



INDUSTRY 4.0:

PROSPECTS & CHALLENGES ON LITERACY

ALFREDO E. PASCUAL

PRESIDENT, INSTITUTE OF CORPORATE DIRECTORS

FORMER PRESIDENT, UNIVERSITY OF THE PHILIPPINES

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DEFINING INDUSTRY 4.0

Fourth **I**ndustrial **R**evolution = **FIRe**

FOURTH INSDUSTRIAL REVOLUTION = **4IR**

INDUSTRIAL REVOLUTIONS



FIRST

- New manufacturing processes
- Water and Steam Power
- Mass extraction of coal

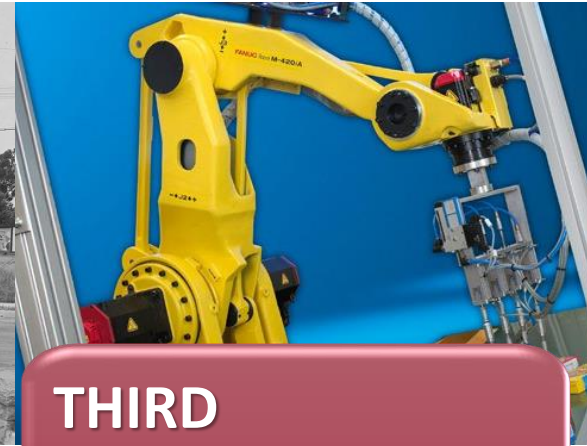
(1760 to 1840)



SECOND

- Used electric power to create mass production
- Widespread adoption of railroad networks, telegraph, water and sewage systems

(1870 to 1914)



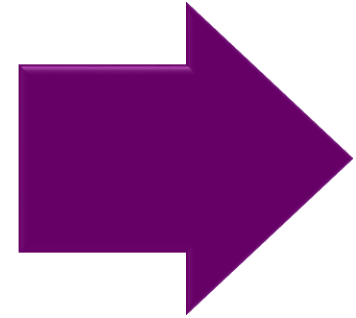
THIRD

- Used electronics and information technology to automate production
- Start of digital revolution

(1950s to Internet)

FOURTH

- Builds on the third industrial revolution
- More disruptive technologies through Artificial Intelligence, interaction of biology with engineering, and more...



INDUSTRY 4.0

- Disruptive technologies that merge the physical, digital, and biological worlds (World Economic Forum)
- Increased industrial productivity and innovation due to digitization and automation of work
- increase in productivity and global income, democratization of business
- Affects labor security and inequality
- **Transparency and agile governance** are expected from governments
- Availability of information—and using this as social currency

