



Production System & New Normal Perspective

disampaikan dalam acara

Sarasehan Online Puslit MTL ITS - Knowledge and Experience Sharing
New Normal: Manufacturing, Transportation and Logistic Perspective
Kamis 11 Juni 2020 Jam 08.00 – 12.00



Sritomo W.Soebroto

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Production System

EXPERIENCE SHARING
NEW NORMAL
MANUFACTURING, TRANSPORTATION AND LOGISTICS PERSPECTIVE

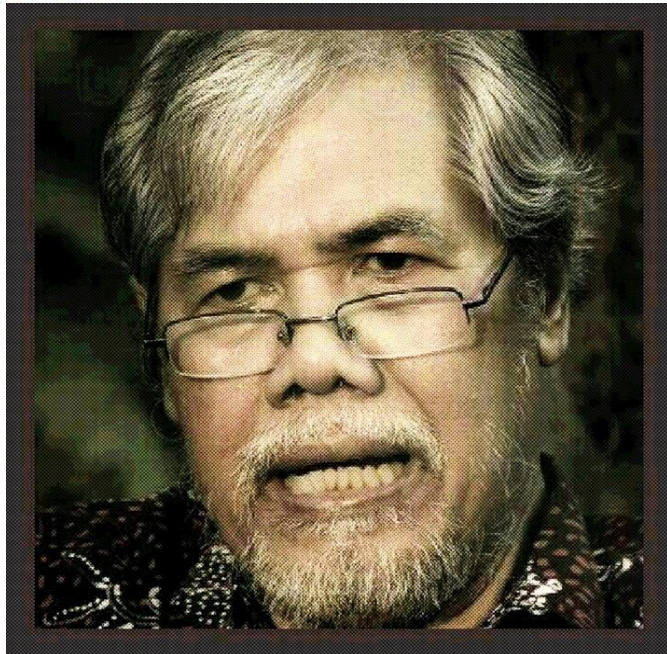
ACADEMICIANS

INDUSTRIAL PRACTITIONERS

JUNE 11, 2020 | 8:00AM - 12:00AM
ON ZOOM

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Sritomo W. Soebroto

Curriculum Vitae

Sritomo W. Soebroto

Solo, 25 Oktober 1947

Dosen Senior DTSI ITS (1978 – now), Kaprodi TI (1985-1990), Dekan FTI-ITS (1996-2999).

Alamat : *Perumahan ITS, Jl. Ilmu Pasti Alam F.6 Sukolilo, Surabaya 60111 HP/email : 0811330110, msritomo@rad.net.id*

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Organisasi Profesi : *IPU – PII, ASEAN Engineer Register, ISTMI; DP PEI (Ergonomi), DP BKTI-PII, DP, BKSTI*

Agenda



- **Industri Manufaktur : Sistim Produksi, Produktivitas dan Tantangannya.**
- **Production System & New Normal Perspective : Return to Work for Enhancing Quality and Productivity**



Manufacturing & Service Industry



Manufacturing Industry. The branch of manufacture and trade based on the fabrication, processing, or preparation of products from raw materials and commodities. This includes all foods, chemicals, textiles, machines, and equipment.

Service Industry. An industry made up of companies that primarily earn revenue through providing intangible products and services. Service industry companies are involved in retail, transport, distribution, food services, as well as other service-dominated businesses. Also called service sector, tertiary sector of industry.

Product, Production & Production System

Product - In marketing, a product is anything that can be offered to a market that might satisfy a want or need. In retailing, products are called merchandise. In manufacturing, products are bought as raw materials and sold as finished goods.

Production is a process of combining various material inputs and immaterial inputs (plans, know-how) in order to make something for consumption (the output). It is the act of creating output, a good or service which has value and contributes to the utility of individuals.

Production system is nothing but its a procedure or method to produce goods for market. It involves certain machine processes , and assembly line to produce thing.

Production/Operation Sistem



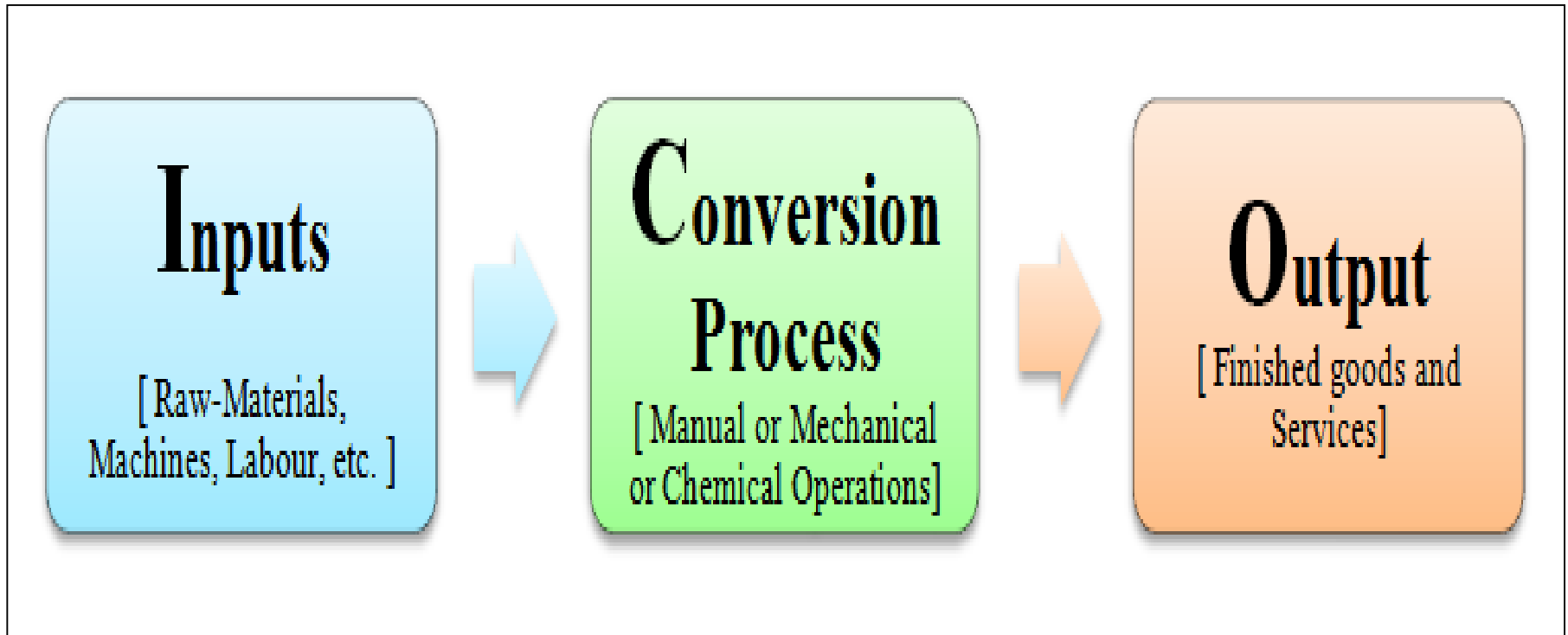
- Production/Operation System merupakan aktivitas yang kompleks berkaitan dengan human resources, energy, raw materials, machine/technology (fasilitas operasional), informasi, dan lain-lain.
- **Konsep Sistem & Model :**
 - Menggambarkan hubungan keterkaitan dari seluruh komponen-komponen yang terkait dalam proses produksi/ operasional
 - Simulasi kondisi-kondisi yang kompleks dan abstrak.
 - Memiliki peranan penting dalam upaya pengambilan keputusan dalam manajemen produksi.



