CHANCES & CHALLENGES OF INDUSTRY 4.0 WORKFORCE

Jakarta, April 17th, 2017
# Industrial Revolution Timeframe

<table>
<thead>
<tr>
<th>Industrial Revolution</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>1784</td>
<td>based on mechanical production equipment driven by water and steam power</td>
</tr>
<tr>
<td>2.0</td>
<td>1870</td>
<td>based on mass production enabled by the division of labor and the use of electrical energy</td>
</tr>
<tr>
<td>3.0</td>
<td>1969</td>
<td>based on the use of electronics and IT to further automate production</td>
</tr>
<tr>
<td>4.0</td>
<td>tomorrow</td>
<td>based on the use of cyber-physical systems</td>
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</tbody>
</table>
The key essence of Industry 4.0 Concept is the enhancement of efficiency in the process of industry by way the utilization of connectivity and ICT (Information & Communication Technology).
Segment of Enterprise in Industry 4.0

Technology Provider
- Artificial Intelligence (AI)
- Internet of Things
- Virtual & Augmented Reality
- Censor & Scanning
- 3D Printing
- Robotics / Automation

Infrastructure Provider
- Internet Service Provider (ISP)
- Big Data Server
- Cloud Computing
- Telecommunication

Technology and Infrastructure User
- Capital Goods Industries (e.g. Machinery, Base Metal, etc.)
- Consumer Goods Industries (e.g. Automotive, Electronics, etc.)
- Industrial Services (e.g. Logistics, Maintenance, Engineering, etc.)
Paradigm Shift in Industry 4.0

- Value Added Optimization in each Industrial Value Chain

- Designed Quality
- Price
- Target cost

Industry K
Core competence k

Industry ...
Core competence ...

Industry B
Core competence 2

Industry A
Core competence 1

Processes:
- Process k
- Process ...
- Process 2
- Process 1
Paradigm Shift in Industry 4.0

- Industrial Structure, derived as **Upstream to Downstream**
- Industrial Value Chain, derived as follows:
  - R&D → Branding → Design → Manufacturing → Distribution → Marketing → After Sales
- Transformation of Industrialization System:
  - One stage of value chain (especially manufacturing), is conducted within an industry from raw materials to end product
  - One segment of industrial structure (upstream or downstream product only), is conducted by an industry within all Value Chain

More efficient and competitive
Global Value Chain (GVC)

Under this model, manufacturing is the lowest-value input.
Paradigm Shift in Industry 4.0

Disruptive Manufacturing

Production processes and products are being decentralized and digitized; manufacturers, suppliers and customers are establishing closer networks and innovation cycles are being reduced.
Digital Compass of Industry 4.0 represents new technologies related to each aspect within an industry.

It divides into number of aspects which are:
- Inventories
- Quality
- Supply/Demand Match
- Time to Market
- Services/Aftersales
- Resources/Process
- Asset Utilization
- Labor

Would it be CHALLENGES or CHANCES???
Preparation Towards Industry 4.0

- **Power Supply**
  - Abundant
  - Cheap
  - Continuous

- **Internet Bandwidth**
  - Large
  - Wide Coverage

- **Data Center**
  - Large storage
  - Secure
  - Affordable

- **Logistic 4.0**
  - Modern logistic infrastructure

- **Policy**
  - Competent Human Resources
  - Employment
## The Future of Jobs

<table>
<thead>
<tr>
<th>Demographic and Socio-Economic Driver</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing nature of work, flexible work</td>
<td>44%</td>
</tr>
<tr>
<td>Middle class in emerging markets</td>
<td>23%</td>
</tr>
<tr>
<td>Climate change, natural resources</td>
<td>23%</td>
</tr>
<tr>
<td>Geopolitical volatility</td>
<td>21%</td>
</tr>
<tr>
<td>Consumer ethics, privacy issues</td>
<td>16%</td>
</tr>
<tr>
<td>Longevity, ageing societies</td>
<td>14%</td>
</tr>
<tr>
<td>Young demographics in emerging markets</td>
<td>13%</td>
</tr>
<tr>
<td>Women's economic power, aspirations</td>
<td>12%</td>
</tr>
<tr>
<td>Rapid urbanization</td>
<td>8%</td>
</tr>
</tbody>
</table>

# The Future of Job Skills Requirements

## Abilities

**Cognitive Abilities**
- Cognitive Flexibility
- Creativity
- Logical Reasoning
- Problem Sensitivity
- Mathematical Reasoning
- Visualization

**Physical Abilities**
- Physical Strength
- Manual Dexterity and Precision

## Basic Skills

**Content Skills**
- Active Learning
- Oral Expression
- Reading Comprehension
- Written Expression
- ICT Literacy

**Process Skills**
- Active Listening
- Critical Thinking
- Monitoring Self and Others

## Cross-functional Skills

**Social Skills**
- Coordinating with Others
- Emotional Intelligence
- Negotiation
- Persuasion
- Service Orientation
- Training and Teaching Others

**Resource Management Skills**
- Management of Financial Resources
- Management of Material Resources
- People Management
- Time Management

**Systems Skills**
- Judgement and Decision-making
- Systems Analysis

**Complex Problem Solving Skills**
- Complex Problem Solving

**Technical Skills**
- Equipment Maintenance and Repair
- Equipment Operation and Control
- Programming
- Quality Control
- Technology and User Experience Design
- Troubleshooting

Source: World Economic Forum, based on O*NET Content Model.
Strategies Planned by Industries

Share of respondents pursuing strategy, %

- Invest in reskilling current employees: 65%
- Support mobility and job rotation: 39%
- Collaborate, educational institutions: 25%
- Target female talent: 25%
- Attract foreign talent: 22%
- Offer apprenticeships: 22%
- Collaborate, other companies across industries: 14%
- Collaborate, other companies in industry: 12%
- Target minorities’ talent: 12%
- Hire more short-term workers: 11%

Immediate Focus

- Reinventing the HR function
- Making use of data analytics
- Talent diversity
- Leveraging flexible working arrangements and online talent platforms
- Incentives for industries regarding workforce competencies
Long-Term Focus

- Rethinking education systems
- Incentivizing life-long learning
- Cross-industry and public-private collaboration
- National Standards on Workforce Competencies
THANK YOU

AGENCY FOR RESEARCH & DEVELOPMENT OF INDUSTRY