EMERGING TECHNOLOGICAL LANDSCAPE



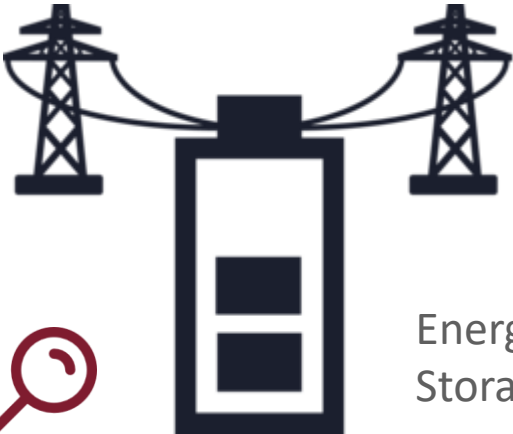
Artificial Intelligence



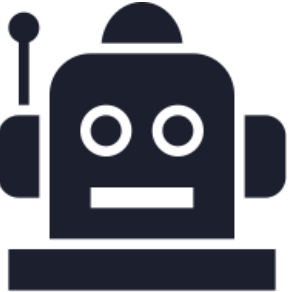
Blockchain Tech



Big Data



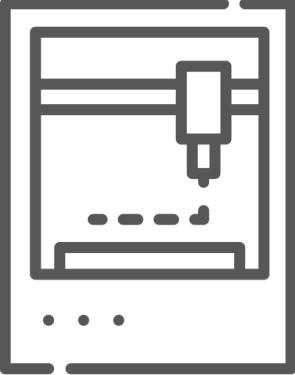
Energy Storage



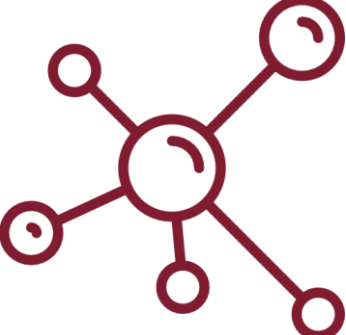
Robotics



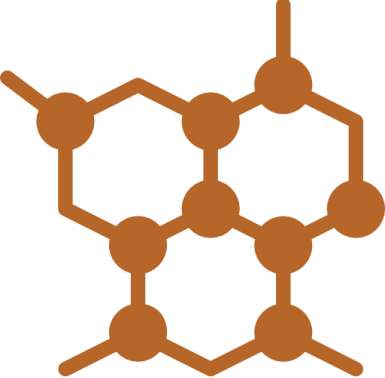
Internet of Things



Additive Manufacturing



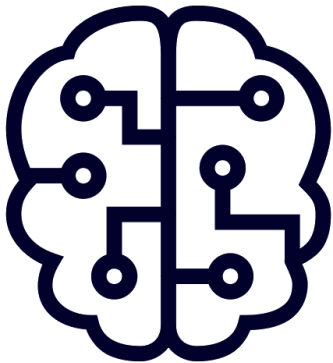
Nanomaterials



Synthetic Biology



Cloud Computing



Neurotechnology

INDUSTRY4.0

ARTIFICIAL INTELLIGENCE



- Programmed reasoning and thinking skills to mimic human or animal intelligence
- AI sense the environment and create decisions to be carried out as response
- May have the ability to learn and solve problems which are considered cognitive skills

ROBOTICS

- Design, construction, and implementation of robots which may have also have AI
- Aimed to replace humans in tedious and hazardous tasks
- Fusion of mechanical, electrical, and computer science



Sophia Hanson

AI Robot by Hanson Robotics
Hong Kong



ARE FILIPINOS READY FOR INDUSTRY 4.0?

INTERNET ACCESS IN THE PHILIPPINES

Needless to say, most of the emerging technologies of Industry 4.0 are heavily dependent on the Internet—and its quality.

Participation of Filipinos in the advancements in quality of life, access to service, and opportunity to extend their knowledge depends on their access.

We have free Facebook, but is that enough?

<https://www.techpinas.com/2019/02/2019-Philippines-Internet-Social-Media.html>
<https://cnnphilippines.com/lifestyle/2019/02/01/2019-digital-hootsuite-we-are-social-internet-philippines-facebook.html>
<https://news.abs-cbn.com/business/04/18/19/ph-internet-speed-still-below-global-average-speedtest>
2019 Data
<https://dict.gov.ph/wp-content/uploads/2017/09/2017.08.09-National-Broadband-Plan.pdf>
2016 Data

10

Average hours spent per day using the Internet On Social Media: 4.2
Global Average: 6.7 [GlobalWebIndex]

19.5

MBPS, average speed
Highest (Singapore): 199.77
Global Average: 57.91
[Speedtest Global Index]

99%

Penetration of social media among ages 13 and up
Global Average: 58
[GlobalWebIndex]

40.7%

Individuals with Internet
111th among 187 countries
[UN Broadband Commission, 2016 Data]



WHAT ABOUT
LITERACY?