Production/Operation System

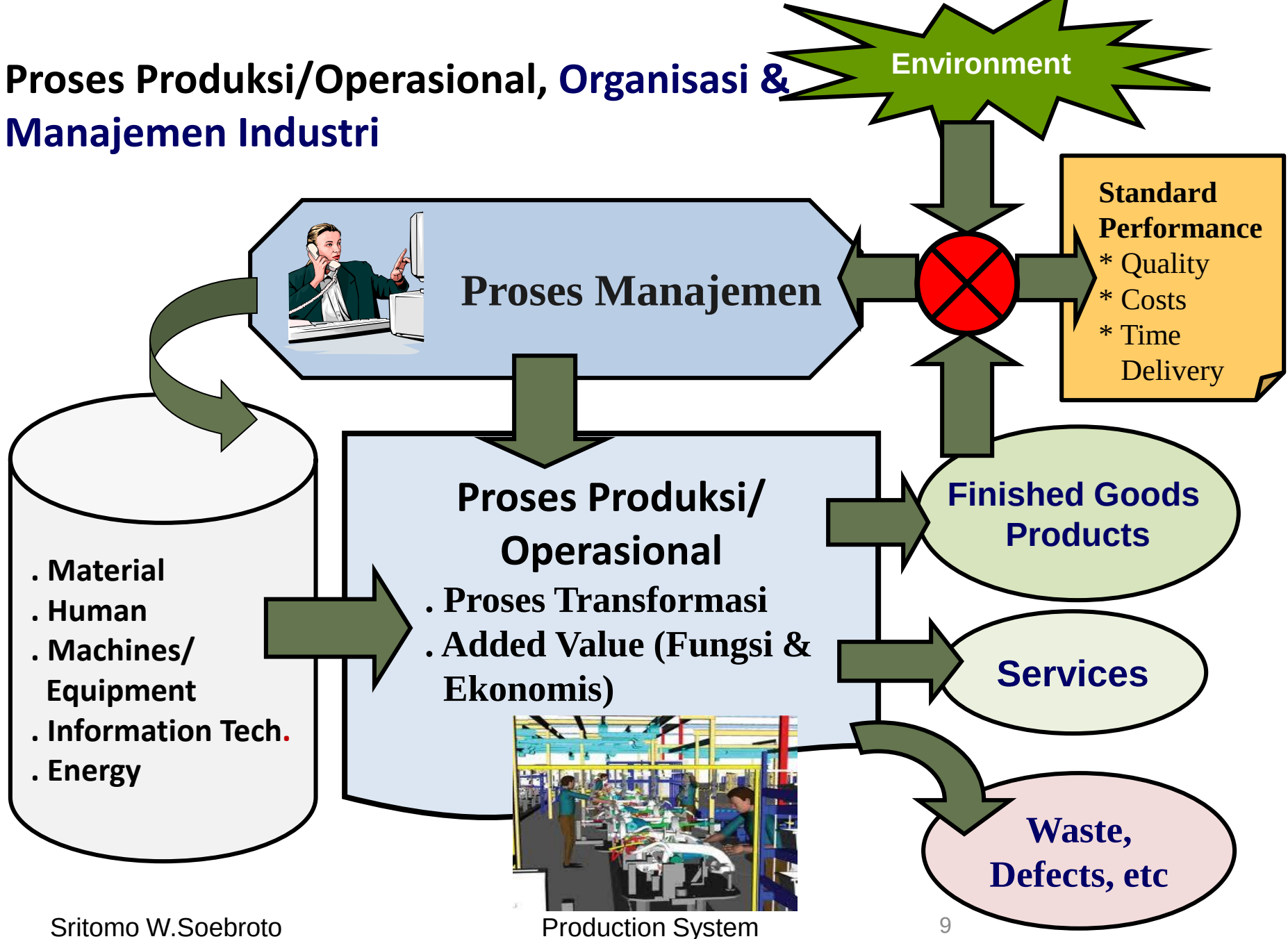
... a production/operation system uses resources to transform inputs into some desired outputs

Production/Operation System



Production/Operation system is a union or combination of its three main components viz., **Inputs**, **Conversion Process**, and **Output**. Everything which is done to produce goods and services or to achieve the production/operation objective is called **production/operation system**.

Proses Produksi/Operasional, Organisasi & Manajemen Industri





Sritomo W Soeprono IE Roadmap 2019 **Nilai Tambah? Parquet U\$ 20 - 60/m²**



Audi R8 – \$

Nilai Tambah? AUDI R8 – \$ 150,000

© izmo cars

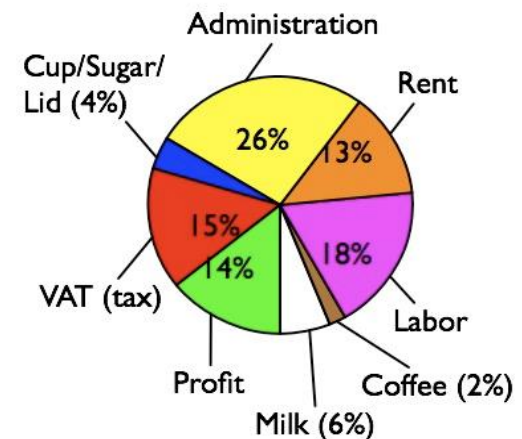


Berapa Nilai (Tambahnya) Sekarang ?



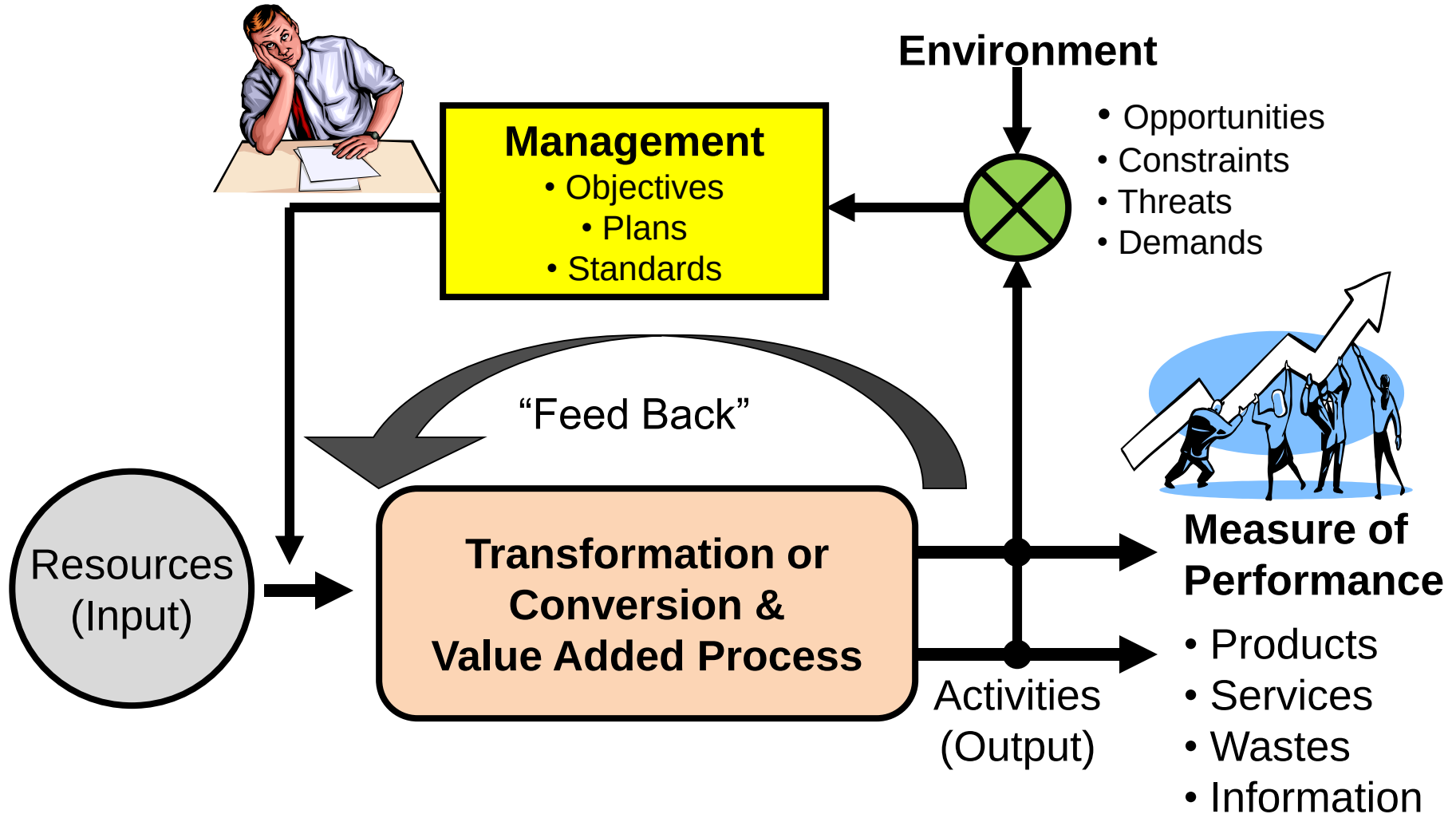
- Core Component
- Packaging Component
- Support Service Component

