

REVISITING RESEARCH ACTIVITIES IN THE ERA OF 4TH INDUSTRIAL REVOLUTION

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Research is....

the application of **the scientific method** in searching for the truth
a systematized effort to gain new knowledge





(Research) Problem :

- ▶ The problem is **the gap** between what should be and what in reality is, or between what necessary is and what available is, or between the expectation and the reality, or between what theoretically should be and what happens in practice, or between the rule and the reality
- ▶ A problem requires research to find a solution, although not all problems require research, however, a research conducted due to the problem.



- **So, someone who will conduct the research must first determine what the problem is**
- **and of course determine the gap**



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WHAT IS A RESEARCH GAP?

- A literature gap, or research gap, is an unexplored topic revealed during a literature search that has scope for research or further exploration.
- The gap, also considered the missing piece or pieces in the research literature, is the area that has not yet been explored or is under-explored. This could be a population or sample (size, type, location, etc.), research method, data collection and/or analysis, or other research variables or conditions.



CATEGORIES OF RESEARCH GAP?

- We may categorize research gaps into several different types: **empirical gap, knowledge gap, evidence gap, theoretical gap, population gap, application or implementation gap, and methodology gap.**
- To identify Research gaps, you need to do a thorough review of existing literature in both the broad and specific areas of your topic

Research Gap Type	Definition
Evidence Gap (Contradictory Evidence Gap)	Results from studies allow for conclusions in their own right, but are <i>contradictory</i> when examined from a more abstract point of view [Jacobs, 2011; Müller-Bloch & Kranz, 2014; Miles, 2017].
Knowledge Gap (Knowledge Void Gap)	Desired research findings do not exist [Jacobs, 2011; Müller-Bloch & Kranz, 2014; Miles, 2017].
Practical-Knowledge Gap (Action-Knowledge Conflict Gap)	Professional behavior or practices deviate from research findings or are not covered by research [Jacobs, 2011; Müller-Bloch & Kranz, 2014; Miles, 2017].
Methodological Gap (Method and Research Design Gap)	A variation of research methods is necessary to generate new insights or to avoid distorted findings [Jacobs, 2011; Müller-Bloch & Kranz, 2014; Miles, 2017].
Empirical Gap (Evaluation Void Gap)	Research findings or propositions need to be evaluated or empirically verified [Jacobs, 2011; Müller-Bloch & Kranz, 2014; Miles, 2017].
Theoretical Gap (Theory Application Void Gap)	Theory should be applied to certain research issues to generate new insights. There is lack of theory thus a gap exists [Müller-Bloch & Kranz, 2014]. [Jacobs, 2011; Müller-Bloch & Kranz, 2014; Miles, 2017].
Population Gap	Research regarding the population that is not adequately represented or under-researched in the evidence base or prior research (e.g., gender, race/ethnicity, age and etc). [Robinson, et al, 2011].

Source: Robinson, Saldanha, & McKoy (2011); Müller-Bloch & Kranz, (2015); Miles, (2017).



WHAT DO WE DO WHEN WE SEE PROBLEMS???

- Ignore them
- Talk about them
- ✓ Try to solve them

The research problem should be:

USEFUL to be disclosed

RELEVANT to the ability or expertise of researchers.

ATTRACTING attention to be disclosed
possibly **PRODUCING** something new
ensured that data could be collected

