Planning Prosperity Together

Ushering TVET to Address the Challenges of Industrial Revolution 4.0

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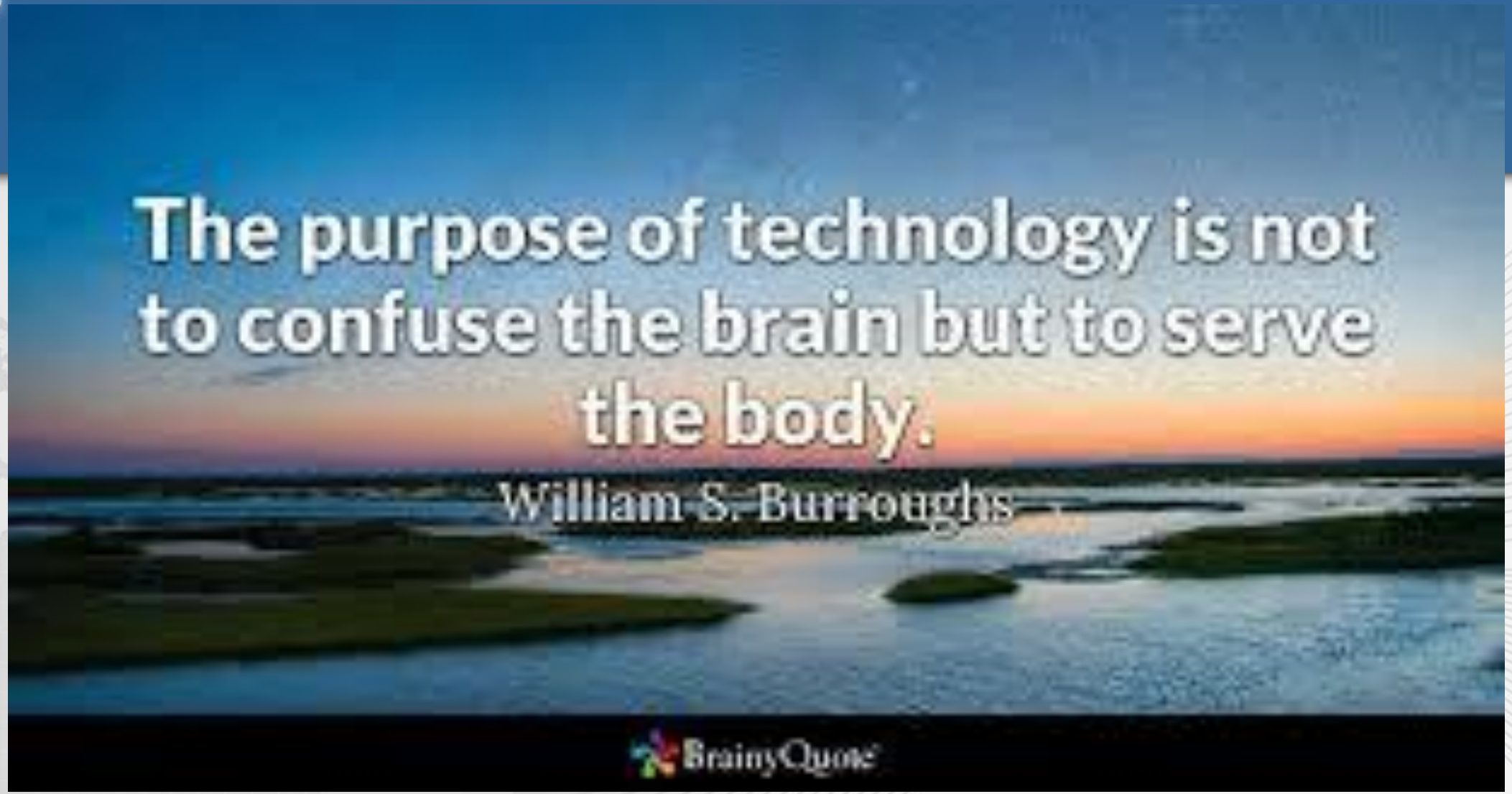
Presentation Outline

- Industrial Evolutions to Revolutions
- Global Trend of Labour Market
- Regional Issues in TVET
- Way Forward


The purpose of technology is not to confuse the brain but to serve the body.
William S. Burroughs
BrainyQuote

Industrial Evolution to Revolutions

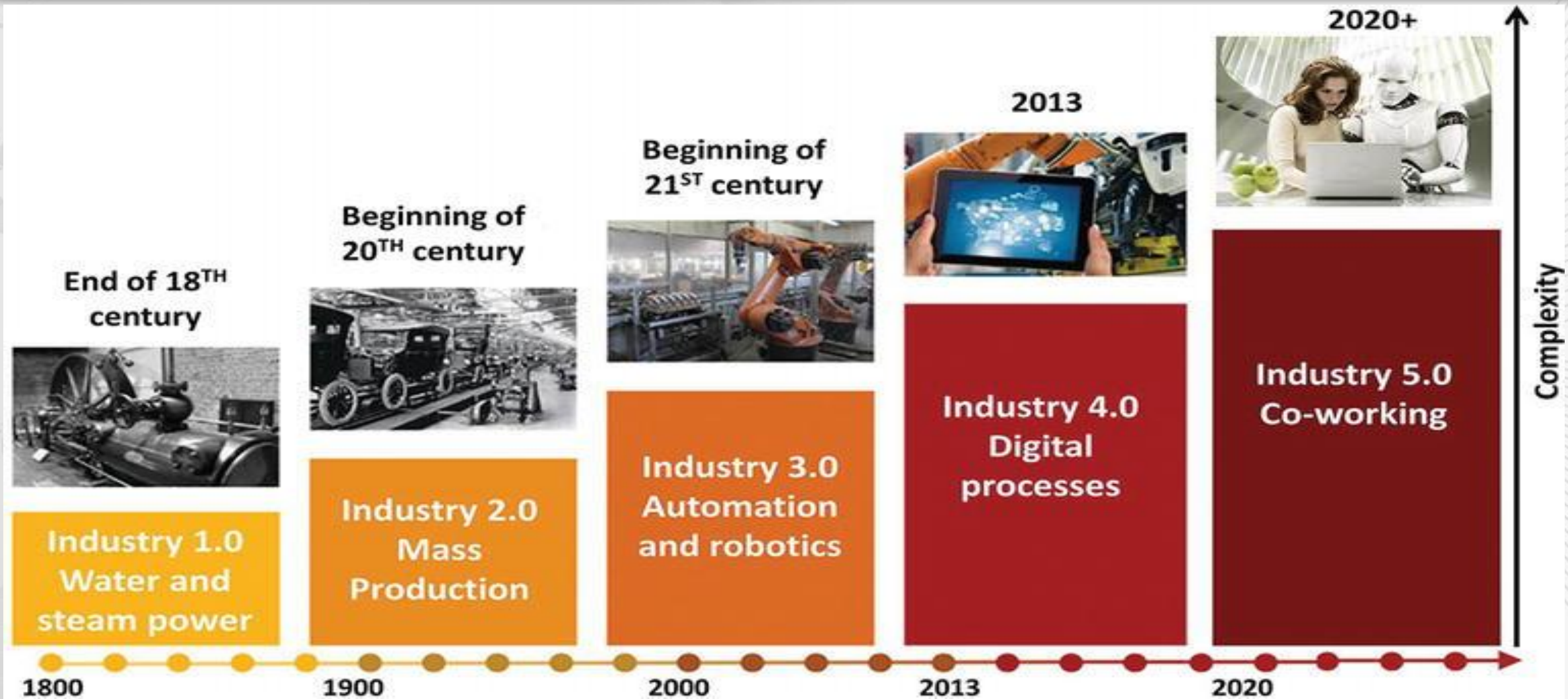
What is this?

What is this?

What is this?

What is this?