The Price of a Cup of Coffee

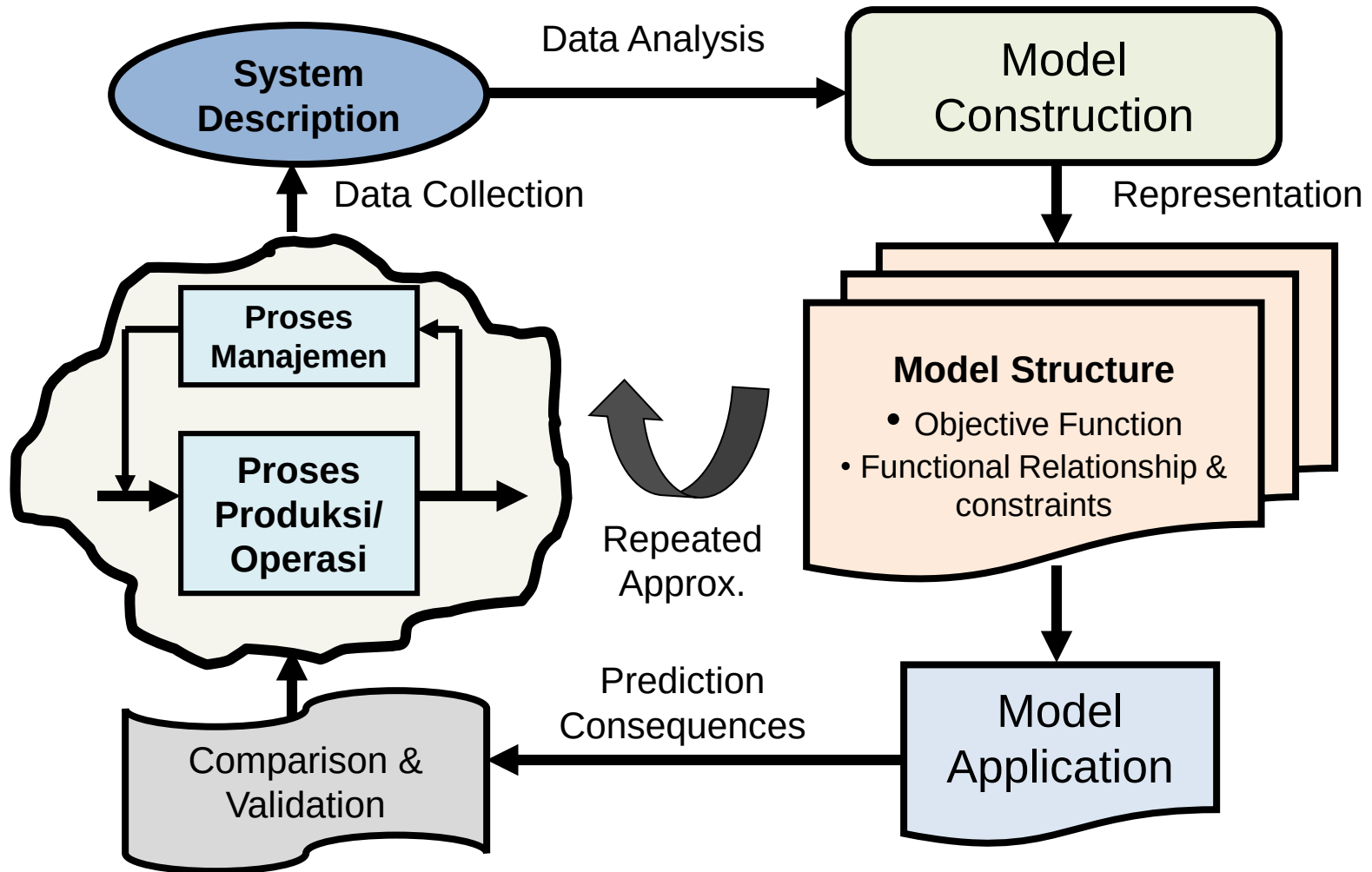


Source: <http://www.economicshelp.org/>

Skema Diagram Input-Output Sistim Industri

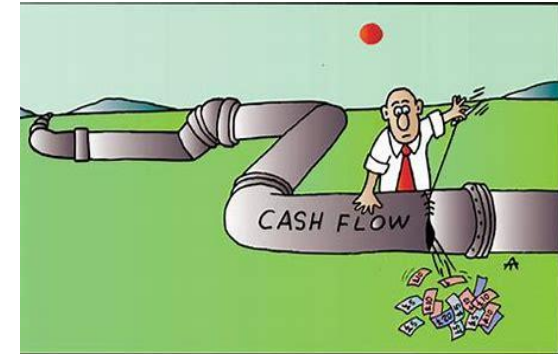


Proses Permodelan Sistim Industri

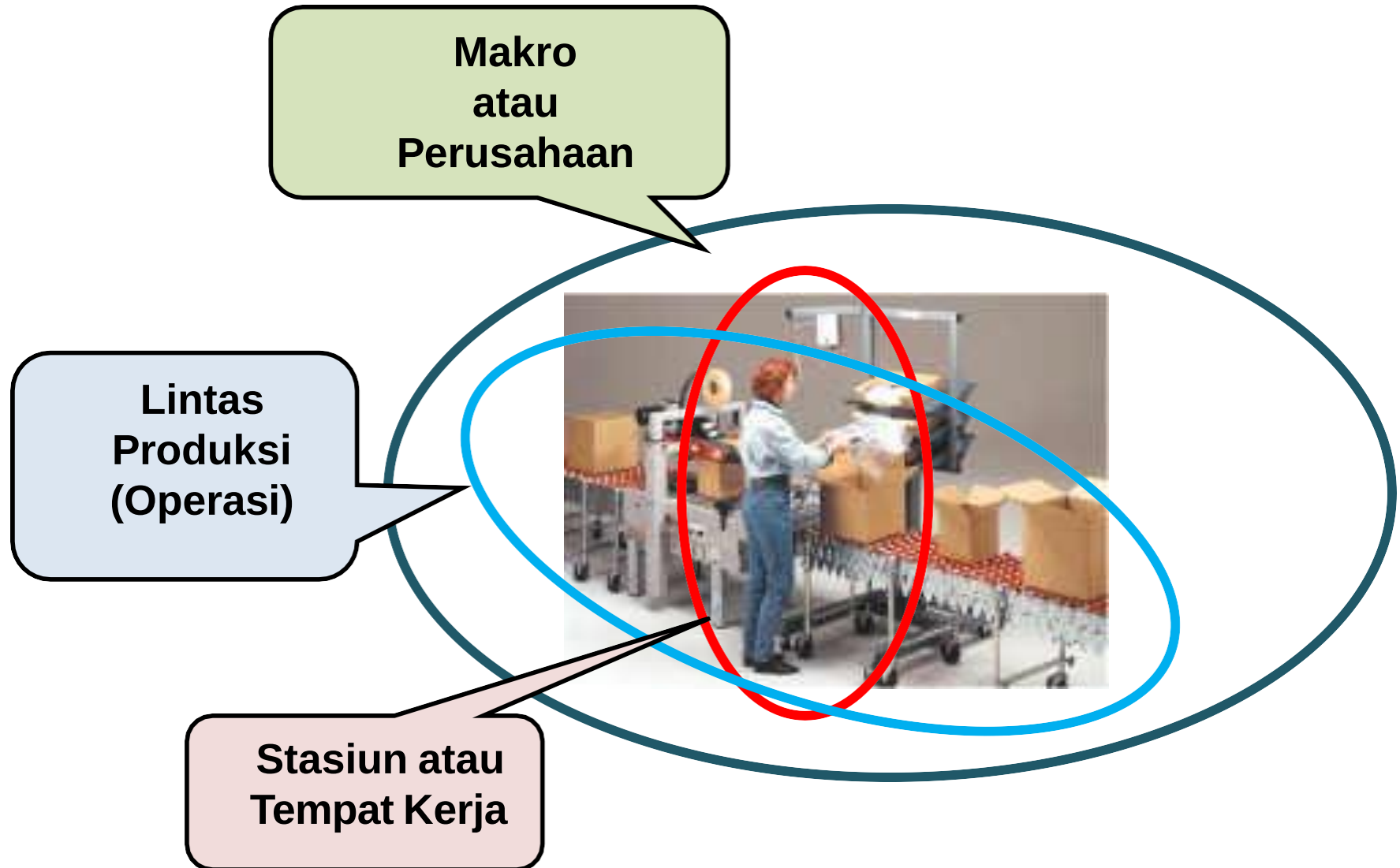


Permodelan Sistem Produksi/Industri

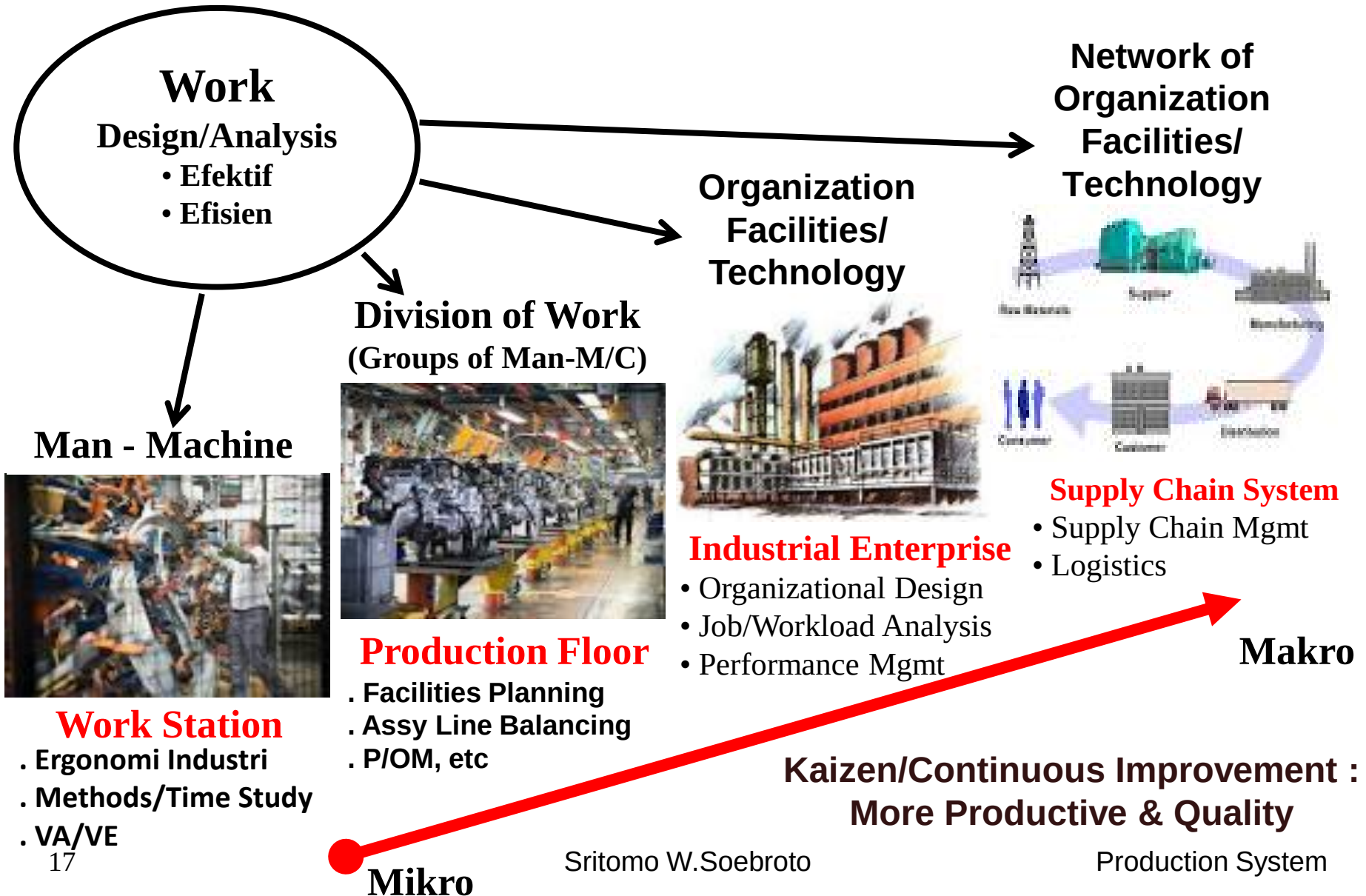
- **Pertama – *Dinamika Aliran Material & Uang*.** Penekanan pada prinsip-prinsip yang terjadi saat proses transformasi nilai tambah. Aliran material akan berlangsung dalam sistem produksi yang terus berkelanjutan sampai meningkat ke aliran distribusi barang (produk akhir) memenuhi kebutuhan konsumen.
- **Kedua - *Dinamika Aliran Informasi*.** Menyangkut aliran informasi yang diperlukan dalam proses pengambilan keputusan manajemen khususnya dalam skala operasional seperti perencanaan produksi agregat, pengendalian kualitas, dan berbagai macam problem produksi/operasional akan merupakan kajian pokoknya.
- **Ketiga -** cenderung menggambarkan sistem produksi/industri ini untuk bergerak ke arah persoalan-persoalan yang bersifat ***makro-strategis*** sebagai sebuah ***mata rantai pasok (supply chain)*** yang saling terkait dan membentuk sebuah jaringan kerja (network). Model ketiga ini cenderung menjauhi persoalan-persoalan teknis (deterministik-fisik-kuantitatif) yang umum dijumpai di lini produksi (model pertama) dan lebih banyak bergelut dengan persoalan non-teknis (stokastik-abstraktif-kualitatif).



