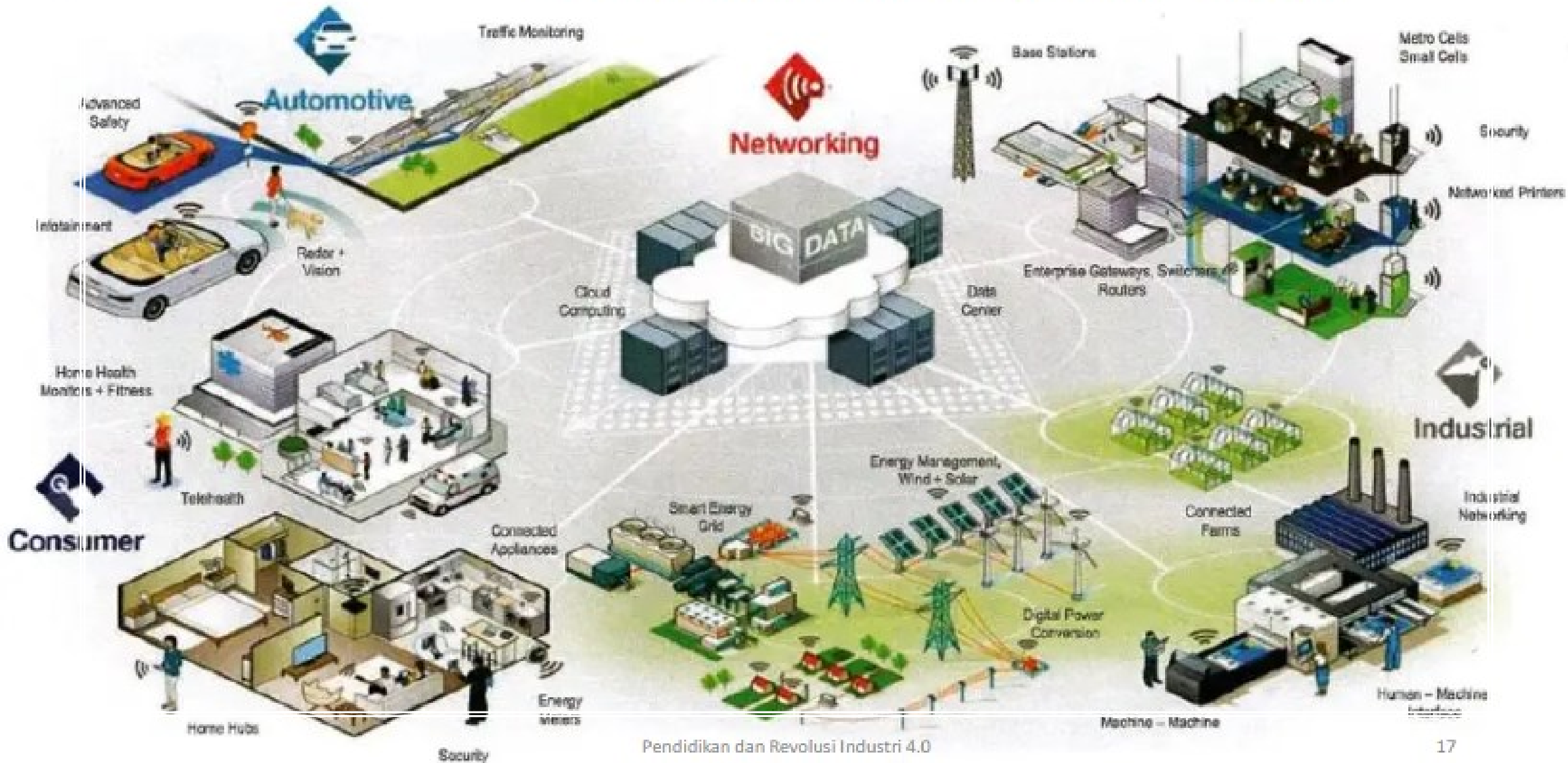




Artificial Intelligence

The Internet of Things

IoT adalah konsep yang bertujuan untuk memperluas manfaat dari konektivitas **internet** yang tersambung secara terus-menerus.



