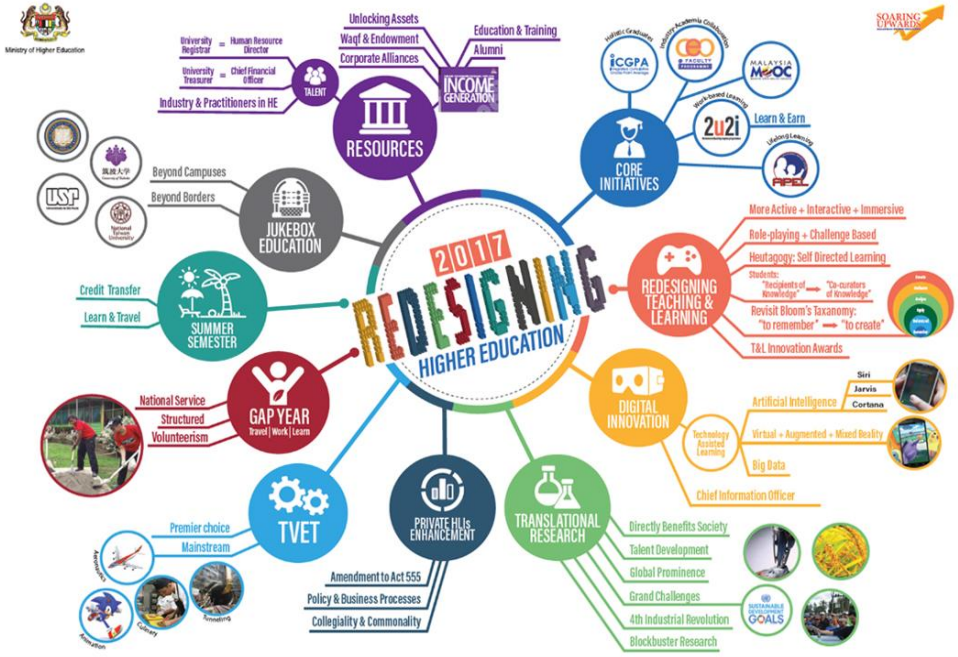
POLICY RESEARCH SEMINAR 2/2018

IR 4.0 & Innovation Champion Through the Enhancement of Entrepreneurship Education Policy



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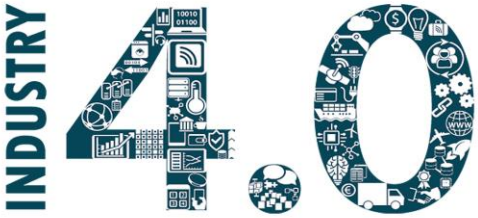