COMPLETELY and **OBJECTIVELY**

NOT TOO WIDE, NOT TOO NARROW



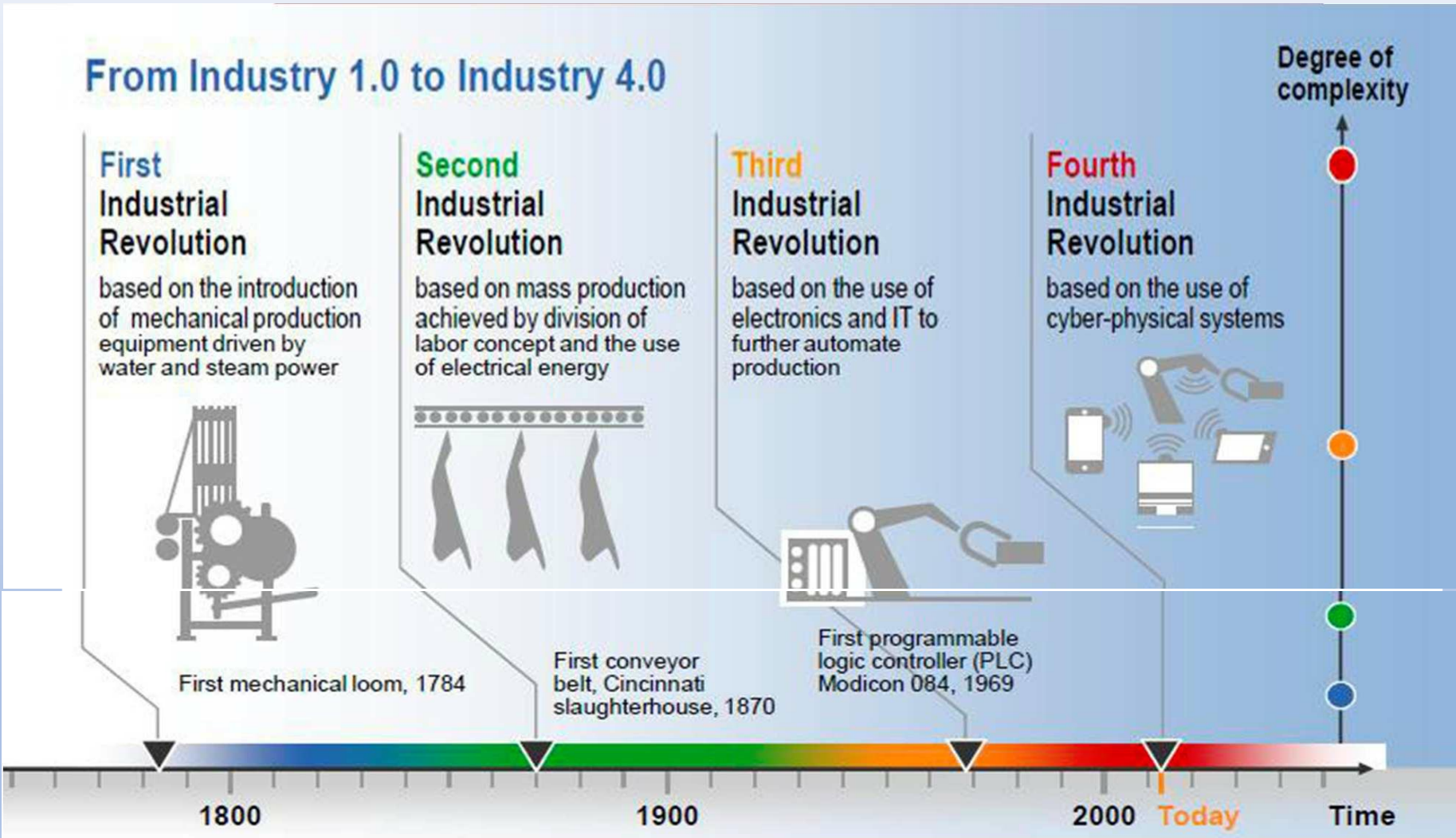
IDENTIFYING A UNIQUE RESEARCH GAP – MAP YOUR STORY



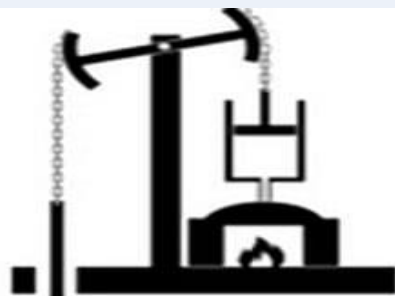
- **What is your topic?**
- Who are the key people in your field? What are the key resources?
- What are the key ideas in your field? What methodologies have been used?
- What are some of the strengths and weaknesses of existing research?
- What will your contribution be? How will it be different?