10 Peluang dan Tantangan di Era Industri Internet

1

The Industrial Internet transforms the entire company and must be part of the CEO agenda

10

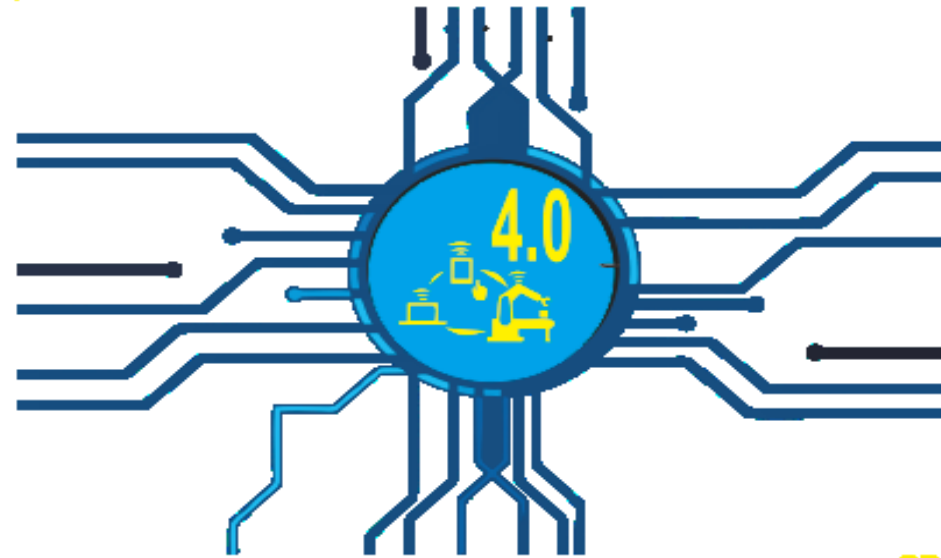
The Industrial Internet holds various challenges – policy-makers and industrial associations can help

2

By 2020, European industrial companies will invest €140 billion annually in Industrial Internet applications

3

In five years, more than 80% of companies will have digitized their value chains



9

Horizontal co-operation allows for improved satisfaction of customer needs

8

The Industrial Internet paves the way for new, often disruptive digital business models

4

The Industrial Internet increases productivity and resource efficiency – an 18% increase in efficiency within five years

7

Digitized products and services generate approximately €110 billion of additional revenues per year for the European industry