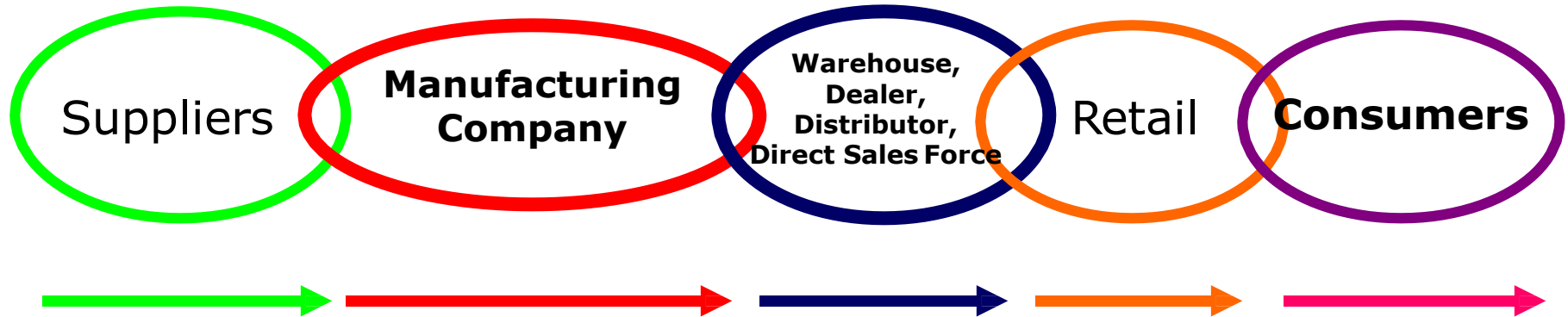
Tingkatan Sistem Manufaktur



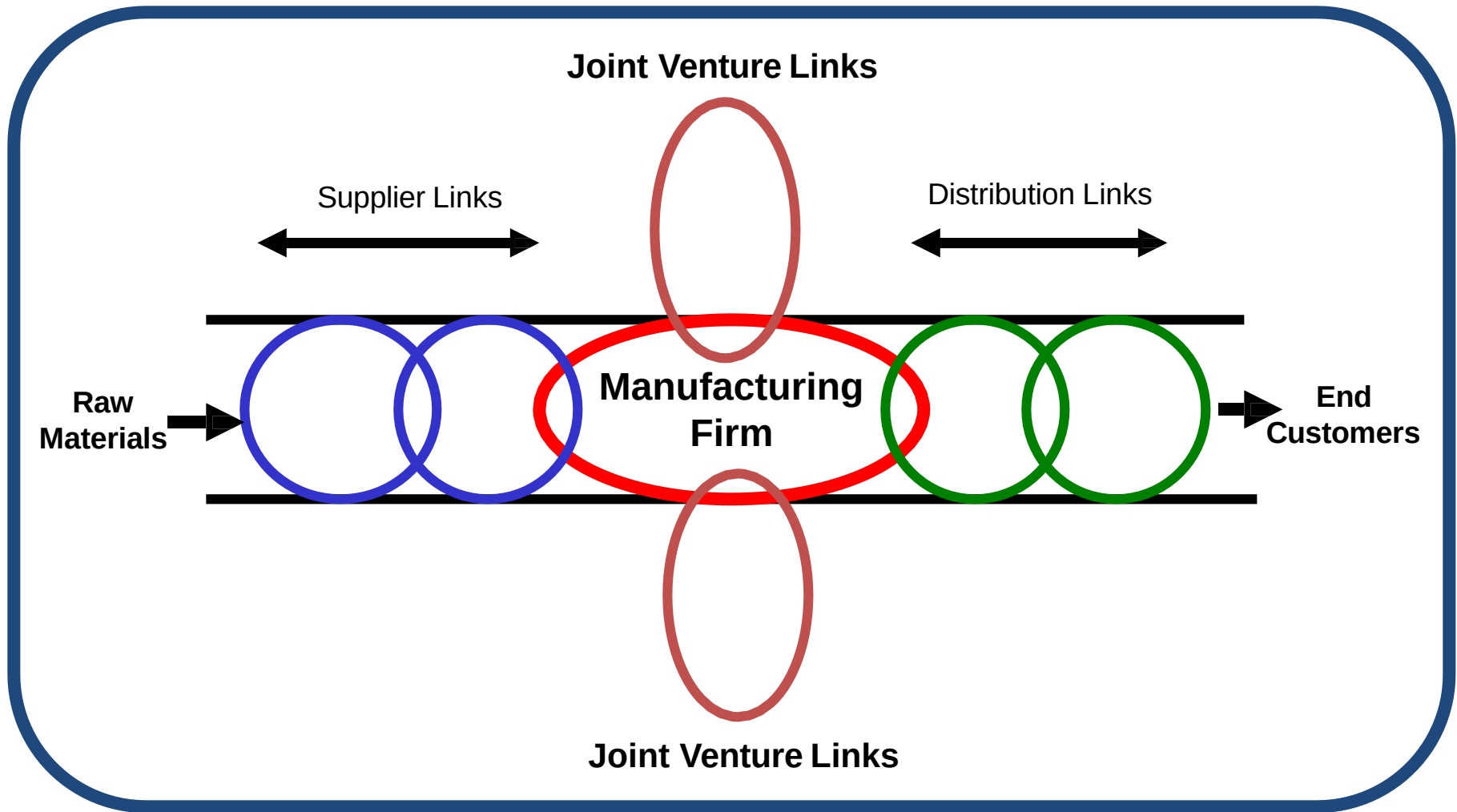
Design & Analysis of Production System?