Stages of Industrial Evolution



Industry 4.0

Six Design Principles (Martin, 2017)

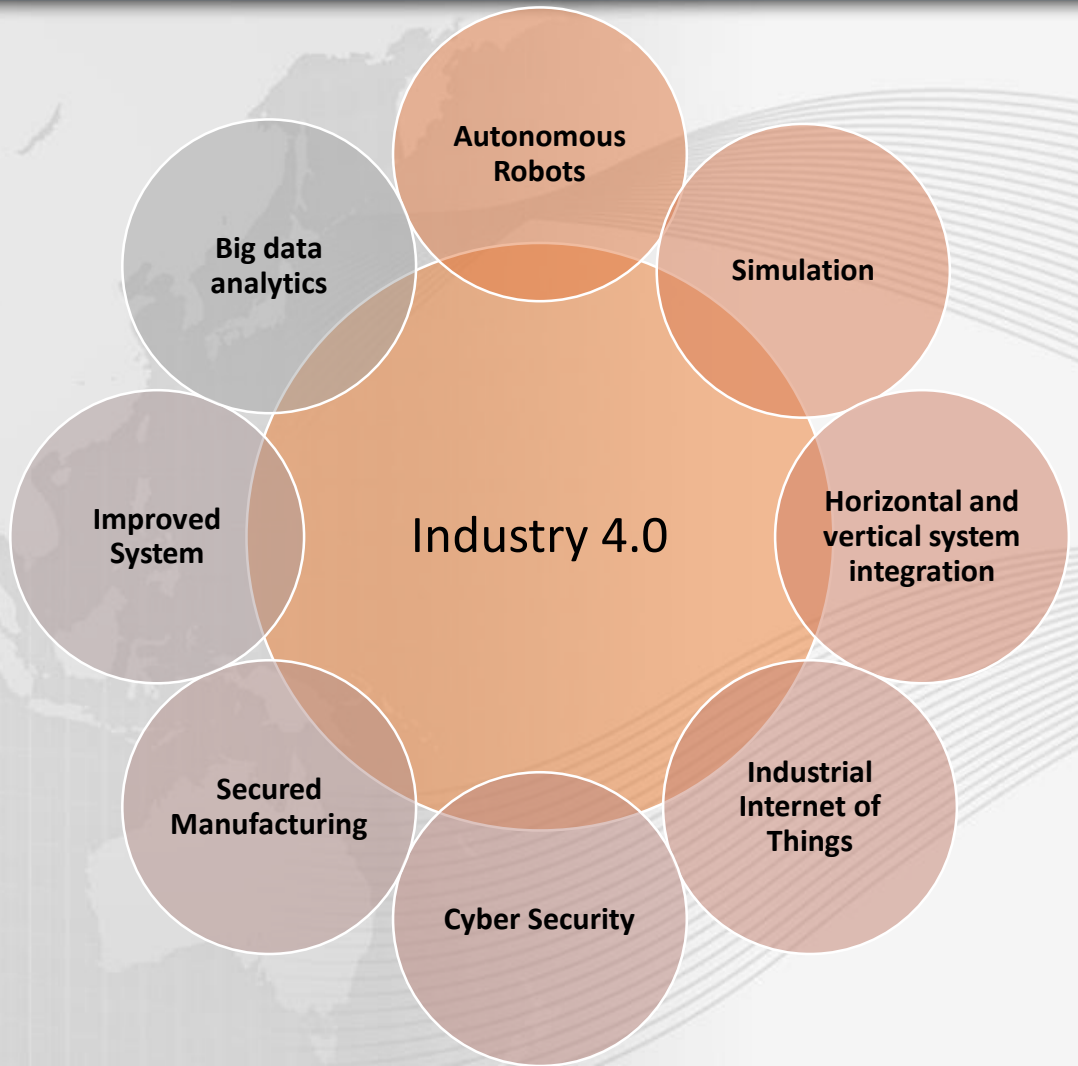
- **Interoperability:** the ability of **cyber-physical systems** (i.e. work piece carriers, assembly stations and products), humans and Smart Factories to connect and communicate with each other via the **Internet of Things** and the **Internet of Services**
- **Virtualization:** a virtual copy of the Smart Factory which is created by linking sensor data (from monitoring physical processes) with virtual plant models and simulation models
- **Decentralization:** the ability of **cyber-physical systems** within Smart Factories to make decisions on their own
- **Real-Time Capability:** the capability to collect and analyze data and provide the insights immediately
- **Service Orientation:** offering of services (of **cyber-physical systems**, humans and Smart Factories) via the **Internet of Services**
- **Modularity:** flexible adaptation of Smart Factories for changing requirements of individual modules

Did not exist in 2006

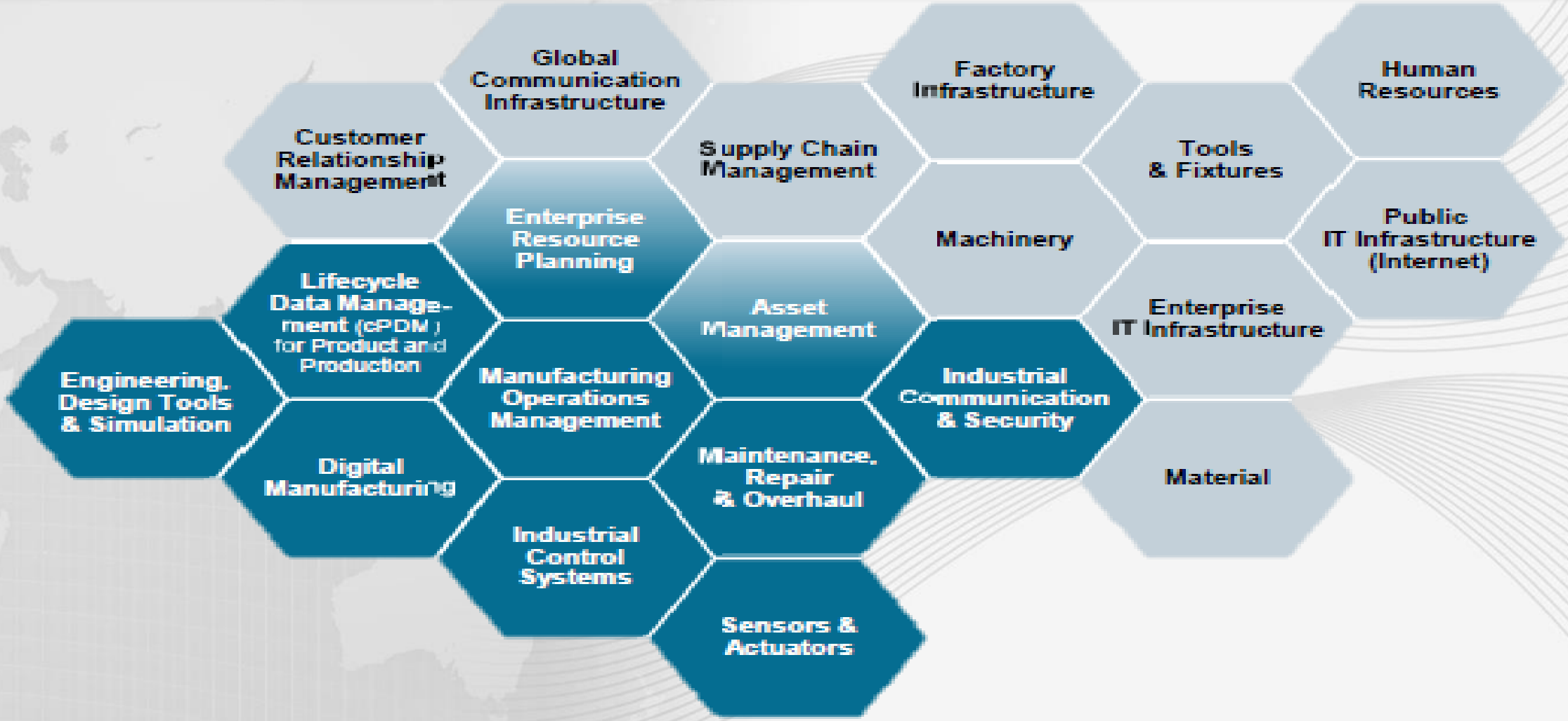
Time to reach 100 Million customers

- Telephone 75 Years
- Web 7 Years
- Facebook 4 Years
- Instagram 2 Years
- Pokemon Go 1 Month