5

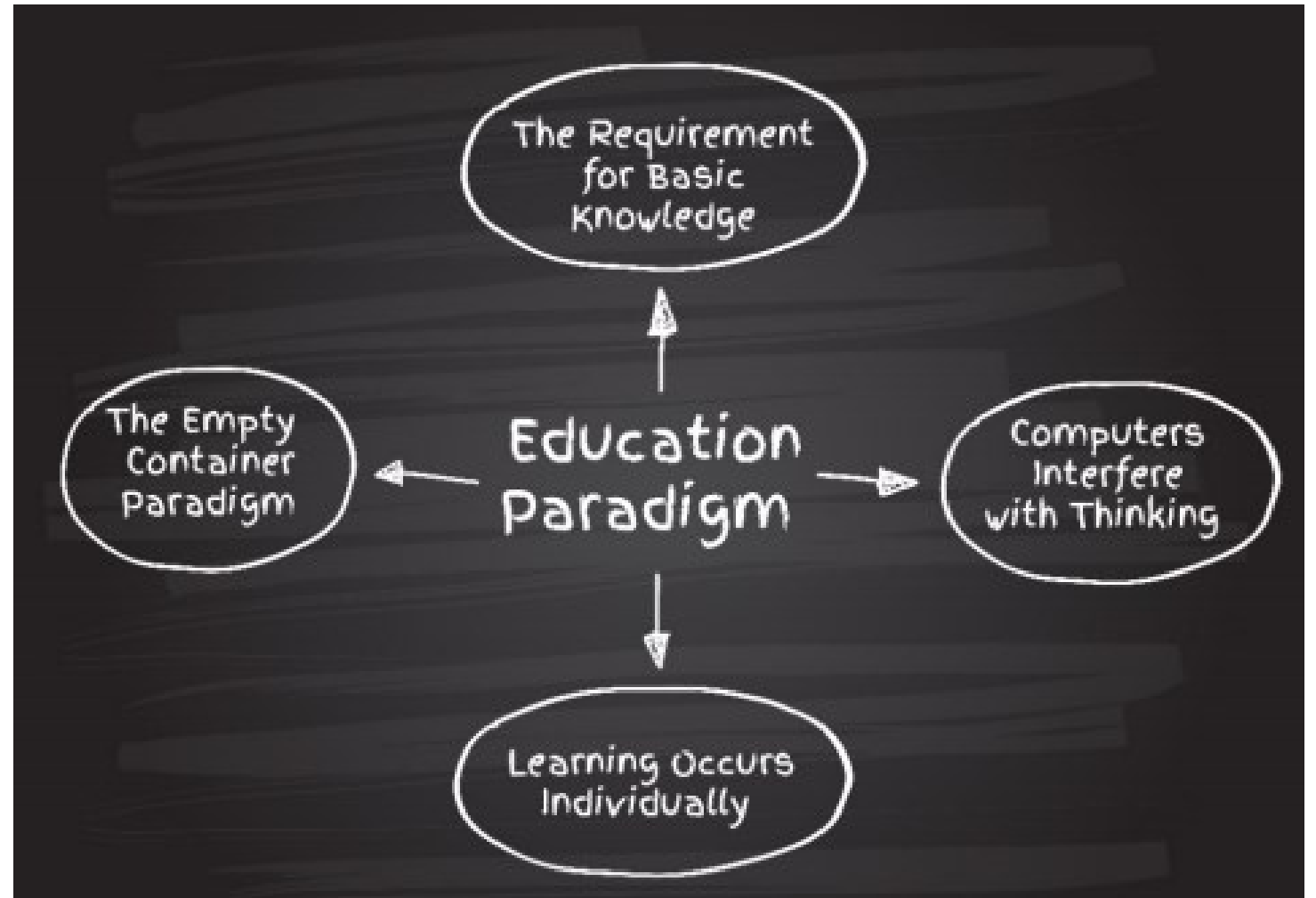
The integrated analysis and use of data are the key capabilities for the Industrial Internet

6

Digitization of the product and service portfolio is the key to sustainable corporate success

- istilah umum yang digunakan untuk menggambarkan berbagai cara untuk mengintegrasikan teknologi cyber baik secara fisik maupun tidak ke dalam pembelajaran.

EDUCATION
PARADIGM
MUST BE
CHANGED



Education 4.0

Pendidikan tidak terbatas di kelas;

Pendidikan dilihat sebagai sepanjang hayat;

EDUCATION
4.0

- involves collaboration with peers,
- Involves collaboration with guests;
- Involves collaboration with teachers and administrators.