(NB: If you can't answer some of these question, make a note of this. It will come in handy later!)

From Industry 1.0 to Industry 4.0



From Industry 1.0 to Industry 4.0



Industry
1.0

Industry
2.0

Industry
3.0

Industry
4.0

- Mechanization,
Steam Power,
Water Power

- Mass production,
Assembly Line,
Electricity

- Computer &
Automation

- Cyber Physical
System



1784



1870

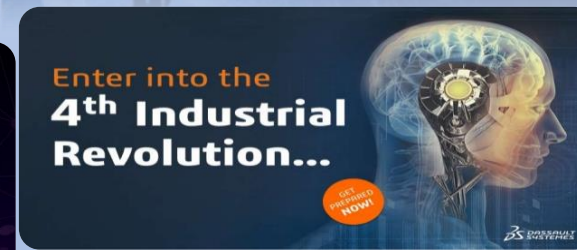


1969



Today

MEETING THE CHALLENGES OF THE 4TH IR



Knowledge

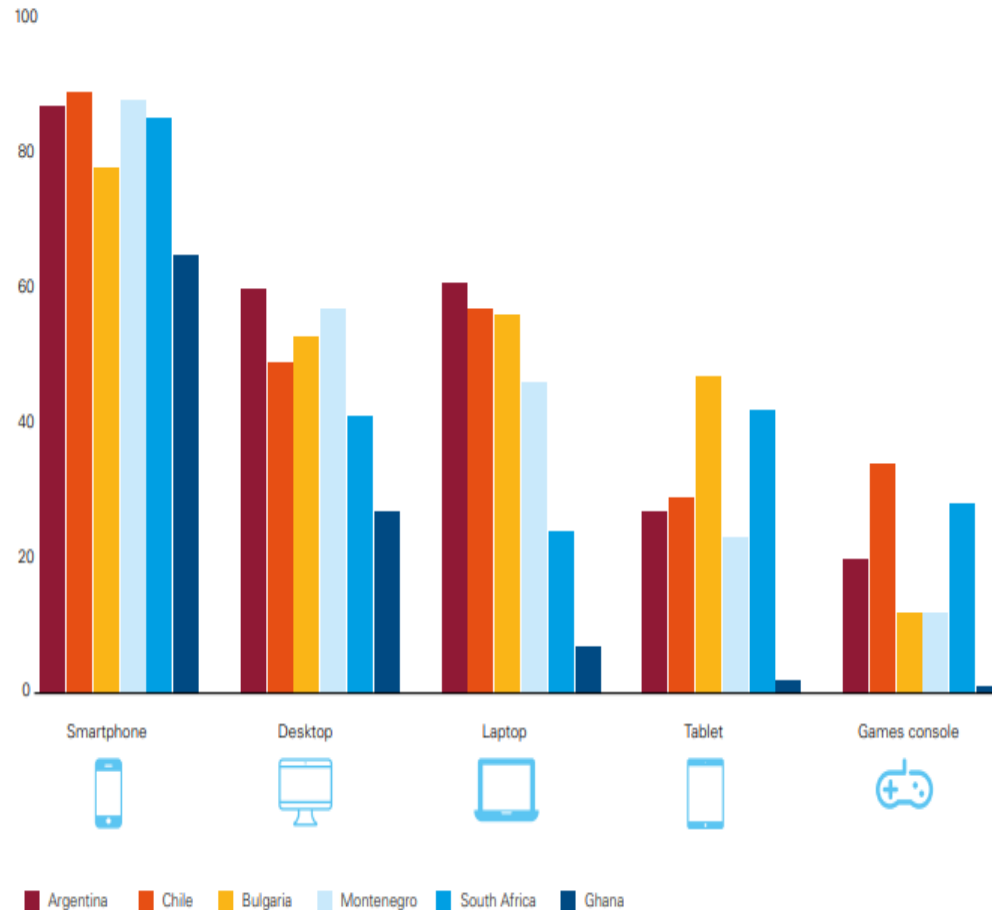
UniMAP

Sincerity

Excellence

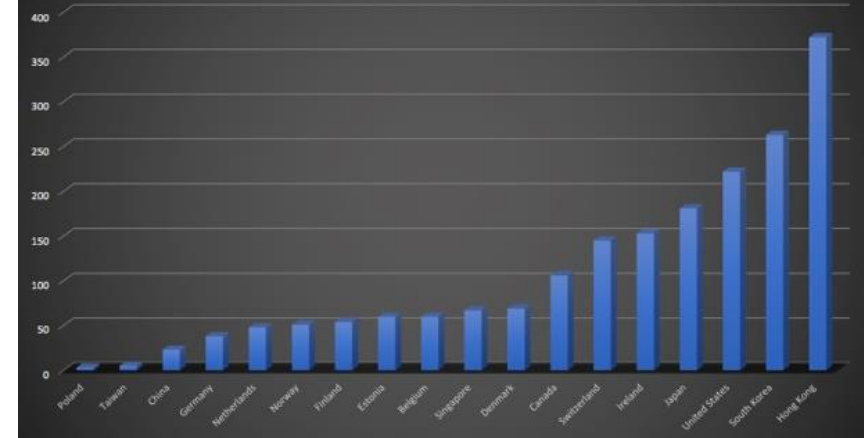
Social world: what has changed?

PERCENTAGE OF CHILDREN USING EACH DEVICE AT LEAST ONCE A MONTH, 2016–2017



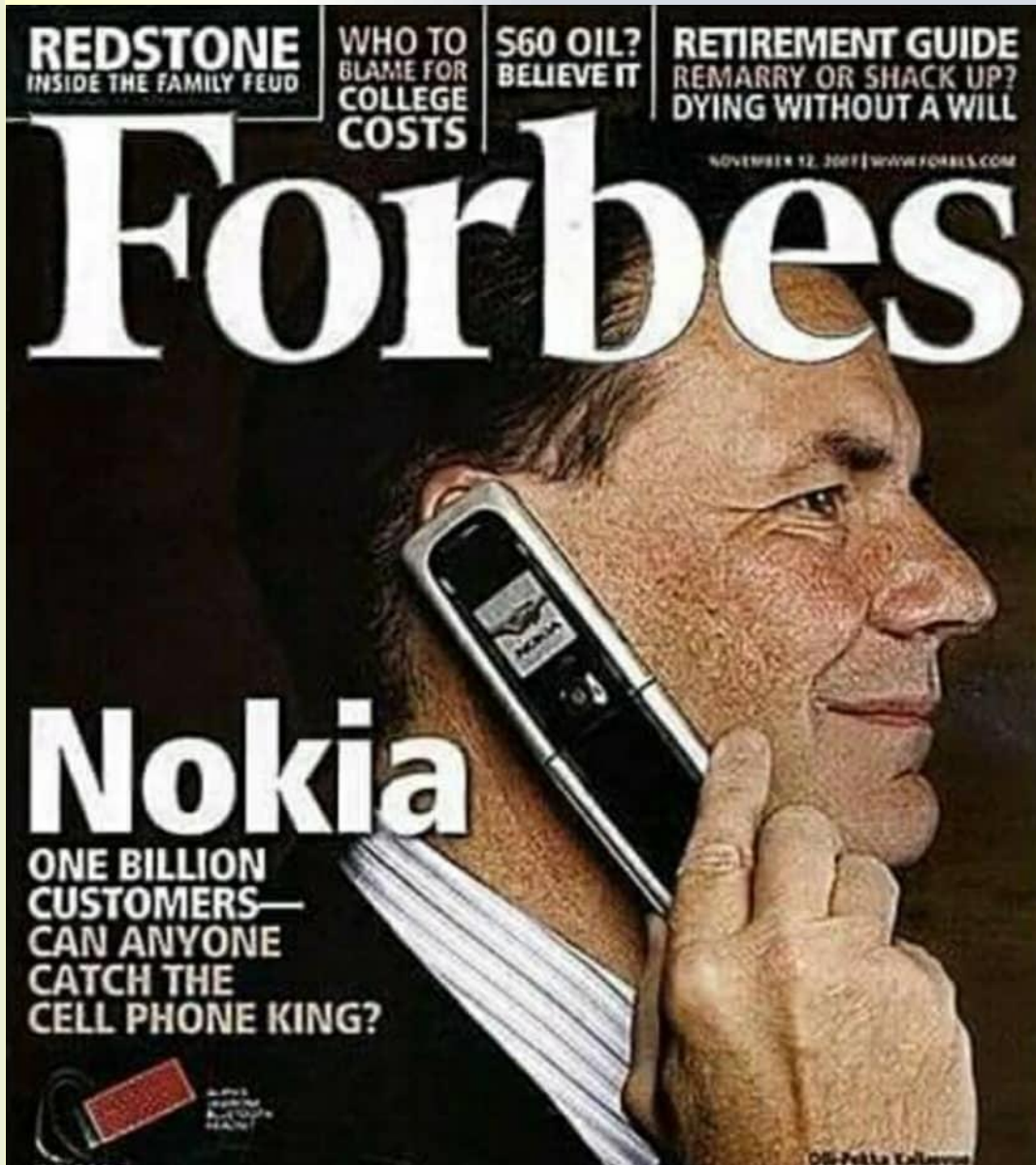
Source: Global Kids Online partner countries 2016–2017, aggregated by UNICEF Office of Research – Innocenti.