Building blocks of Industry 4.0



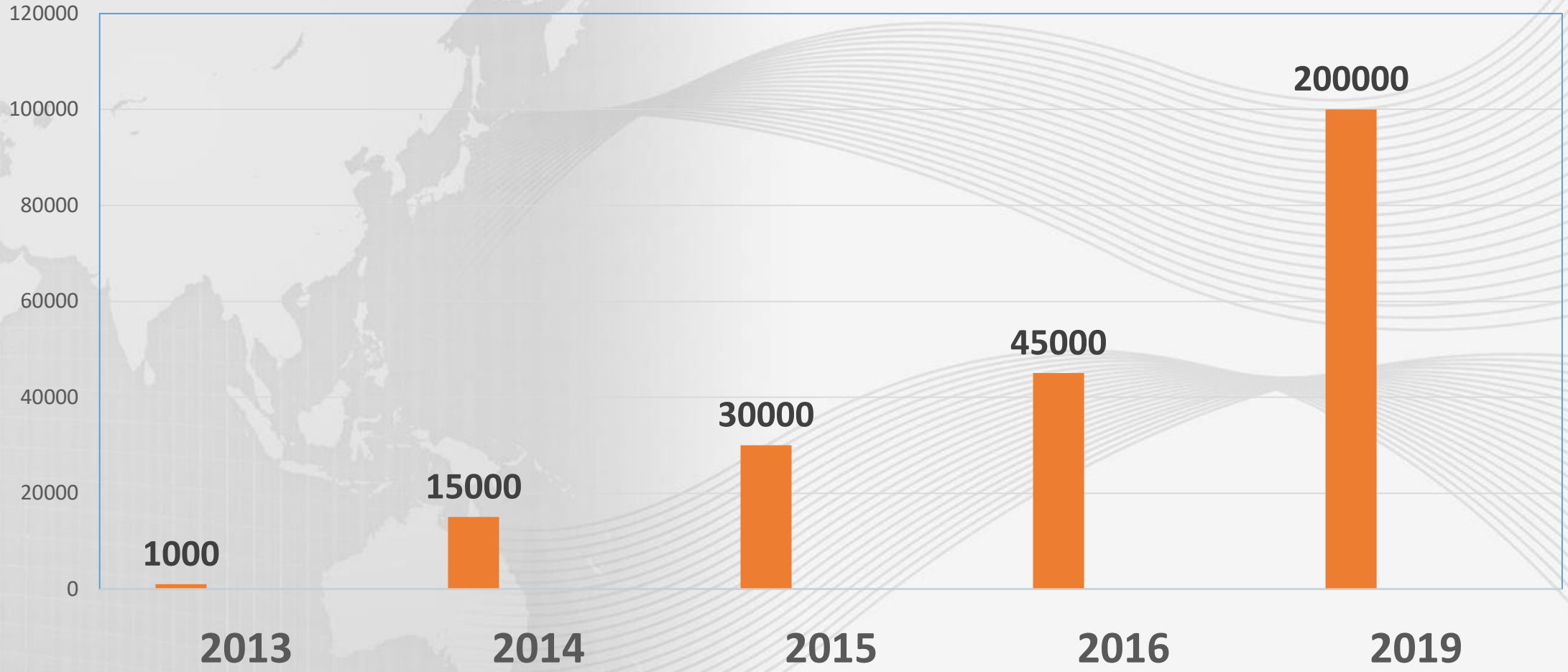
IR 4.0 Impacting all Aspect of Value Chain



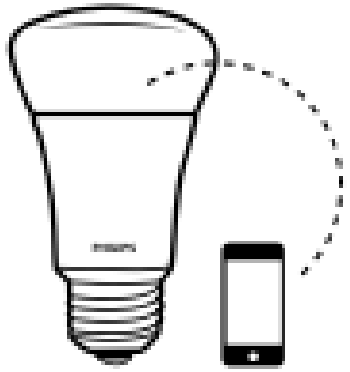
Potential Implications of IR 4.0

- Robot Assisted production
- Predictive Maintenance
- Additive Manufacturing of Complex Parts
- Machines as a Service
- Big Data Drive Quality Control
- Production Line Simulation
- Smart Supply Network

Robots Working in Amazon Ware House



Examples of Product Evolution: Connected and Smart Products

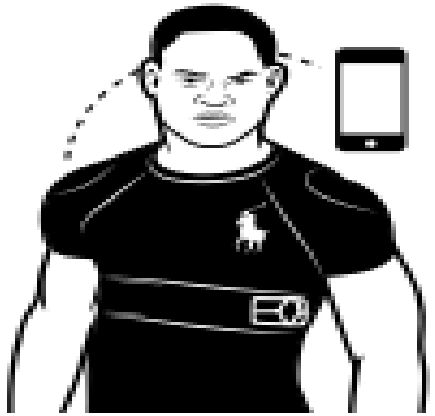


Philips Lighting

Users can control Philips Lighting hue lightbulbs via smartphone, turning them on and off, programming them to blink if they detect an intruder, or dimming them slowly at night.

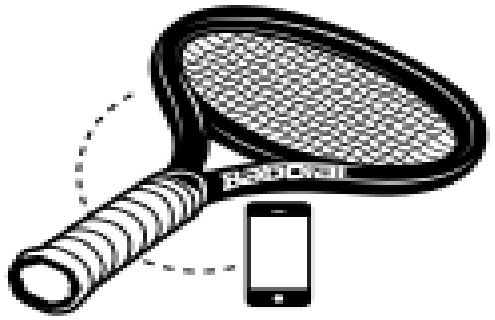
Medtronic

Medtronic's implanted digital blood glucose meter connects wirelessly to a monitoring and display device and can alert patients to trends in glucose levels requiring attention.



Ralph Lauren

Ralph Lauren's Polo Tech Shirt, available in 2015, streams distance covered, calories burned, movement intensity, heart rate, and other data to the wearer's mobile device.



Babolat

Babolat's Play Pure Drive product system puts sensors and connectivity in the tennis racket handle, allowing users to track and analyze ball speed, spin, and impact location to improve their game.

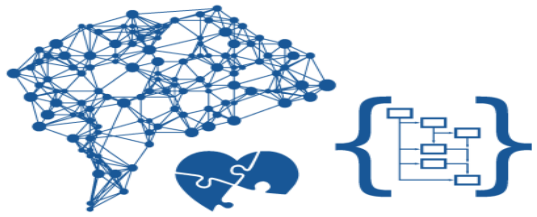
Top 10 Skills to be Relevant in Industry 4.0

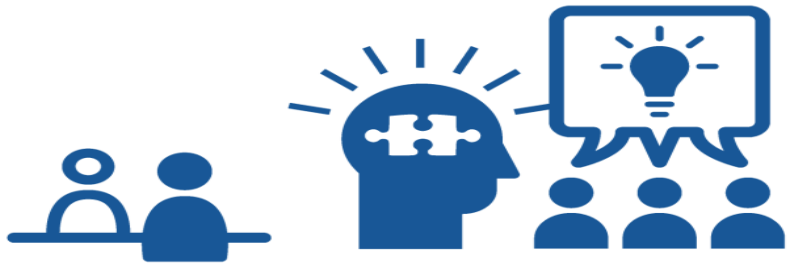
in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