Education Revolution 1.0 – 4.0

Education 1.0 Teacher Centered System



Education 2.0 Learners as communicating



Open Access
to Information



Accessing of Global Rxperties



Education 4.0 Learners as Co-creation and Innovation in the center

Learners as Teacher

Educator as
Resources Guide

Diversity of Network

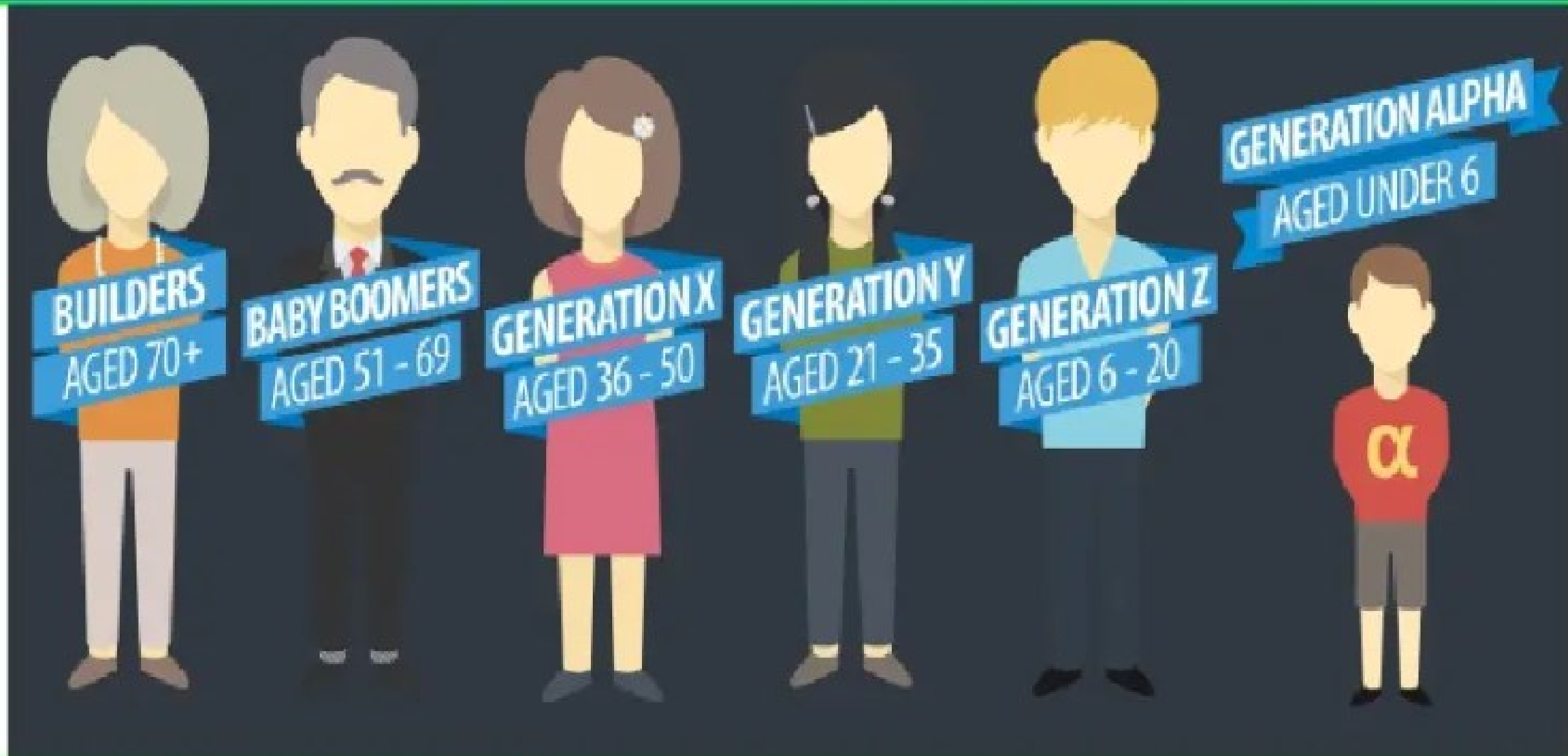
access to experts

Collaboration