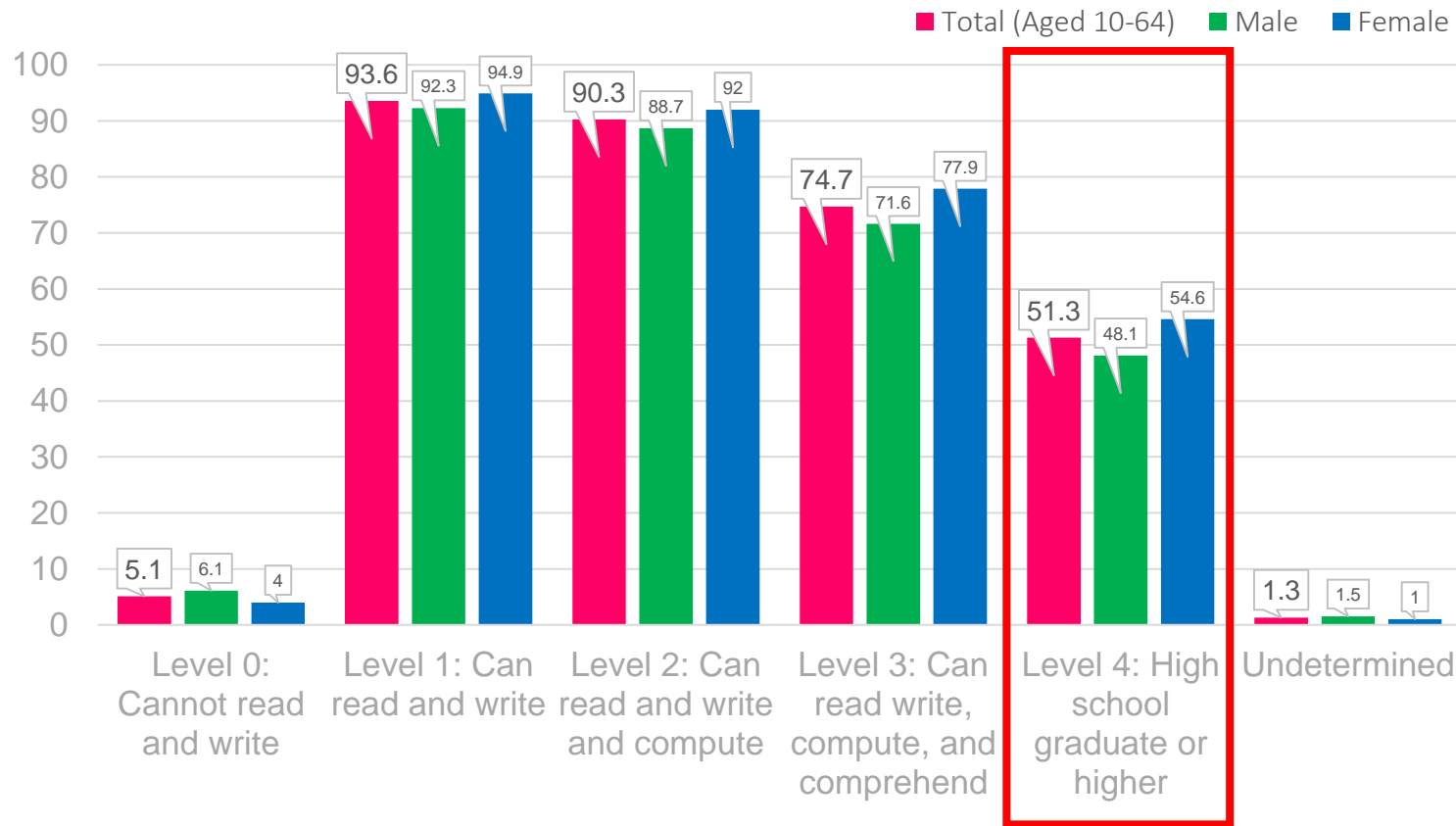
PHILIPPINES: 2013 FLEMMS REPORT

(Functional Literacy, Education, and Mass Media Survey)

BASIC LITERACY - can read and write a simple message in any language and dialect

FUNCTIONAL LITERACY – addition of numeracy skills

CHART: Percentage of Individuals Aged 10



UNESCO DEFINITION

Literacy is the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts.

Literacy involves a continuum of learning in *enabling individuals to achieve their goals*, to develop their knowledge and potential, and to *participate fully* in their community and wider society

(UNESCO, 2004; 2017)

Given the changes that Industry 4.0 brings, are we measuring enough?

COMPARISON OF DEFINITIONS

SIMPLE & FUNCTIONAL

- Per Phils. Statistics Authority in FLEMMS
- Information is **self-reported**.
- Since it is not a *test*, the assessment is **indirect**.
- Measures the population's general level of literacy—**simple reading and writing** plus some numeracy skills
- **English proficiency** should also be included but this is not currently measured.

ADAPTIVE

- Literacy is about the uses people make of it as a **means of communication** and expression through a variety of media.
- Literacy is plural, being **practiced in particular contexts** for particular purposes, and using specific languages.
- Literacy involves a **continuum of learning** measured at different proficiency levels.
- Preferred assessment is **direct**.

THE AI BRIEFER

Critical element

MACHINE LEARNING

We already encounter AI in...



Ride sharing
apps and food
delivery



Entertainment
(Netflix, Spotify,
Youtube)