in 2015

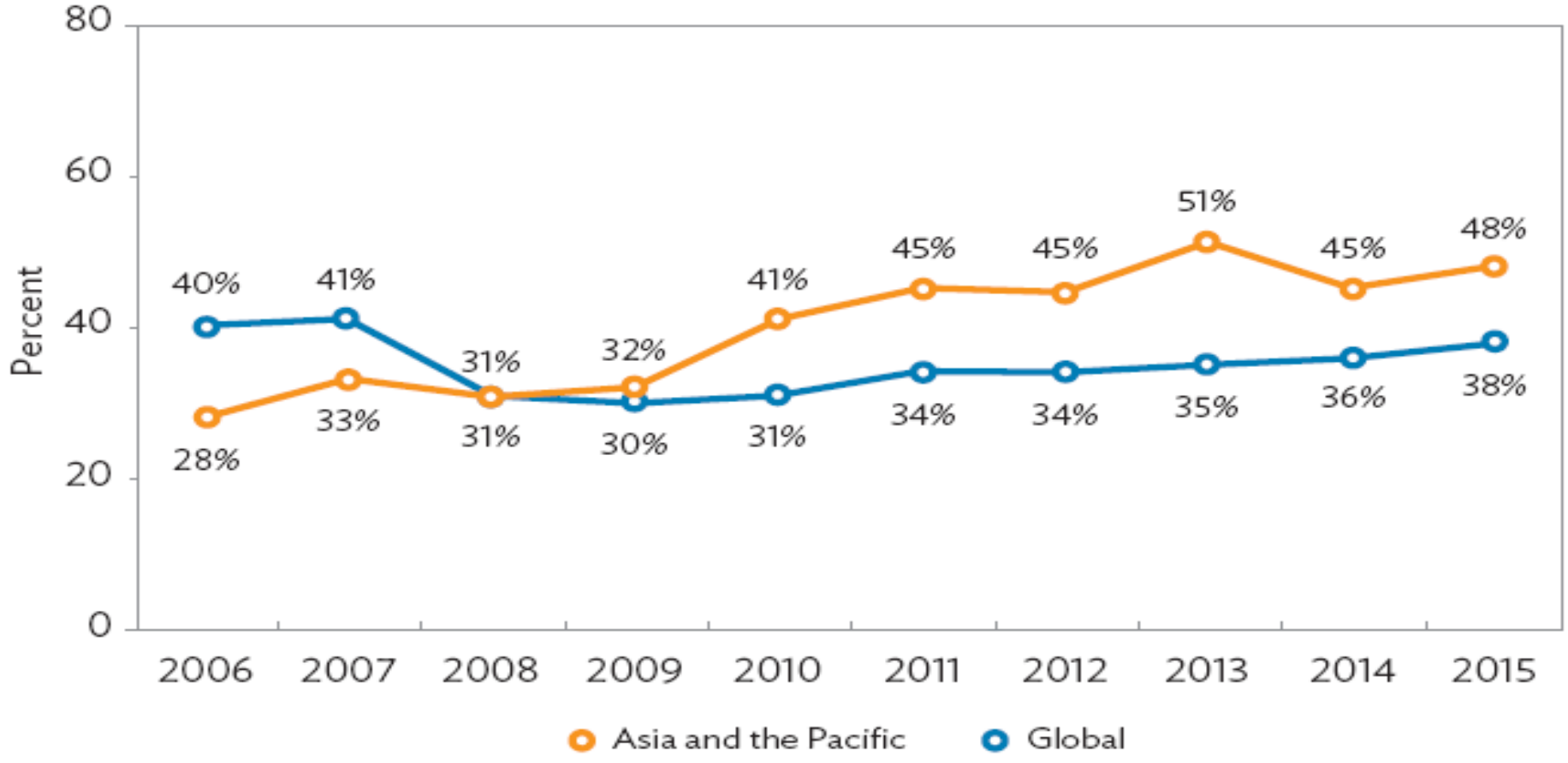
1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity





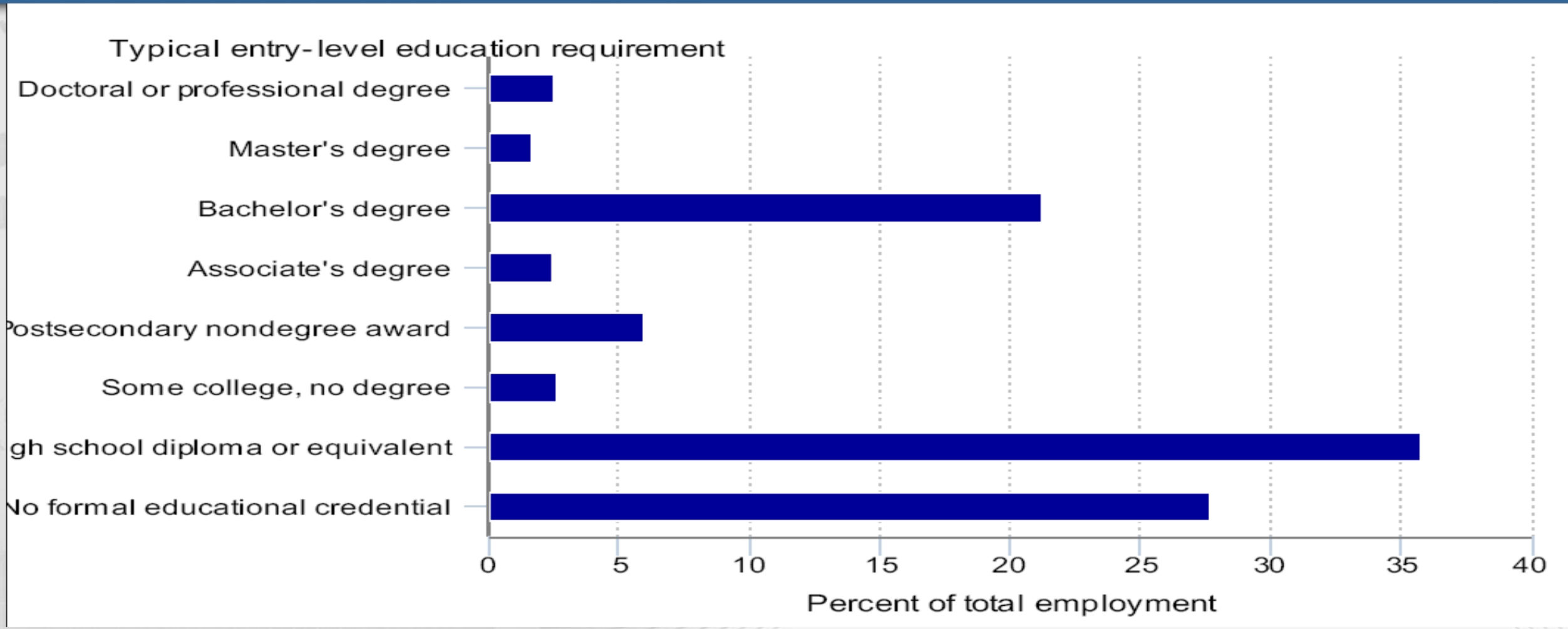
Global Trend of Labour Market

Shortage of Skilled (Talent) Workforce



Source: 2015 Talent Shortage Survey (ManpowerGroup 2015).

Employment by Entry-Level Education Requirement (May 2016)



Source: U S Bureau of Labour Statistics, Occupational Employment Statistics Programme

Employment Effect of Drivers of Change, by Job Family

Source: Future of Job Survey, World Economic Forum, 2016

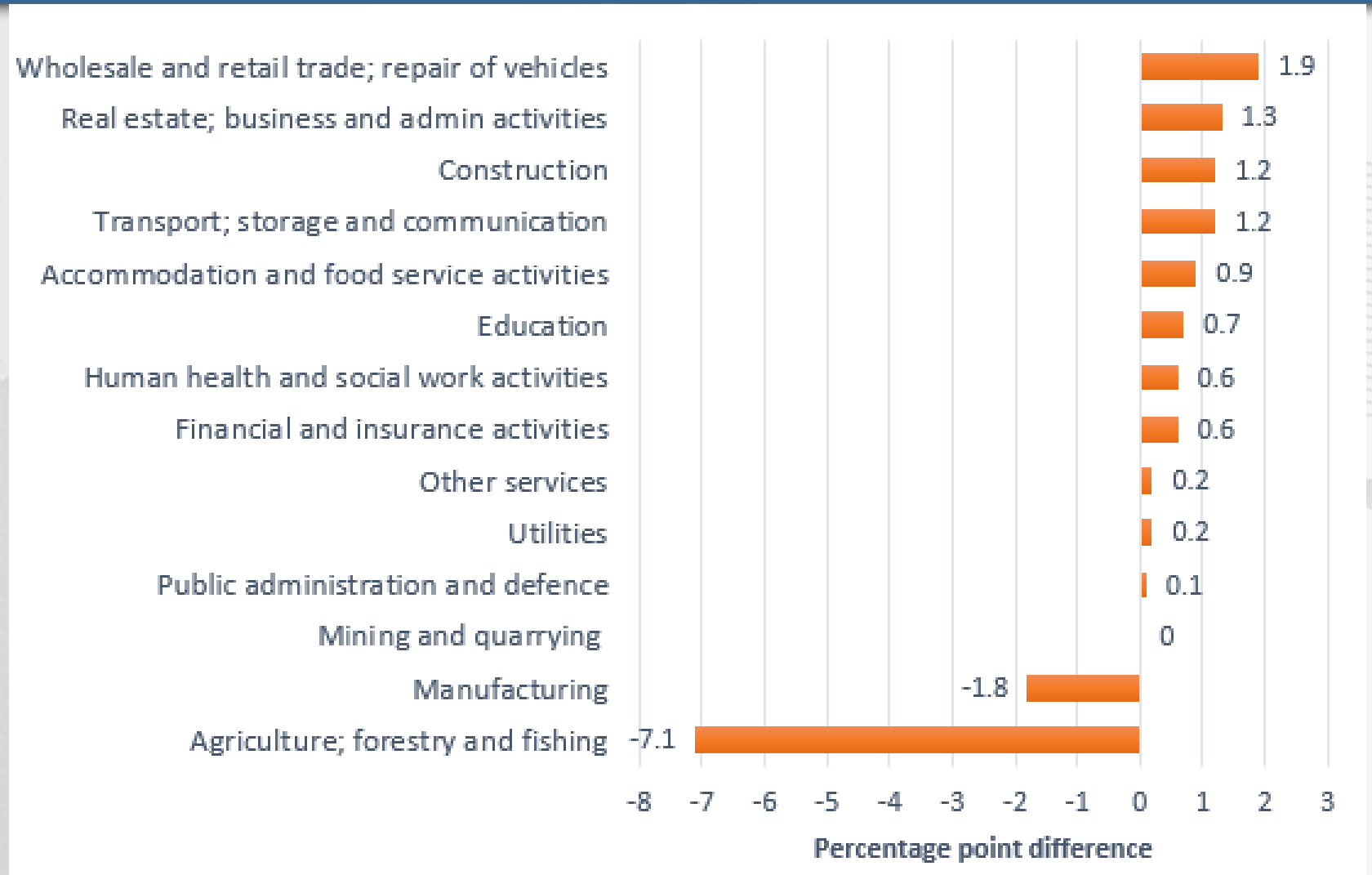
Job Family	Employment Compound Growth Rate percent
Computers & Mathematics	3.21
Architecture and Engineering	2.71
Management	0.97
Business and Financial Operations	0.70
Sales and Related	0.46
Installation & Maintenance	(0.15)
Construction and Extractions	(0.93)
Arts, Design, Entertainment, Media and Sports	(1.03)
Manufacturing and Production	(1.63)
Office and Administration	(4.91)