PBL
Project and Inquiry
Based Learning

Collaborative, Interactive
Web Tools, Apps, Blogs
Generated strategy notes

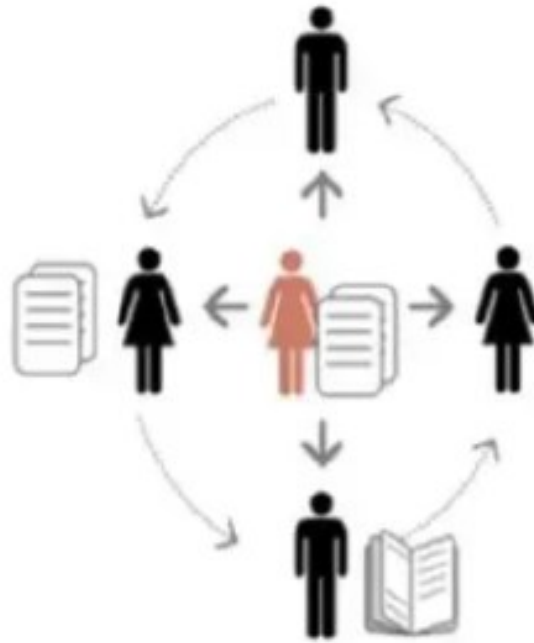
Nama Setiap Generasi



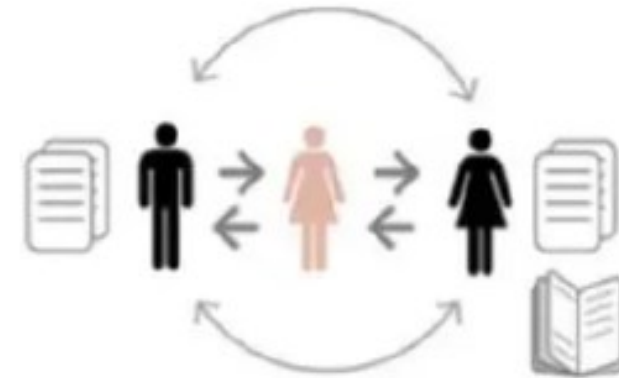
PERUBAHAN PERAN PENDIDIK (1)



EDUCATION 1.0:
Educators as content experts



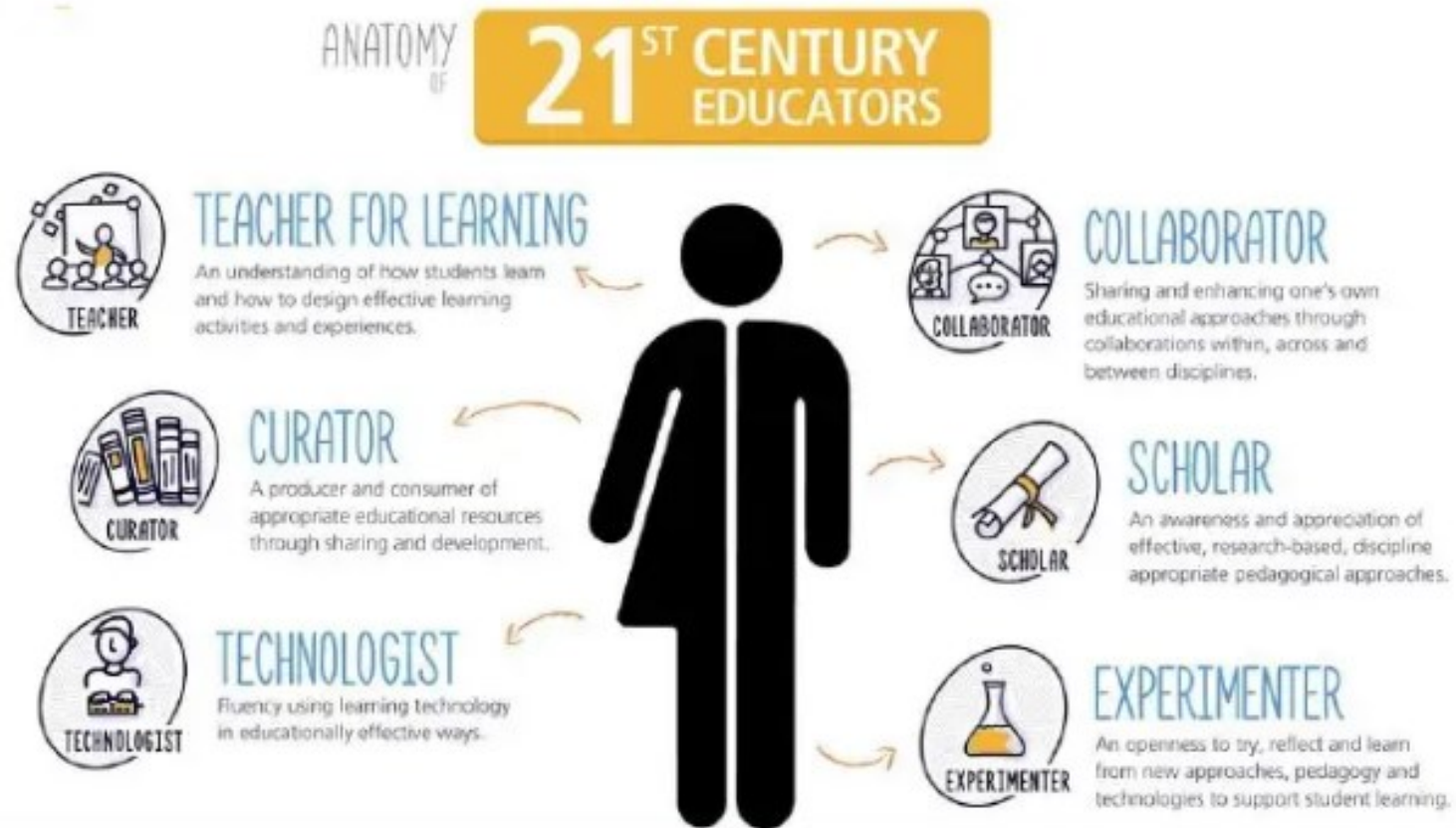
EDUCATION 2.0:
Educators as orchestrators