Supply Chain of a Mfg Industry



Strategic Alliances – Horizontal and Vertical



Organisasi Industri & Pendekatan Sistem



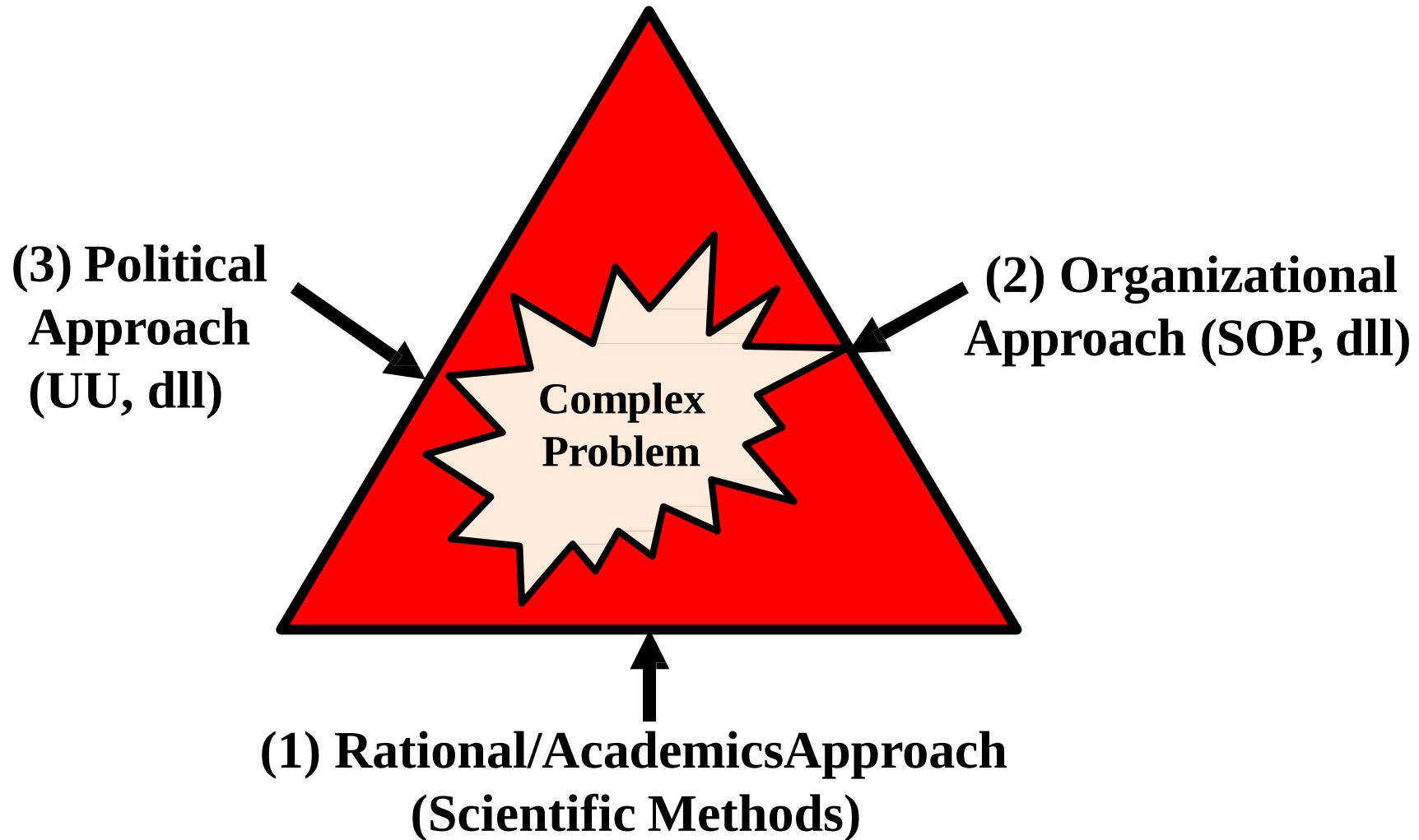
- Organisasi dipandang sebagai sebuah *sistem* yang komprehensif & integral.
- Setiap tindakan yang mengenai komponen, elemen, atau sub-sistem organisasi akan memberikan pengaruh (dampak) ke sub-sistem yang lainnya.
- Setiap sistem merupakan sub-sistem dari sistem yang lain dan yang lebih besar.

Pendekatan Sistem ?

- Selalu memperhatikan setiap permasalahan organisasi dan solusi penyelesaiannya secara *komprehensif-integral*.
- Setiap pemecahan masalah yang terjadi harus dilihat pengaruh dan keterkaitannya dengan masalah yang lain.
- Pendekatan masalah dilakukan melalui *proses analisis* (diferensiasi) dan solusi dilakukan melalui *proses sintesis* (integrasi).
- Hindari langkah-langkah penyelesaian masalah yang cenderung mengaplikasikan model *trial & error*; dan sebaiknya menggunakan metode ilmiah (*scientific methods*).



Metode Pendekatan Sistem dalam Proses Pengambilan Keputusan



Performans Manufaktur Industri Masa Depan

- Focus on processes, continuous improvement, mass-customization.
- Reach the market faster, at lower costs, at higher quality, high customer satisfaction and loyalty.
- Quality - reliability - maintainability - sustainability
- Manufacturing ethics : emphasis on people and environment (human capital/assets, human-ware, brain-ware, etc.



PERAN INDUSTRIAL ENGINEERS



- **Engineering role** : (1) Design (production system, service system, methods/work, facilities, product, etc); (2) Operation (productivity, quality, reliability, maintenance, etc).
- **Business Role (Development)** : system, culture, organization, entrepreneurial, R & D, risk analysis, etc.
- **Financial Role** : financial structuring.
- **Strategic Role** : product development/diversification, marketing strategy, alliance/partnership/collaboration, human development, etc.



Industrial Engineering Functional Work Areas

Product Engineering



- Team Facilitation
- Product Development

Finance



- Make/Buy Analysis
- Comparison of Alternatives
- Cost Estimating

Quality



- SPC/SQC
- DOE
- Supplier Quality
- Queuing Theory
- Six Sigma

Project Management



- Resource Planning
- Risk Analysis
- Project Scheduling

Production Control



- Job Scheduling
- Expedite procedures

Facilities



- Layout Design
- Process Flow Analysis

Factory Operations



- Production Simulation
- Theory of Constraints
- Systems Integration
- OSHA Regulations
- Safety Management
- Linear Programming
- Lean Manufacturing

Transportation



- Logistics Planning
- Material Handling

Training



- Course Facilitation

IE Methods



- Workstation Design
- Ergonomics
- Methods Engineering

Tooling



- Tool Fab process
- Tool Offload procedures
- Tool Repair process
- Tool Room procedures

Inventory



- Inventory Management
- Supplier Selection
- Material Requirements Planning
- Supply Chain Management

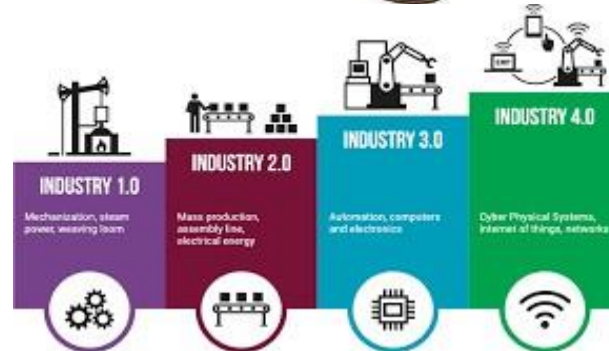
Agenda



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Industrialization for Enhancing QWL & Productivity



Sritomo W. Soebroto

Production System

Paradigma Industri Manufaktur di Era Normal Baru

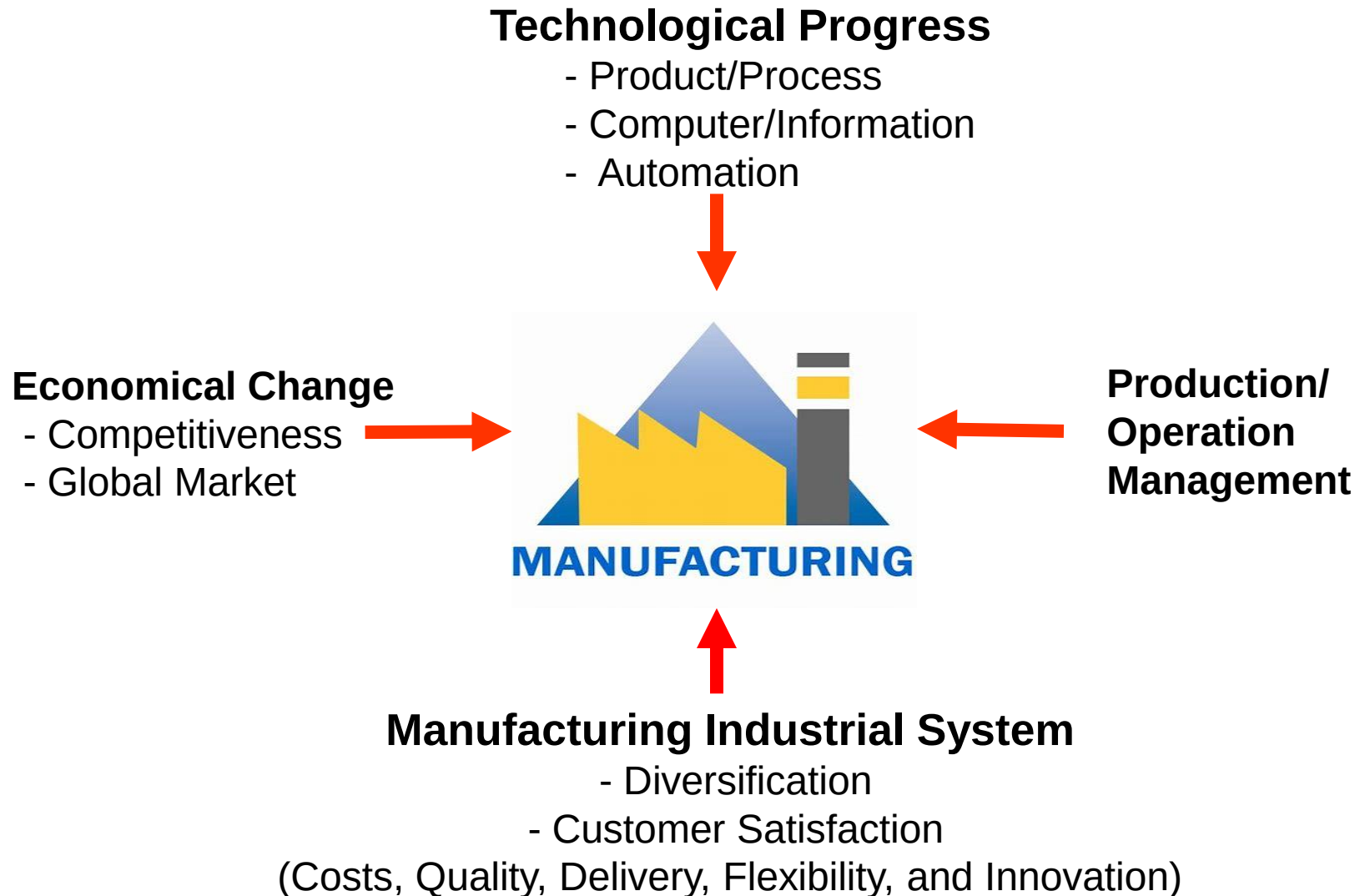
<https://id.wikipedia.org/wiki/Paradigma>

Paradigma dalam disiplin intelektual adalah cara pandang orang terhadap diri dan lingkungannya yang akan mempengaruhinya dalam berpikir, bersikap, dan bertindak laku.