Employment Effect of Drivers of Change, by Industry

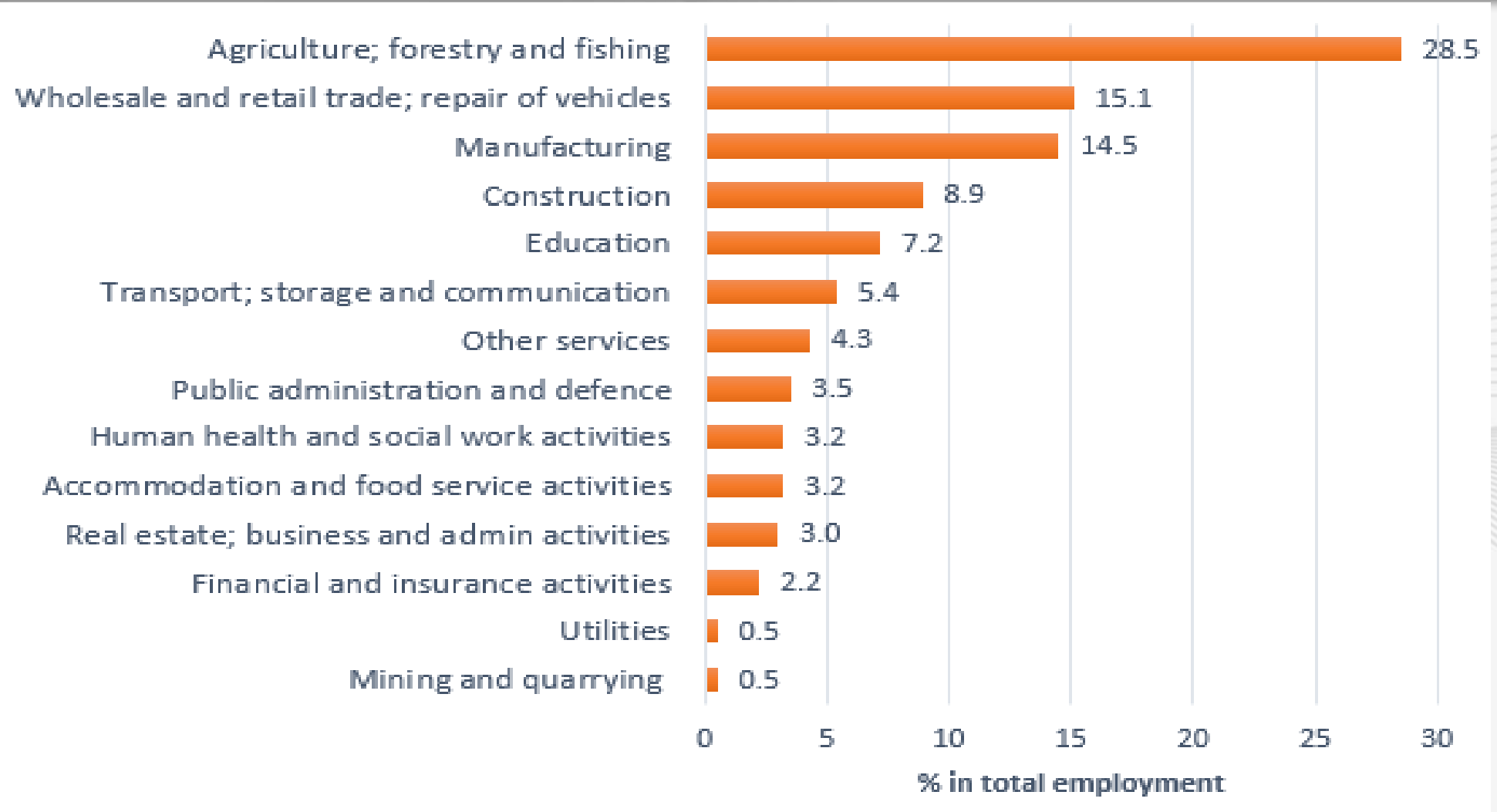
Source: Future of Job Survey, World Economic Forum, 2016

Industry	Employment Compound Growth Rate percent
Information and Communication Technology	2.91
Professional Services	2.45
Media, Entertainment, and Information	2.31
Consumer	1.72
Mobility	1.61
Energy	1.54
Financial Services and Investors	1.54
Basic and Infrastructure	0.61
Health Care	(0.37)

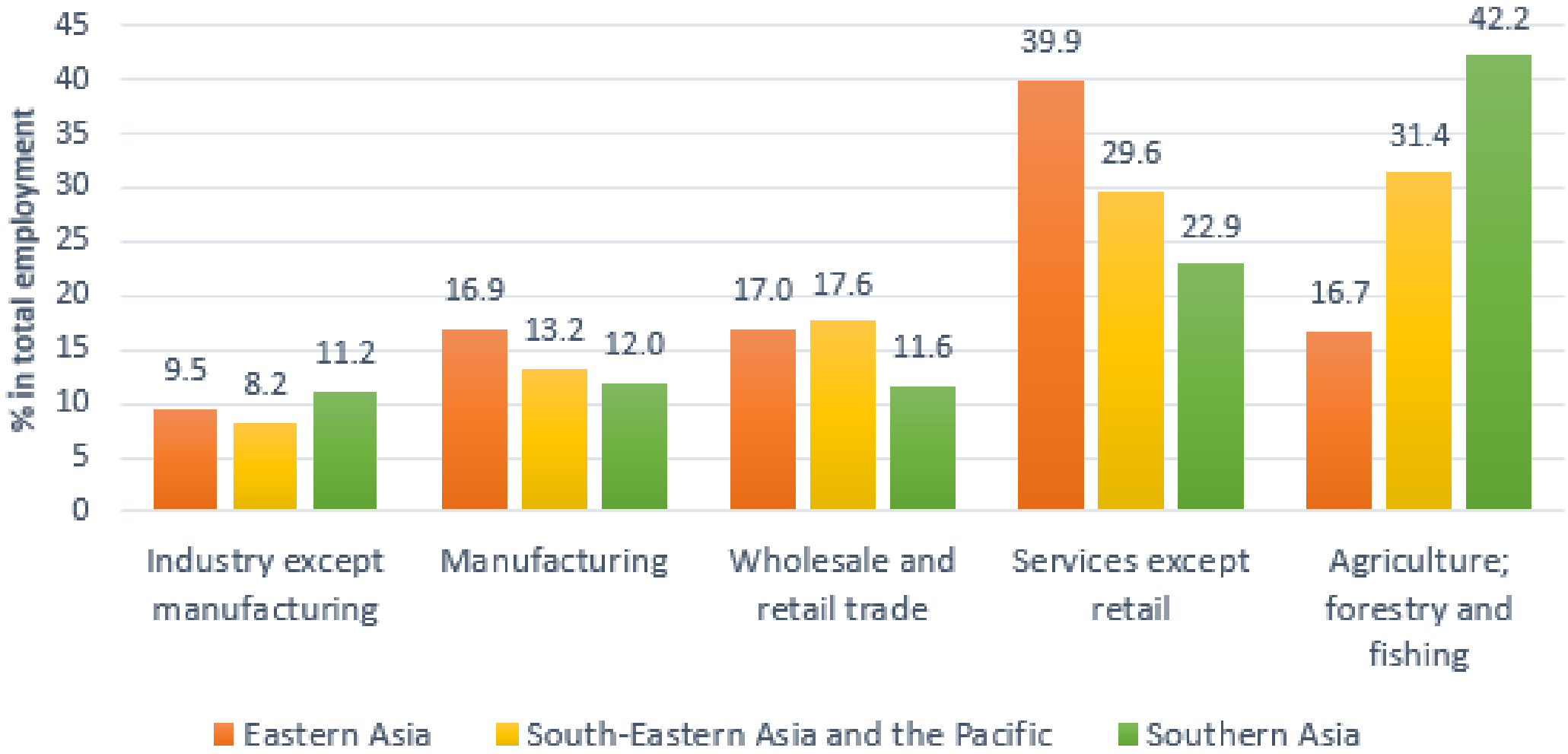
Changes in Employment by Sector in Asia, 2010-2017
(ILO, 2020)