EDUCATION 3.0:
Educators as mentors

PERUBAHA PERAN PENDIDIK (2)

Edu-
cation
4.0



KETERAMPILAN YANG DIBUTUHKAN 2020

1 Complex Problem Solving

2 Critical Thinking

3 Creativity

4 People Management

5 Coordinating with Others

6 Emotional Intelligence

7 Judgement and Decision Making

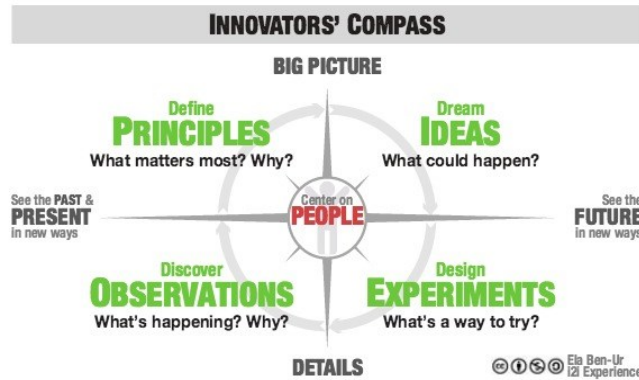
8 Service Orientation

9 Negotiation

10 Cognitive Flexibility

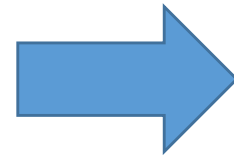
KEAHLIAN
UMUM
YANG
DIPERLUKAN
KE DEPAN

1. TEKNOLOGI INFORMASI
2. KEPEMIMPINAN DAN SOCIAL SKILLS
3. LEARNING SKILLS
4. KEMAMPUAN BERKOMUNIKASI MELALUI BANYAK CHANEL.