PlaneAutopilot,
Driverless Vehicles



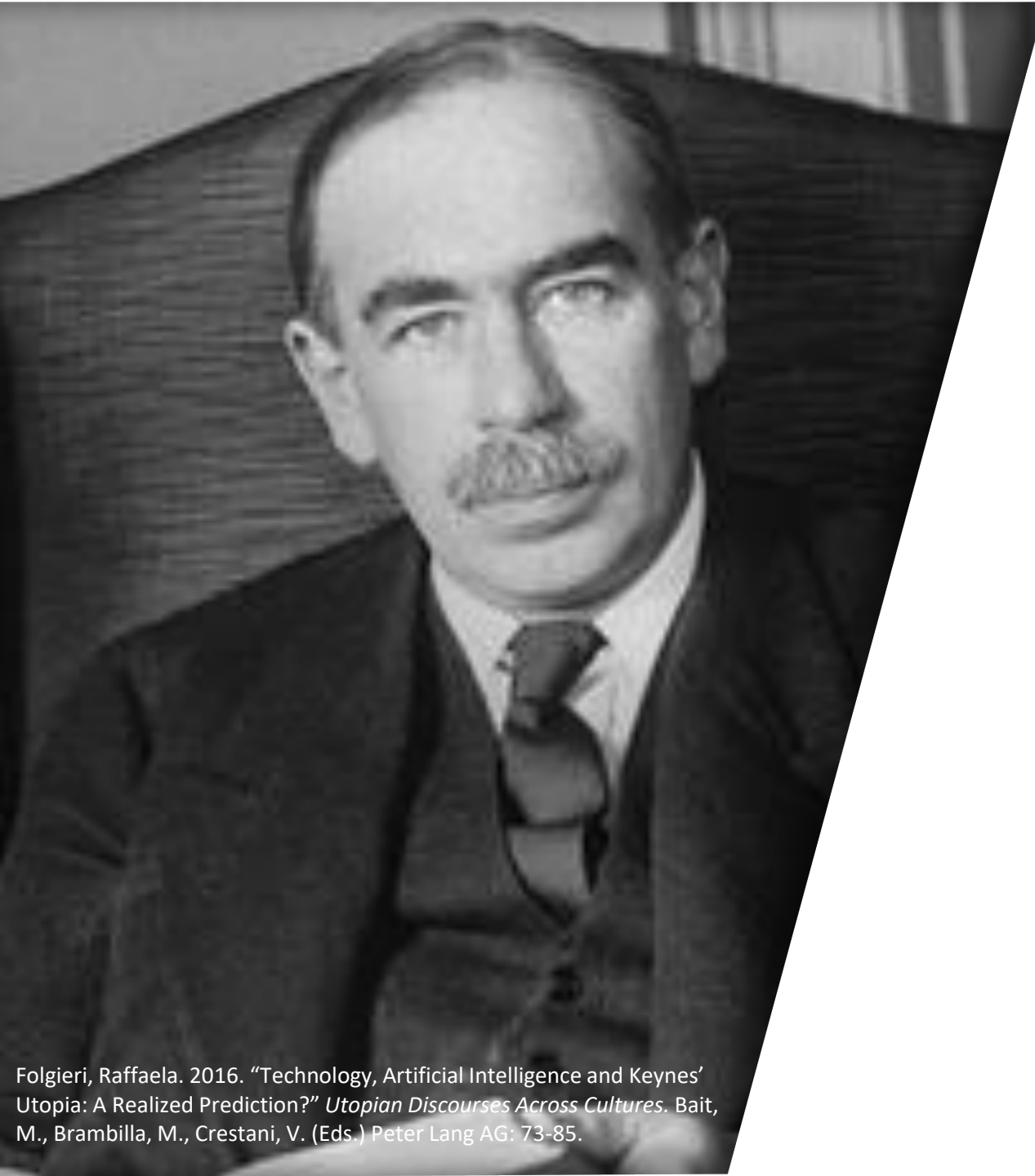
Digital Assistants
(Siri, Google Assistant)

- Spam Email Filters, automated alerts
- Route Apps (Google Maps, Waze)
- Credit Risk Assessments, Bank Security Features
- Facial Recognition Feature (Cameras, Facebook, Security Devices)
- Autosuggestion of translations, emojis, etc.
- Augmented Reality (Snapchat, Pokémon GO)

As more and more data becomes accessible and more sophisticated algorithms get developed, the capacity of AIs to learn and predict outcomes for decisions become more powerful.

AUTOMATION WILL IMPACT MILLIONS AND ALL SECTORS IN THE PHILIPPINE ECONOMY

	Employment by sector (millions)	Automation Potential of sector (%)
1. Agriculture	12.5	48%
2. Retail & Wholesale	7.4	48%
3. Manufacturing	3.9	61%
4. Transportation	2.9	55%
5. Administrative & Support	2.6	41%
6. Construction	2.2	41%
7. Accommodation & Food Service	1.6	54%
8. Educational	1.2	28%
9. Finance	0.7	35%
10. Healthcare	0.4	39%
11. Others	2.4	40%



JOHN MAYNARD KEYNES

ECONOMIC POSSIBILITIES FOR OUR GRANDCHILDREN (1930)

<http://www.econ.yale.edu/smith/econ116a/keynes1.pdf>

Keynes imagined a world, a hundred years hence, where humans will work 3 hours a day just to occupy themselves, not for survival, because of technology.