Distribution of Employment by Sector, 2017 (ILO, 2020)

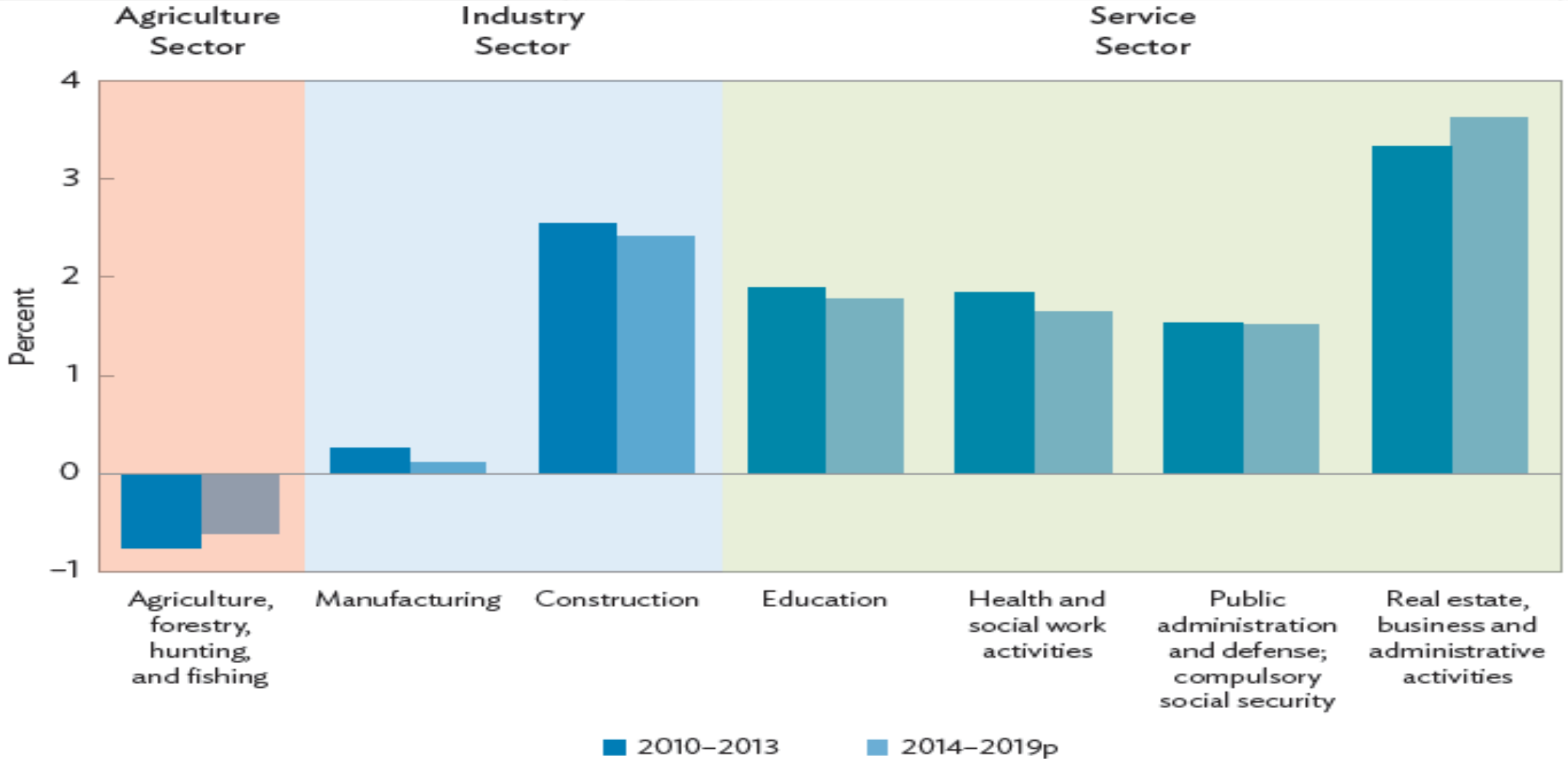


Sectoral Distribution of Employment by Sub- Region, 2017 (ILO, 2020)



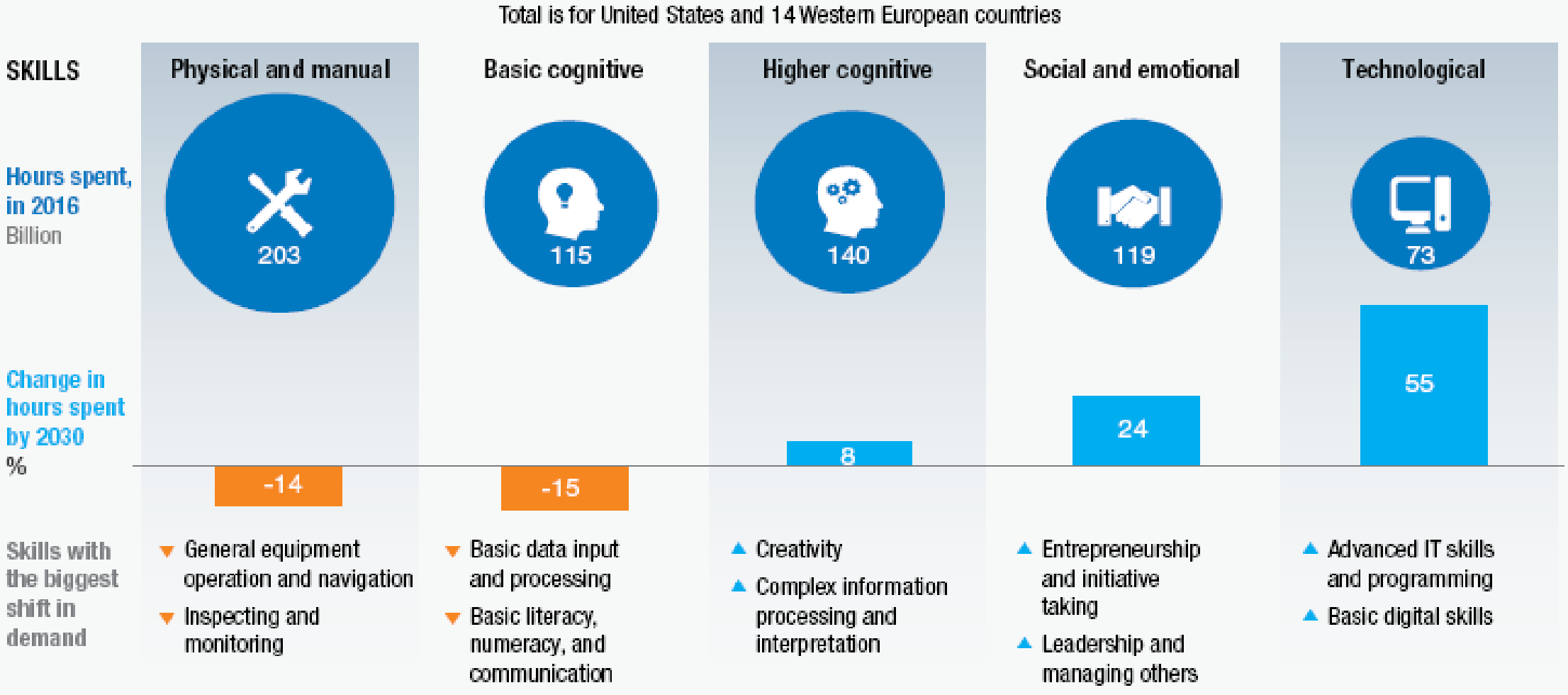
Global Sectoral Employment Growth in Selected Industries, 2010-2013 and 2014-2019