LEARNING 4.0

CO SHAPING THE FUTURE → SOURCE OF CREATIVITY
DI LEVEL PERGURUAN TINGGI



Problem solving

Project based learning

THINK GLOBALLY, ACT LOCALLY,
COLLABORATIVE INTERNATIONALLY



MOOCs

E-learning

Hybrid/blended

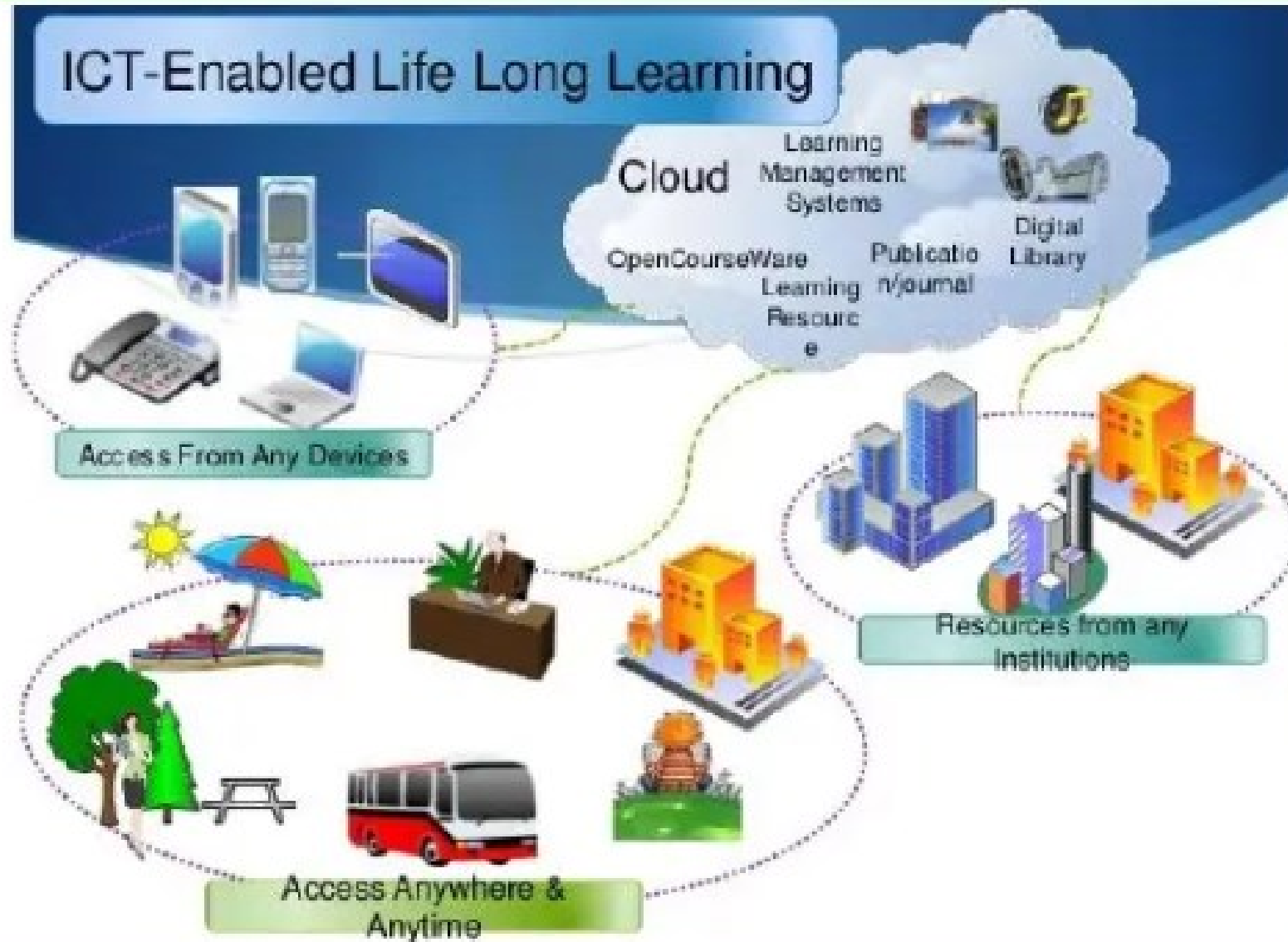


Teori dan praktek terintegrasi

Trends Pembelajaran ke Depan



Ubiquitous Learning



1. Distributed (Cloud) computing
2. Extended smart mobile technology
3. Collaborative intelligent filtering
4. 3D visualisation and interaction