AUTISM DIAGNOSES PER 10,000 CHILDREN



Digital technology has already changed the world – and as more and more children go online around the world, it is increasingly changing childhood.

- Youth (ages 15–24) is the most connected age group. Worldwide, 71 per cent are online compared with 48 per cent of the total population.
- Children and adolescents under 18 account for an estimated one in three internet users around the world.
- A growing body of evidence indicates that children are accessing the internet at increasingly younger ages. In some countries, children under 15 are as likely to use the internet as adults over 25.
- Smartphones are fuelling a ‘bedroom culture’, with online access for many children becoming more personal, more private and less supervised.



"NOKIA. CAN ANYONE CATCH THE CELL PHONE KING?"

Forbes, November 12, 2007

- iPhone had been released 5 months earlier, but Forbes did not see the revolution yet and was admiring Nokia's almost-monopoly. RIM's BlackBerry too loomed unbeatable and supreme.
- Just a couple years later, Nokia and RIM would effectively be out of the cell phone business and the kids won't even know those brands.



DISRUPTIVE TECHNOLOGIES



UBER

World's largest
taxi company

Owens NO

~~Taxis~~



World's largest
Accommodation provider

Owens NO

~~Real
estate~~



World's largest
Phone companies

Owens NO

~~Telco
infra~~



World's most
Valuable retailer

Owens NO

~~Inventory~~

facebook.

Most popular
Media owner

Owens NO

~~Content~~

SocietyOne

World's fastest
Growing bank

Owens NO

~~Actual
money~~

NETFLIX

World's largest
movie house

Owens NO

~~Cinemas~~

Apple Google

World's largest
Software vendors

Owens NO

~~Apps~~

Today is the era of convergence

- The merger between information technology and biotechnology revolution has created the biggest **tsunami** in our lives.
- The future is about negotiating VUCA (volatility, uncertainty, complexity and ambiguity).