(Source: Adapted from Trends Econometric Models (ILO 2014b))



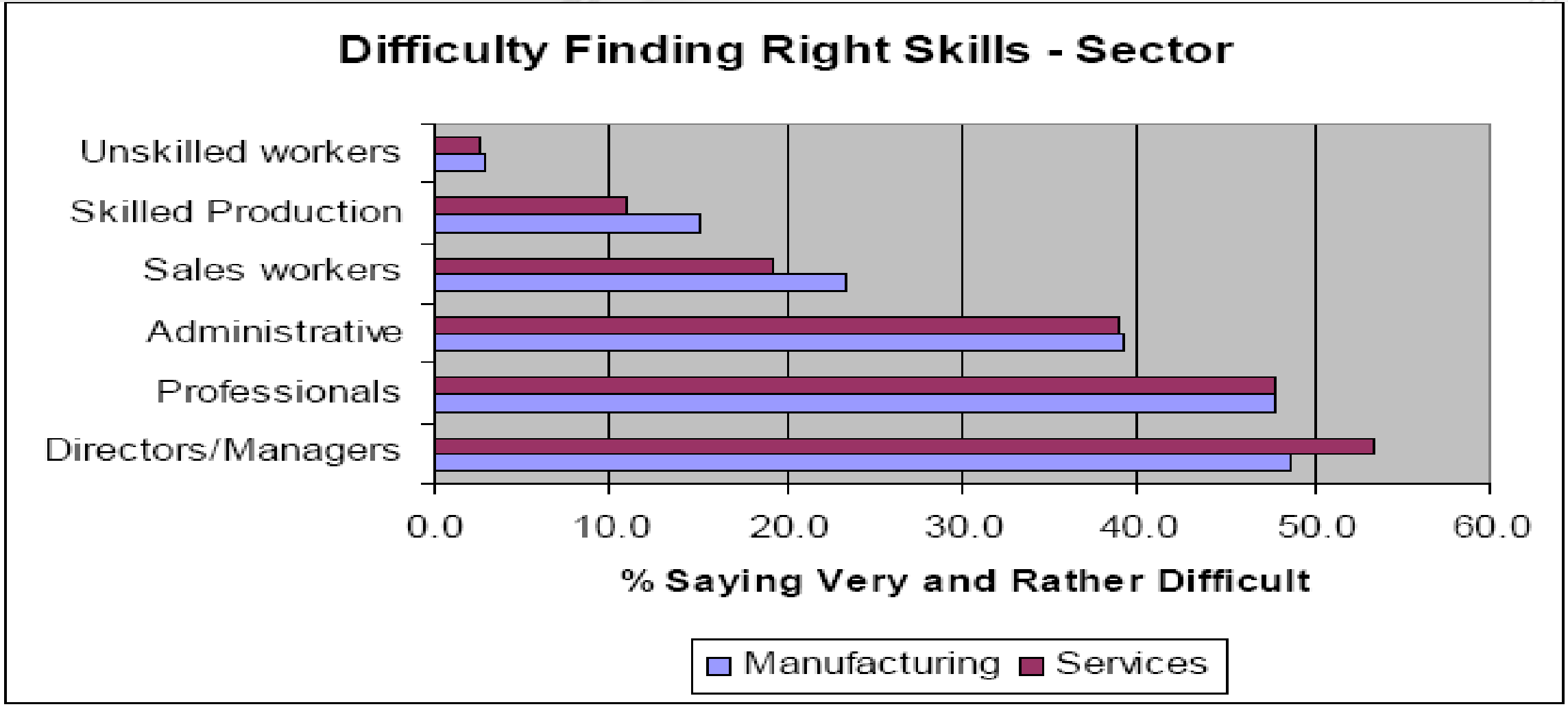
Automation and AI will Change the Skills Need in the Workforce

(Source: Mckinsey Global Institute, 2018)



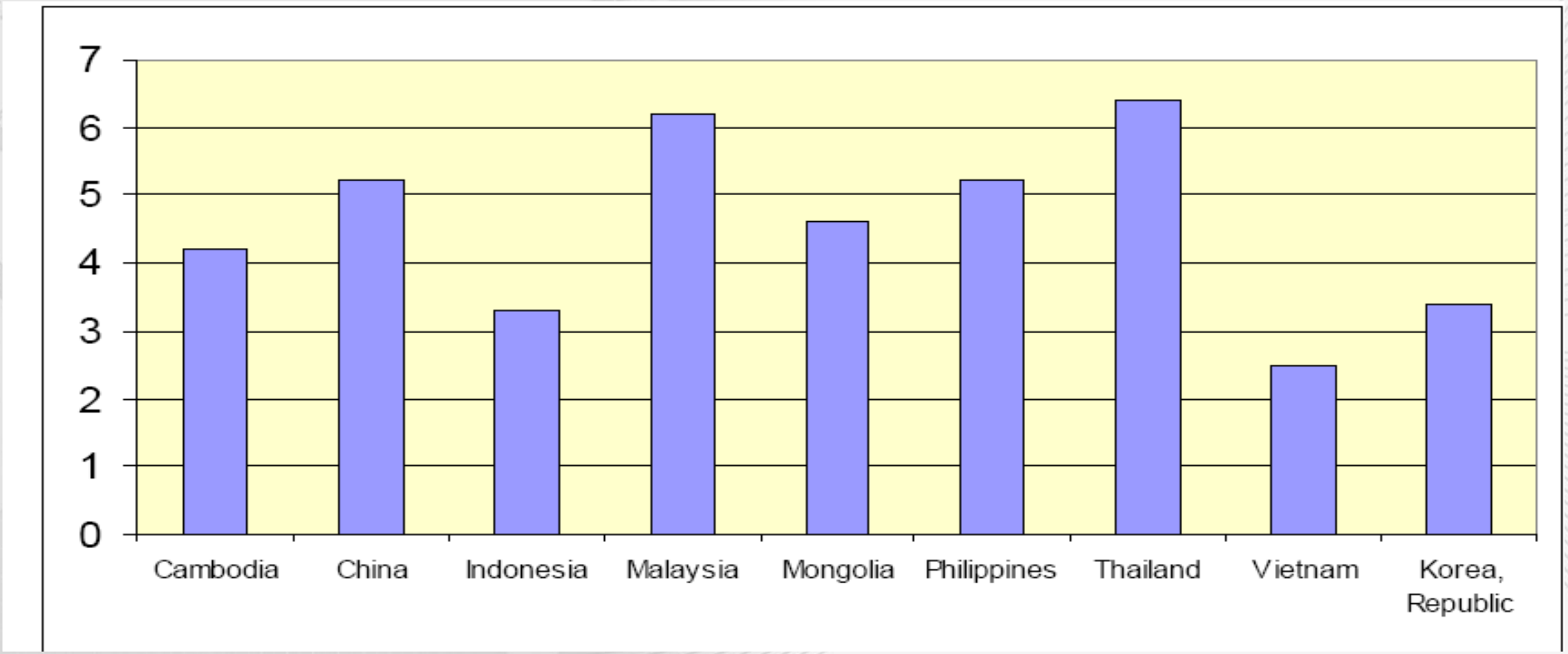
Difficulty Finding Right Skills

(Source: World Bank, 2010)