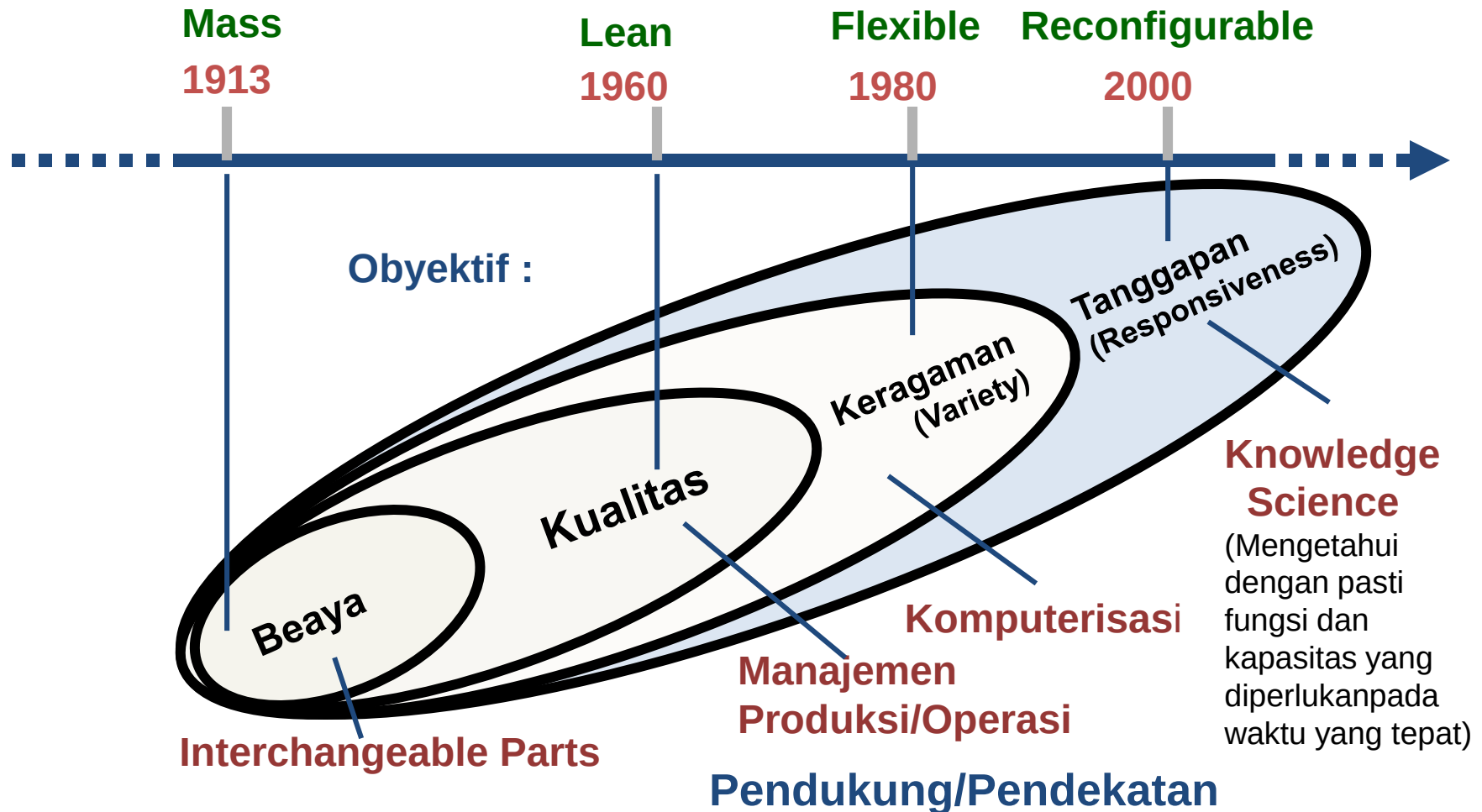
Paradigma juga dapat berarti seperangkat asumsi, konsep, nilai, dan praktik yang di terapkan dalam memandang realitas dalam sebuah komunitas yang sama, khususnya, dalam disiplin intelektual

New Paradigm in Manufacturing Industry



Paradigma Industri Manufaktur

Production/Operation



Perkembangan Atribut Daya Saing Industri



Cost

Quality

Delivery

**Flexibility/
Responsiveness**

Innovation

1800

1960

1970

1980

1990

2000

Ind.1.0 - Ind. 2.0 - Ind. 3.0 - Ind. 4.0

Now

Abad-Abad Perubahan

Agricultural Age

Industrial Age

Information Age

Wealth Definition

People work as

People work in

**Production/
Operation System**

food

*slaves/serfs
(man-power)*

*hierarchies
organization*

*one-piece
customization*

*food &
things*

*employees
(human resources)*

*bureaucracies
organization*

*mass-production
mfg system*

knowledge

*partners
(human capital)*

*teamnets/networks
organization*

*mass-customization
mfg-system*

Industry 1.0

Industry 2.0 – 3.0

Industry 4.0

..... ?