20 job roles in increasing demand across industries in future forecasted by World Economic Forum (2020)

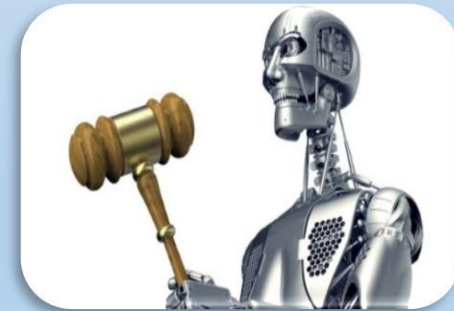
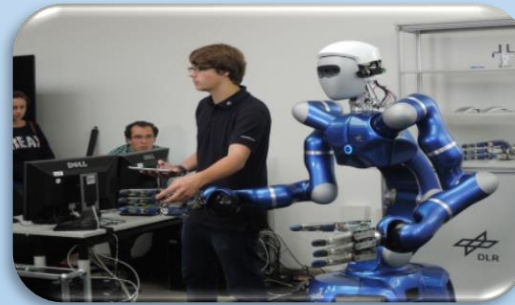
- 1 Data Analysts and Scientists
- 2 AI and Machine Learning Specialists
- 3 Big Data Specialists
- 4 Digital Marketing and Strategy Specialists
- 5 Process Automation Specialists
- 6 Business Development Professionals
- 7 Digital Transformation Specialists
- 8 Information Security Analysts
- 9 Software and Applications Developers
- 10 Internet of Things Specialists
- 11 Project Managers
- 12 Business Services and Administration Managers
- 13 Database and Network Professionals
- 14 Robotics Engineers
- 15 Strategic Advisors
- 16 Management and Organization Analysts
- 17 FinTech Engineers
- 18 Mechanics and Machinery Repairers
- 19 Organizational Development Specialists
- 20 Risk Management Specialists

(Source: http://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf)

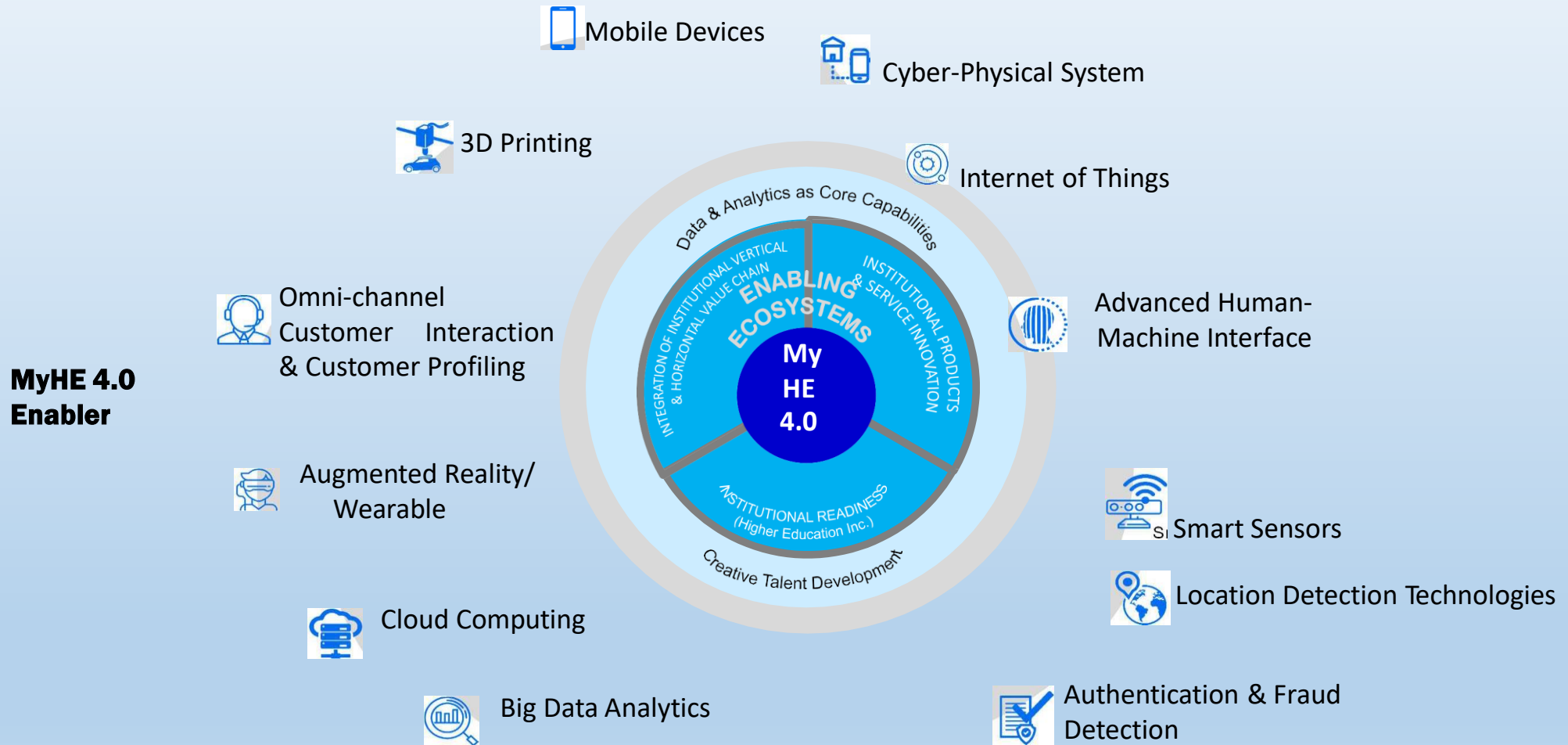
20 job roles in decreasing demand across industries in future forecasted by World Economic Forum (2020)