- In the 1930s, unemployment was also rising because of machine replacement.
- Keynes called this **technological unemployment**.
- He believed it to be a temporary phase of maladjustment.
- He did not foresee that most businesses raised production goals and reduced the staff—which did not reduce working hours, just produced a lot of unemployment. (Folgeri, 2016)
- Although his view was utopian, it presented a continuing reality of technology replacing humans in work.

RESILIENCE OF JOBS

BECOMING OBSOLETE

If full automation possible including predictive decision making.



FULL VIDEO: <https://www.youtube.com/watch?v=gfWjsKsEry0>

For example, when **self-driving vehicles** are perfected, or **drone technology** developed, jobs in the transportation industry and delivery service won't be needed.

MORE SOPHISTICATION

Jobs that require creativity and talent are less prone to automation.



FULL VIDEO: <https://www.youtube.com/watch?v=gWmRkYsLzB4&t=12s>

Automation of tedious, high-volume, but low skill requirement tasks **frees up time for humans to innovate** or take on more creative and sophisticated tasks.

THE TRAVEL AGENT: AN EXAMPLE

With the advent of online booking, travel agents seemed to have become obsolete—but they did not disappear!



- People used to buy airline tickets through travel agents at a physical location or by calling.
- Useful for travel itineraries with complicated routes and transfers.
- Online booking expected to make travel agents useless.
- But travel agents survived by refocusing their business to customers that do not DIY
- Bilingual agents are also becoming in demand.
- In PH, BPOs servicing travel agencies offer entry-level salaries as high as P100,000 a month for non-English bilingual travel agents.



<https://edition.cnn.com/travel/article/travel-agent-survival/index.html>

Last bullet point – info from Stellar BPO, hiring for Korean Bilingual Flights Reservations Agent for an Australian Airline Account.

CHANGING NATURE OF WORK

3RD INDUSTRIAL REVOLUTION

- Technical skills are valuable and are expected to set one for life—updating is good but not crucial
- Mostly clear path in career progression, employees aim to spend long careers in one company for stability
- Consequences of global markets are felt but dealing with the structure at work is not for all levels of the company
- Social skills are important for career progression but not always crucial for the work itself

INDUSTRY 4.0

- Shelf life of skills are becoming increasingly short—continuous update crucial!
- Favors more flexible and shorter-term assignments
- Keeping up with globally scaled markets with enormous amounts of transactions happening within the space of a microsecond is for everybody in the business
- Predicted to need social skills as an essential component of work—for understanding the human condition and adapting to it

DEMOCRATIZATION OF INDUSTRIES

The Gig Economy & Business Platforms

- With new mobile platforms, a key trend is the rise of “The Gig Economy” and the “On Demand Economy” which lower barriers to creation of wealth through businesses and service.
- Altering personal and professional environments—“The Human Cloud”, “Digital Nomads”, “Coworking Spaces” (see notes)
- Those with vehicles or available spaces can make money by offering a service online through ‘platforms’ like AirBnB or Grab. Selling as a business is also democratized through platforms like Lazada, Shopee, eBay, and Etsy.
- Reliable connection to the Internet is needed, as well as adaptability to different and rapidly updating platforms.
- These economies are **not yet comprehensively legislated** which makes labor vulnerable to exploitative business practices. Government needs to study how to regulate while maintaining their advantages.
- Can become an avenue of transition for those in jobs that are rendered ‘obsolete’ by new technologies and distribute tasks to poorer countries that need them and open opportunities to build small businesses with wider reach.



74.7%

Can read, write,
compute, and
comprehend
(Ages 10-64)

CAN FILIPINOS ADJUST?

EDUCATION WILL PLAY A
BIGGER AND BIGGER ROLE
IN DETERMINING ECONOMIC
PARTICIPATION IN
INDUSTRY 4.0.

BUT:

GOVERNMENT SPENDING IN BASIC
EDUCATION IS VERY LOW COMPARED
TO OUR ASEAN NEIGHBORS!

21ST CENTURY SKILLS LITERACIES

From Various 21st Century Skills Models

TECHNICAL

Technological Literacy

Digital Literacy

Scientific and Economic Literacy



Multicultural Literacy

Social Literacy

Information Literacy

DISPOSITIONAL

CONTINUOUS LEARNING

Instill as a habit.

Make opportunities for return.

New learning cultures needed.

Underscore changing society.

A KNOWLEDGE-BASED SOCIETY

The government itself needs a paradigm shift—
knowledge-based policymaking and governance.

[<http://bit.ly/UPThinkPaper2016>]

Investment in education will have to eventually
increase to keep up with our neighbors.

THANK YOU

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