Scarcity of Resources

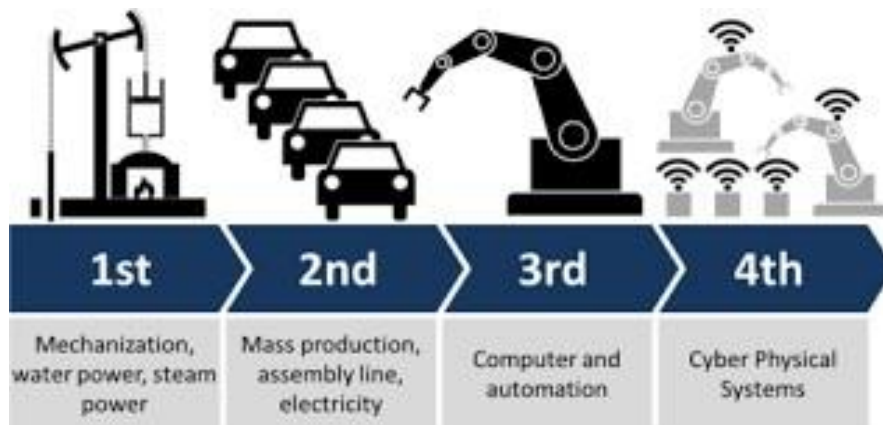
Abundance of Information



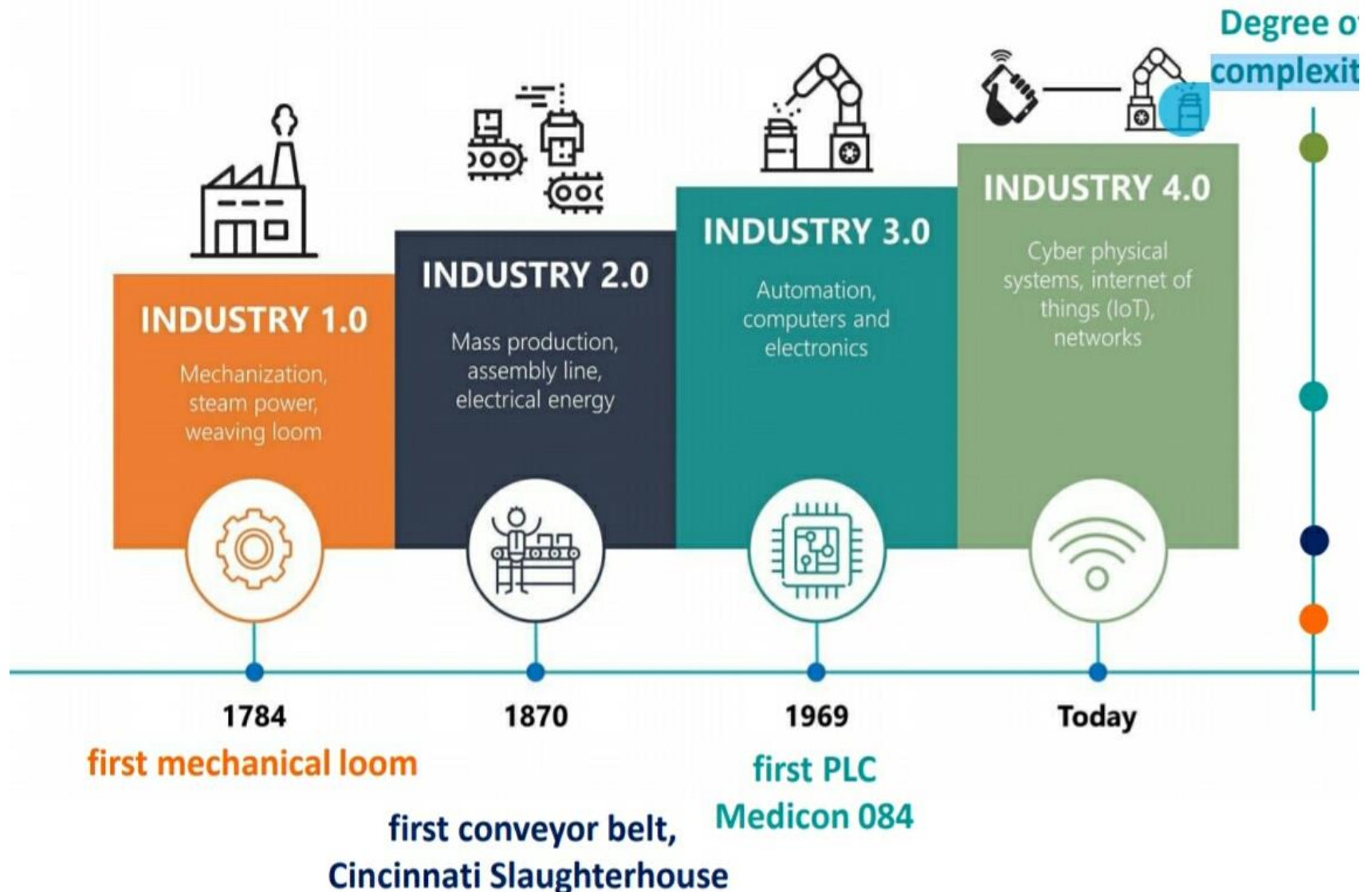
Revolusi Industri

https://id.wikipedia.org/wiki/Revolusi_Industri

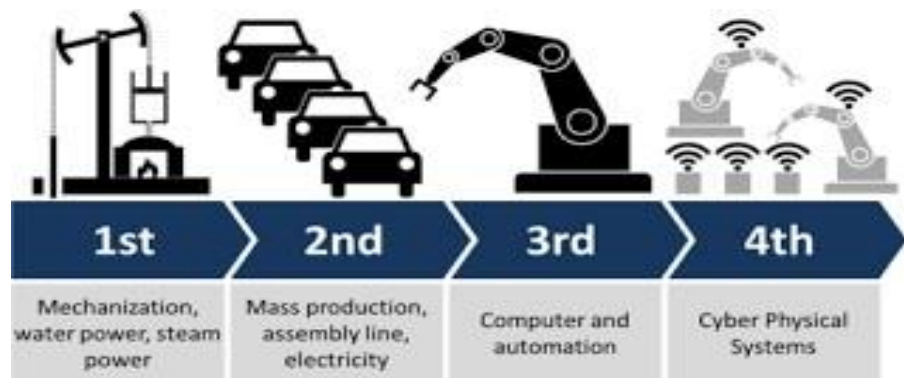
Awal munculnya periode antara tahun 1750- 1850 di mana terjadi perubahan secara besar - besaran di bidang pertanian, manufaktur, pertambangan, transportasi, dan teknologi serta memiliki dampak yang mendalam terhadap kondisi sosial, ekonomi, dan budaya di dunia.



the industry 4.0 transformation



Revolusi Industri 4.0



Sebenarnya kita sedang berada di ambang era baru di mana konsep-konsep ekonomi tradisional tidak lagi bisa diandalkan.

Sekarang ini kita hidup dalam dunia yang bergerak cepat dan saling terkoneksi, dimana perubahan teknologi, politik, demografi, dan ekonomi secara bersamaan mampu mengguncang dunia nyaris secara instan.

Klaus Schwab, World Economy Forum (WEF), 1970

Apa dan Bagaimana Industri 4.0 Bekerja ?

- ❖ Industri 4.0 mengintegrasikan dunia online dengan produksi industri. Sebuah pabrik pintar (smart factory) yang didalamnya dijumpai mesin-mesin dan robot yang mampu bekerja menjalankan tugas-tugas rumit, bertukar informasi, saling memberi dan menerima perintah secara otomatis **tanpa melibatkan manusia**.
- ❖ Semua proses produksi beroperasi dengan memanfaatkan teknologi internet. Dimana semua obyek dilengkapi sensor yang mampu berkomunikasi sendiri dengan sistem teknologi informasi (ICT).



Antisipasi (Revolusi) Industri 4.0

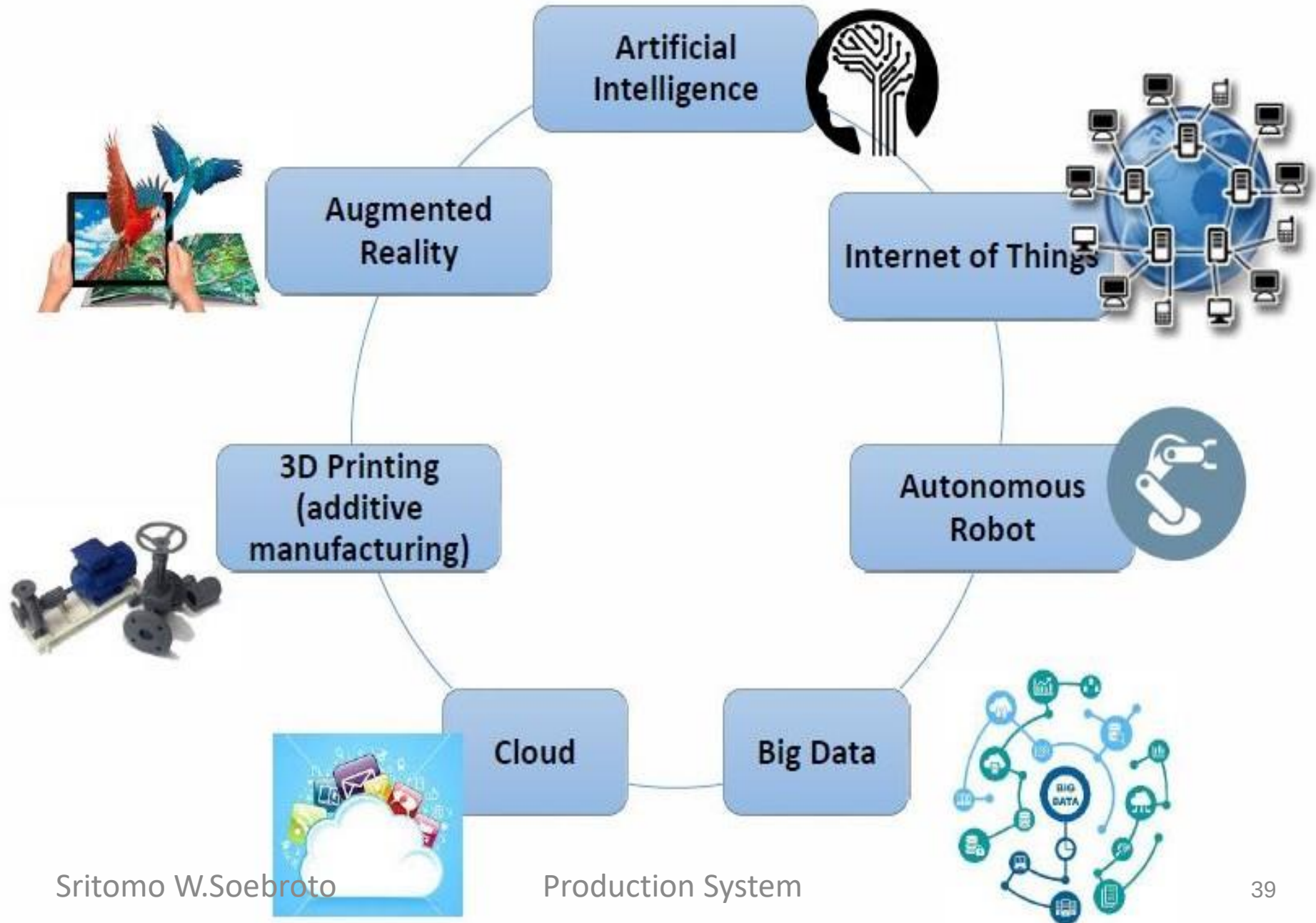


- ❖ Pabrik pintar sebagai produk Industri 4.0 **nyaris tidak membutuhkan tenaga kerja manusia**. Mesin-mesin dan robot pengganti tenaga manusia bakal hadir (sudah terjadi di revolusi industri sebelumnya). Gelombang Industri 4.0 masih menyisakan ruang bagi tenaga manusia, tapi ini sangat terbatas, hanya untuk tenaga kerja terampil.
- ❖ Dunia memang sedang bergerak menuju era Industri 4.0. Pasar tenaga kerja berubah drastis sebagai **dampak digitalisasi** kegiatan ekonomi. Di satu sisi, kekhawatiran naiknya tingkat pengangguran akan terus membayangi perekonomian. Di sisi lain, Industri 4.0 justru membuka peluang baru bagi kreativitas tenaga kerja sekaligus menaikkan standardisasi tenaga kerja terampil.