- 1 Data Entry Clerks
- 2 Administrative and Executive Secretaries
- 3 Accounting, Bookkeeping and Payroll Clerks
- 4 Accountants and Auditors
- 5 Assembly and Factory Workers
- 6 Business Services and Administration Managers
- 7 Client Information and Customer Service Workers
- 8 General and Operations Managers
- 9 Mechanics and Machinery Repairers
- 10 Material-Recording and Stock-Keeping Clerks
- 11 Financial Analysts
- 12 Postal Service Clerks
- 13 Sales Rep., Wholesale and Manuf., Tech. and Sci. Products
- 14 Relationship Managers
- 15 Bank Tellers and Related Clerks
- 16 Door-To-Door Sales, News and Street Vendors
- 17 Electronics and Telecoms Installers and Repairers
- 18 Human Resources Specialists
- 19 Training and Development Specialists
- 20 Construction Laborers

(Source: http://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf)



FRAMEWORK FOR HIGHER EDUCATION FOR FOURTH INDUSTRIAL REVOLUTION (PROPOSED)



Proposed by: Rose Alinda Alias, Ali Selamat, Norris Syed Abdullah, Suraya Miskon, Nazmona Mat Ali

Enabling Ecosystems



Mobile Devices

First point of access to the Internet

Mobile devices provide ubiquitous connectivity and an array of applications and services that impact almost every facet of Malaysia higher education environment and opens up a huge range of activities that were previously inaccessible.



IoT Platforms

Bridge between the devices' sensors and the data networks

Internet of Things (IoT) platforms which is positioned to revolutionize the entire Malaysia higher education value chain by providing an unprecedented level of connectedness and functionality.



Location Detection Technologies

Detect its current location to control events and information

Location is detected through the use of various sensors and methods of calculating geographical location

such as through GPS technology. MOHE can add value by enhancing products

and services offered

By institutions with location detection technologies.



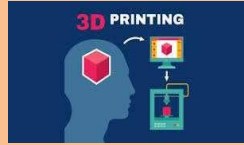
Advanced Human-Machine Interfaces

Method of teaching and learning for modelling and simulation of the real situation.

Advanced Human-Machine-Interface is considered as an interface that allows humans to interact with the machine. This method can be deployed to games for education, simulation-

based training applications and intelligent tutoring systems.

Enabling Ecosystems



3D Printing

An effective way to enrich learning in virtually any discipline.

Nothing conveys an idea better than holding it in your hand. An excellent match for STEM curriculum projects at undergraduate and graduate levels. 3D Printing can be used with virtually all types of 3D CAD software.