Beberapa Dampak dari Revolusi Industri 4.0

QR Code



<http://antrian.imigrasi.go.id>



Materi Siswa SD kelas VI



Video:
Peraga volume
kerucut

Saat ini berbagai macam kebutuhan manusia telah banyak menerapkan dukungan **internet dan dunia digital** sebagai wahana interaksi dan transaksi

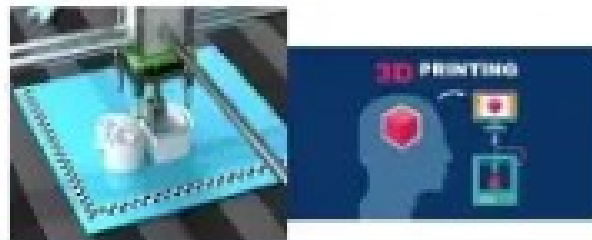
Sharing economy



Cloud Collaborative



Smart Manufacturing



e-Education



Marketplace



Smart City



e-Government



Online Health



Smart Appliances



Skill di Industri Masa Depan

Skills

Scale of Skill
Demand in 2020

Cognitive Abilities

15%

Systems Skills

17%

Complex Problem Solving

36%

Content Skills

10%

Process Skills

18%

Social Skills

19%

Resource Management Skills

13%

Technical Skills

12%

Physical Abilities

4%



Complex Problem Solving

Kemampuan untuk memecahkan masalah yang asing dan belum diketahui solusinya di dalam dunia nyata.



Social Skill

Kemampuan untuk melakukan koordinasi, negosiasi, persuasi, mentoring, kepekaan dalam memberikan bantuan hingga emotional intelligence



Process Skill

Kemampuan terdiri dari: active listening, logical thinking, dan monitoring self and the others



System Skill

Kemampuan untuk dapat melakukan judgement dan keputusan dengan pertimbangan cost-benefit serta kemampuan untuk mengetahui bagaimana sebuah sistem dibuat dan dijalankan



Cognitive Abilities

Skill yang terdiri dari antara lain: Cognitive Flexibility, Creativity, Logical Reasoning, Problem Sensitivity, Mathematical Reasoning, dan Visualization .

(Share of jobs requiring skills family as part of their core skill set, %)



Architects

11%

Automatable



Civil engineers

13%

Automatable



Construction managers

17%

Automatable

According to McKinsey, this is how AUTOMATABLE key jobs are:



Electrical engineers

21%

Automatable



Carpenters

50%

Automatable



Surveyors

56%

Automatable



DATA DAN FAKTA

- ❑ 65% of children entering grade school this year will work in a job that hasn't been invented yet.
- ❑ 49% of current jobs have the potential for machine replacement, with 60% having at least 1/3 of their activities automated.
- ❑ 80% of the skills trained for in the last 50 years can now be outperformed by machines.
- ❑ At a global level, technically automatable activities touch the equivalent of 1.1 billion employees and \$15.8 trillion in wages.

	First generation university	Second generation university	Third generation university
Objective	Education	Education plus research	Education and research plus know-how exploitation
Role	Defending the truth	Discovering nature	Creating value
Method	Scholastic	Modern science, monodisciplinary	Modern science, interdisciplinary
Creating	Professionals	Professionals plus scientists	Professionals and scientists plus entrepreneurs
Orientation	Universal	National	Global
Language	Latin	National languages	English
Organisation	Nationes, Faculties	Faculties	University institutes

Characteristics Generation of Universities