Time to Fill Professional Vacancies in East Asia (weeks)

(Source: World Bank, 2010)



Internet User Population in CPSC Member States

S. N	Country	Population	% of Internet Users	S. N	Country	Population	% of Internet Users
1	Afghanistan	37,209,007	17.6	9	Myanmar	54,336,138	33.1
2	Bangladesh	168,065,920	54.8	10	Nepal	29,942,018	54.1
3	Bhutan	826,229	54.8	11	Pakistan	204,596,442	21.8
4	Fiji	912,241	54.9	12	Papua NG	6,791,317	13.4
5	India	1,368,537,713	40.9	13	Philippines	108,106,310	68.0
6	**Malaysia**	**32,454,455**	**80.1**	**14**	**Singapore**	**5,868,104**	**84.5**
7	Maldives	451,738	75.3	15	Sri Lanka	21,018,859	34.1
8	Mongolia	3,166,244	63.2	**16**	**Thailand**	**69,306,160**	**82.2**

Source: Internet World States (June 2019)

Internet User Population in ASEAN Member States

Rank	Country	Population	% of Internet Users	Rank	Country	Population	% of Internet Users
1	Brunei Darussalam	439,336	94.9	6	Vietnam	97,431,059	65.7
2	Singapore	5,868,104	84.5	7	Indonesia	269,536,422	53.2
3	Thailand	69,306,160	82.2	7	Cambodia	16,482,646	48.6
4	Malaysia	32,454,455	80.1	9	Laos	7,064,242	35.4
5	Philippines	108,106,310	68.0	10	Myanmar	54,336,138	33.1

Source: Internet World States (June 2019)

Conclusions!

Demand Side

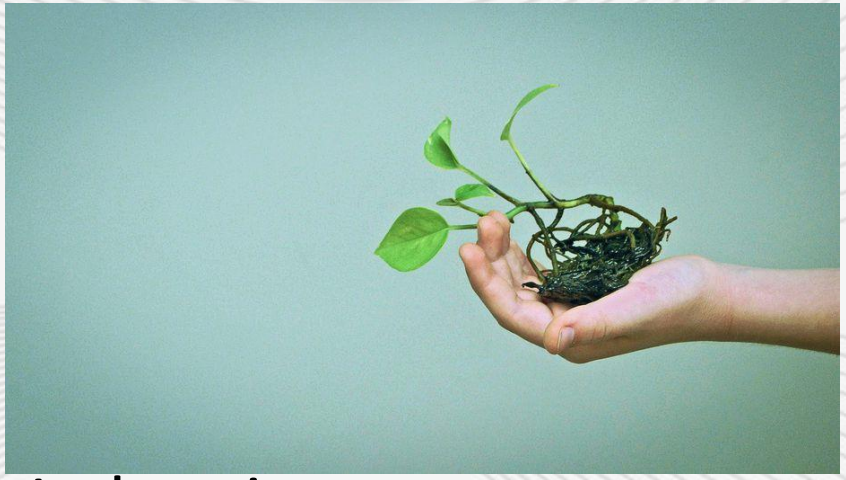
- Strong presence of IR 4.0 in Manufacturing and Health Sector
- Other sectors also lean towards digital technology and modernization of technology
- Pattern of jobs are gradually shifting from agriculture to service, real state and business sectors
- Demand of Higher Level education except physical and labour intensive work
- Basic, Core and Soft Skills

Supply Side

- TVET for IR 1.0 to 3.0
- Still with Absolute Technology and traditional course
- Teachers without industries experience
- Entry Qualification has not revised for long
- Lack of Entrepreneurial and Soft Skills
- Week system for Competency standard
- Diploma programs towards academic orientation
- TVET is not focusing to produce skilled workers
- High number of Unemployed Graduates

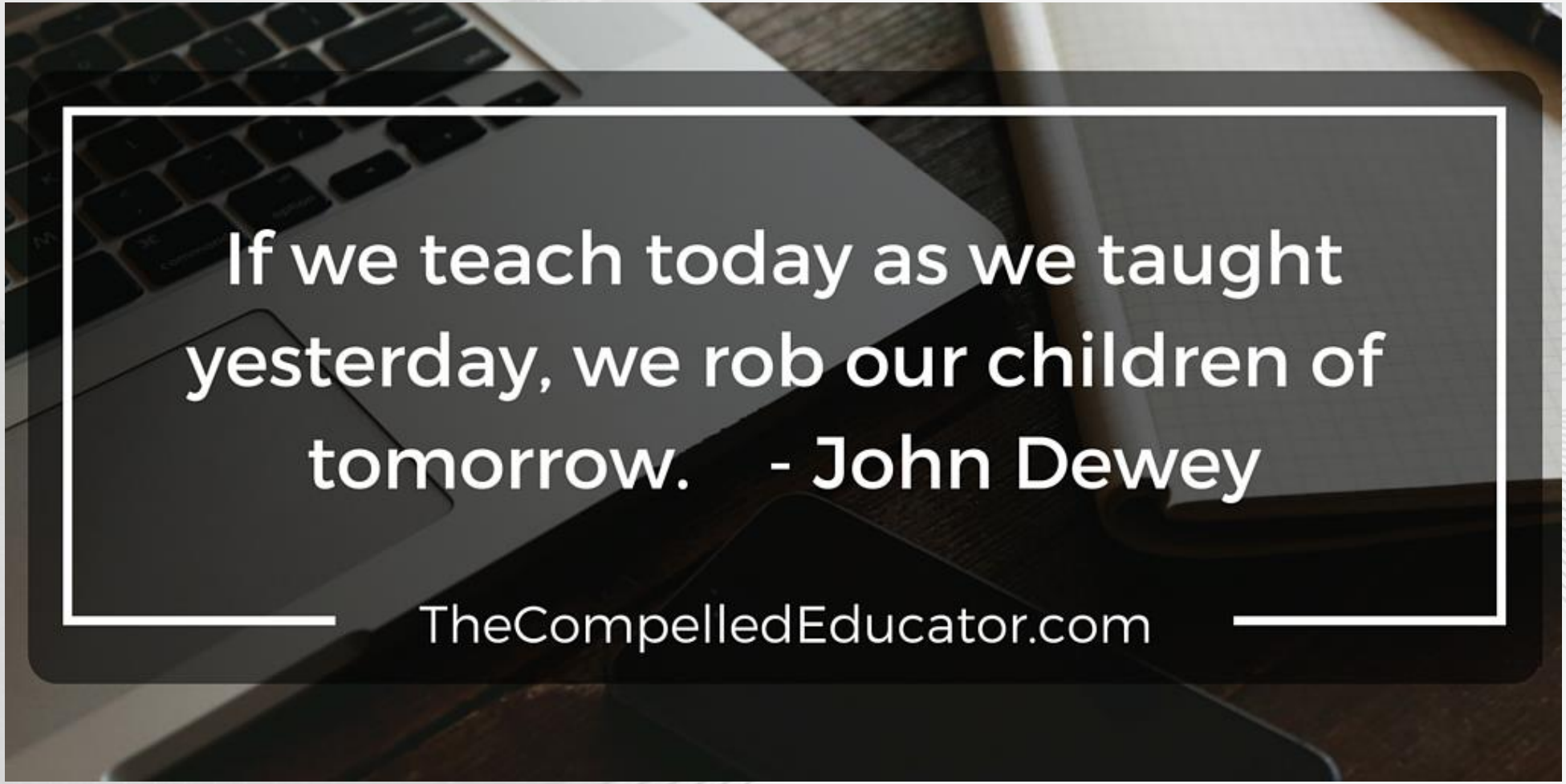
Way Forward !

- Need to Diversification of Program based on Market Demand
- TVET curricula, Labs/Workshops and Teacher to address IR requirement (IR 3.0 and 4.0).
- TVET graduates should have 3 Hs
  - Heads on Skills (Cognitive)
  - Hands on Skills (Psychomotor)
  - Hearts on Skills (Affective)



- Occupational Skills Upgrading Training for Teacher in Industries
- Quality and Competency Focused TVET not Number of Institutes and Graduates

Thank You !


If we teach today as we taught yesterday, we rob our children of tomorrow. - John Dewey
TheCompelledEducator.com