Authentication & Fraud Detection

Secure all digital transactions.

The ability to learn about the latest trends in fraud, either internally through sophisticated data analysis or through external sources. Using up-to-date fraud information, MOHE can rapidly respond to new types of fraud and makes changes to their systems.



Smart Sensors

Towards smart education environment

A smart sensor is a device that takes input from the physical environment and uses built-in compute resources to perform predefined functions upon detection of specific input and then process data before passing it on.



Big Data Analytics and Advanced Algorithms

Faster, better decision making

With the speed of business analytics tools, combined with the ability to analyze new sources of data, organizations are able to analyze information immediately – and make decisions based on what they have learned.

Enabling Ecosystems



Augmented Reality/ Wearables

Bridging the gap
between the
virtual and
physical worlds

Augment changes the way we see, imagine, and learn about the world around us. The augmented reality (AR) app and platform enables students and teachers to visualize 3D models in the real environment, in real time, and at scale.



OMNI Channel Customer Interaction

Continuous experience
across different
channels

An omni-channel platform for higher education puts post-secondary institutions in line with the needs and majority of whom are digital natives – and helps them soar into the digital age.



Cloud Computing

Delivery of
computing
services

The cloud computing is connected to the remote access to and



Cyber-Physical Systems

Cyber and
physical
components
deeply inter-point

A cyber-physical system is characterized by a physical such asset, as a machine, and its digital twin; basically a software model mimics the behavior of the physical asset.

Blockchain is a decentralized, distributed, and oftentimes public, digital ledger that is used to record transactions across many computers so that any involved record cannot be altered retroactively, without the alteration of all subsequent blocks.



Business analytics (BA) is the iterative, methodical exploration of an organization's data, with an emphasis on statistical analysis



Fintech refers to the integration of technology into offerings by financial services companies in order to improve their use and delivery to consumers.



A cryptocurrency is a digital asset designed to work as a medium of exchange that uses strong cryptography to secure financial transactions, control the creation of additional units, and verify the transfer of assets

An extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions



Crowdfunding is the practice of funding a project or venture by raising small amounts of money from a large number of people, typically via the Internet.





market access
expansion

productivity
increment



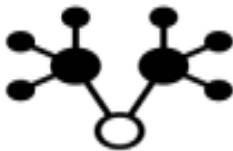
operational cost
reduction



**the potential of the
creative industry;
e-MSME**



Better marketing



Enhancement
customer services



Source of Competitive
advantages



E-MSME culinary



470 x 264 - seoterpadu.com

https://www.google.co.id/imgres?imgurl=http://2.bp.blogspot.com/-N11--r-GnIE/VPkgSvGBc4I/AAAAAAAABJM/XHkw8_w6...

حلال؟
Halal?

E-MSME handicrafts



500 x 330 - industri.bisnis.com



E-MSME agriculture

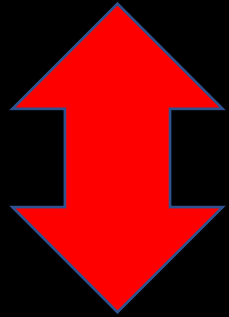


E-MSME livestock



Another issue

the need of food for the people could be provided



the environmental preservation can also be maintained.

The integration of technology and rapid technological developments



- the usage of artificial intelligence and machine learning
- production efficiency, controlling and predicting various indicators accurately and precisely.

ARE WE READY TO CHANGE OUR
MINSETS?

ARE WE READY TO CHANGE OUR
TEACHING METHODS AND DELIVERIES?

ARE WE READY TO FOCUS ON THESE
DISRUPTIVE TECHNOLOGIES AND
CHANGES IN OUR RESEARCH?

ARE WE PRODUCING JOB
SEEKERS OR JOB CREATORS?

ARE WE PREPARING
GRADUATES FOR JOBS THAT DO
NOT YET EXIST OR JUST TO
FULFILL EXISTING JOB
MARKETS?



We need the research for bridging the need and the availability of suitable technologies for the benefit of people over the world