components of industry 4.0



Perkembangan teknologi yang mendukung Revolusi Industri 4.0



Cost

- Eliminate waste & losses
- Eliminate hidden cost
- Cost reduction

Complexity

- Sub-Nano technology
- Cyber Physical System
- Exponential technologies



- Personalize
- Fast, Cheap, Quality
- Total Customer Satisfaction

Customer

- Digitalization
- Increase competitiveness
- Globalization

Competition



UBER

World's largest
taxi company,
owns no taxi



World's largest
accommodation
provider, owns no real
apartment



World's largest
valuable retailer, owns
no inventory



World's most
popular media
owner, owns
no content



World's largest movie
house, owns no
cinemas



Welcome to
the New Normal



None

10

15

20

25

30

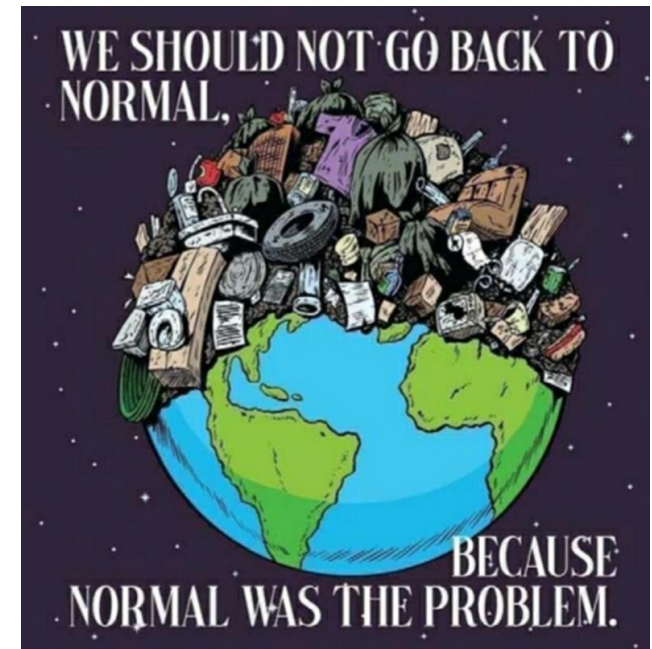
35%

- Previous supply chain consideration : efficiency
- Now: Resiliency!
- Changes in global supply chain moves to local sourcing (protectionism/nationalism)
- Economic of scale to economic of scope
- Countries with vast resources should benefit more

Source: OECD TiVA, Bloomberg Economics

Bloomberg

Adaptasi Bisnis-Industri di Era New Normal



DECODING THE ECONOMICS OF COVID-19

POTENTIAL WINNERS & LOSERS IN THE SHORT TERM



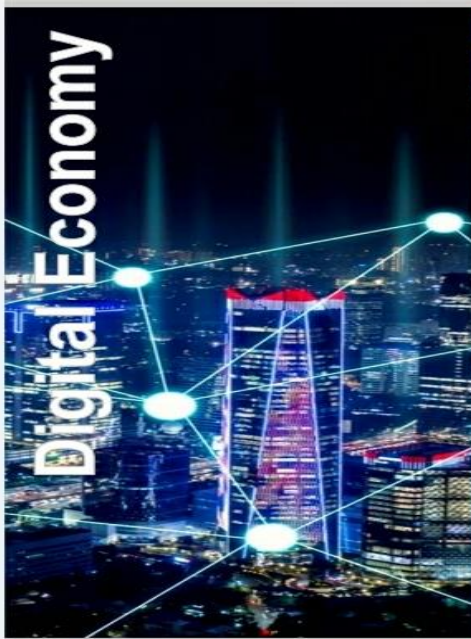
Food Security

- A significant consequence of the pandemic
- Producers challenges: supply chain disruptions, adjust production comply to security, logistics and distribution issues
- Consumer changes: pattern of consumption, more on digital channel, securing more basic stuffs
- Results: changes in price and quantity available for commodities



10 Produk Potensial





Digital Economy



Electric Vehicle



Tourism



Human Resource Dev.

13



INDUSTRI
HALAL



MANUFACTURING
VALUE-ADDED



FURNITUR



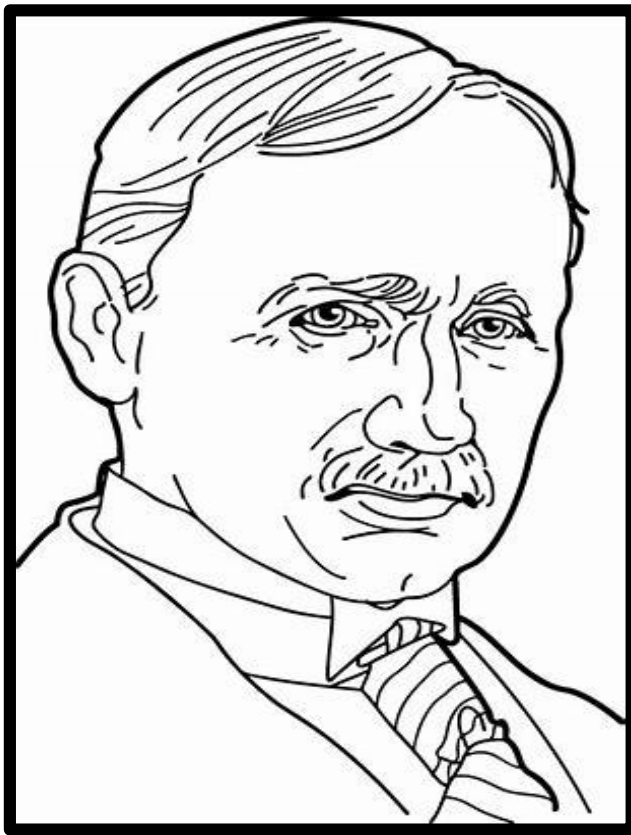
1.Climb a Mountain

A lush, green forest scene with sunlight filtering through the dense canopy. The ground is covered in thick moss and fallen branches. The text "2.Go to The Jungle" is overlaid in a bold, yellow-green font.

2.Go to The Jungle

A large yellow Liebherr excavator is shown in a construction or mining setting. A worker in a white hard hat and safety vest stands next to the excavator's bucket to provide a sense of scale. The excavator's arm and bucket are prominently featured, with the Liebherr logo visible on the bucket. The background is a hazy, reddish-brown landscape.

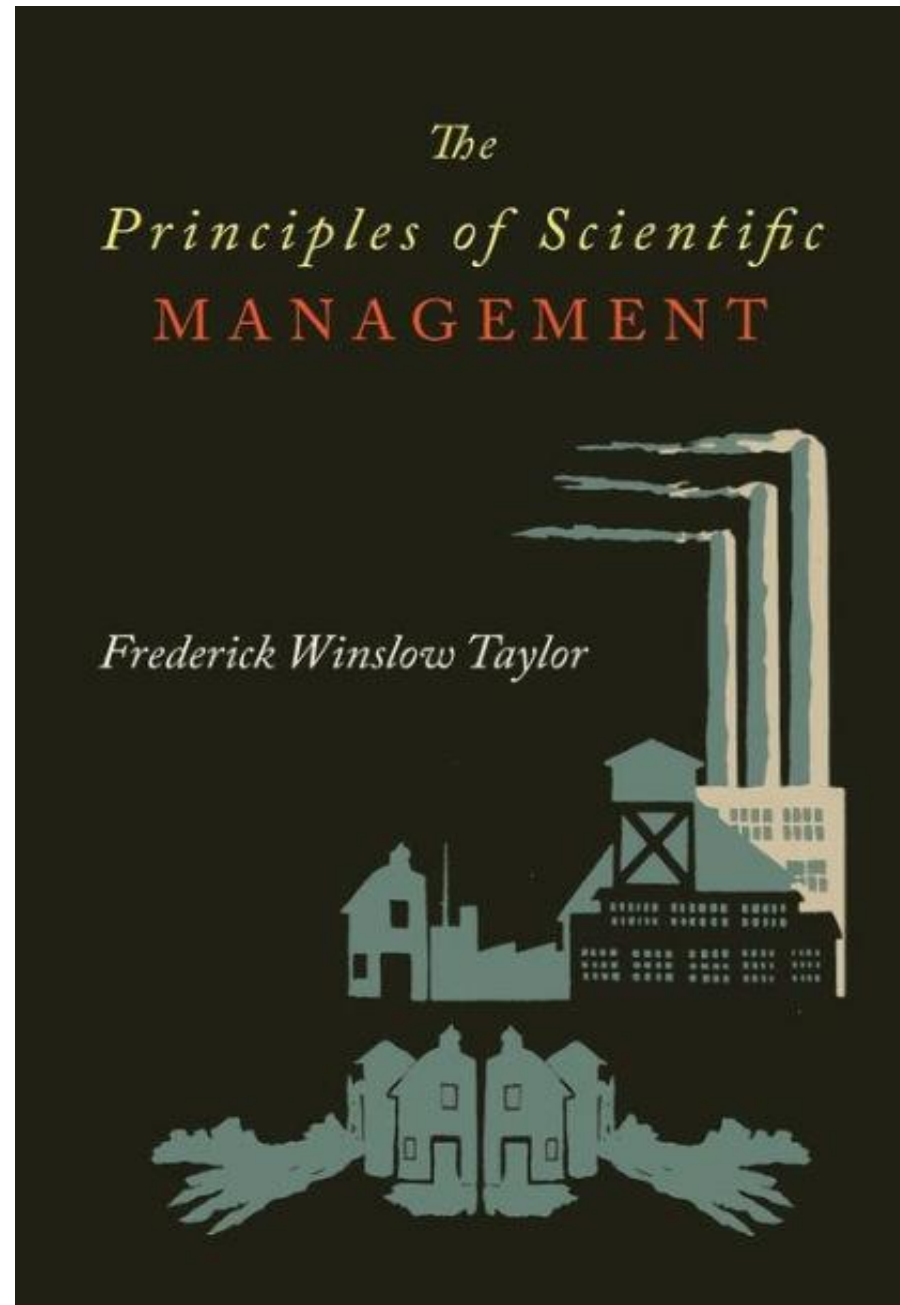
3. Think Like Engineer



***Knowing exactly what you want to do,
and then seeing that they do it
the best and cheapest way***

***In the past the man has been first; in the
future the system must be first.***

(Frederick Winslow Taylor 1856-1915)



It's Time to STOP !