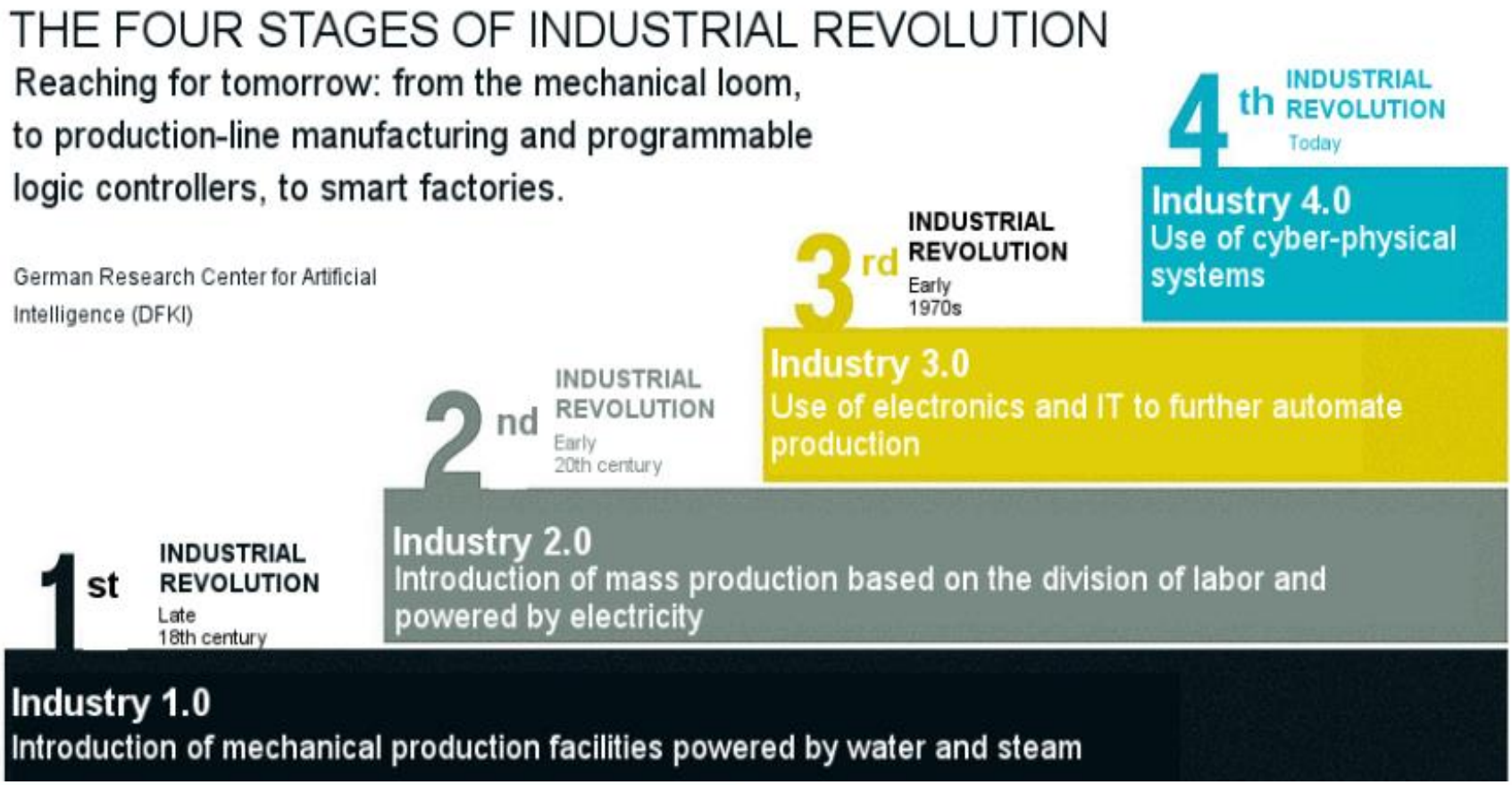
1. Introduction

IR 4.0 – A Necessary Evil

- The high pace and impact of **emerging technologies** have brought the world on the threshold of a **new revolution**.
- The lines between **biological, physical and technological boarders are being blurred**.
- No **nation can afford to take a backseat** in this transition in order to attain a competitive leverage in international business (WEF, 2018).

1.1 Industry Revolution

Revolutions do not occur overnight, but it is an outcome of continuous evolution.



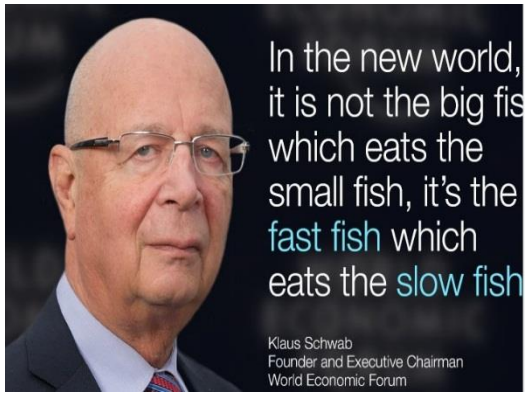
1.2 Founder & Origin of IR 4.0

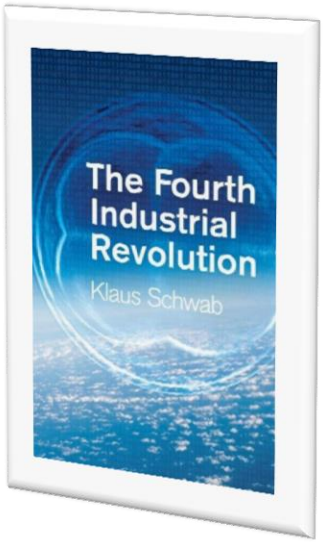
- IR 4.0 takes the automation of manufacturing processes to a new level by **introducing customized and flexible mass production technologies.**

- Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum.

- We are at the beginning of a revolution that is fundamentally **changing the way we live, work and relate to one another**, which he explores in his new book, The Fourth Industrial Revolution.

- He is regarded as the **founder of 4th Industrial Revolution (IR 4.0)**





1.3 Impacts of IR 4.0

- IR 4.0 will impact all disciplines, economies and industries, but none more so than production:

  - ✓ on the **demand** side, it will "enlarge the pie" and **create new value and profit** pools
  - ✓ on the **supply-side,** technologies will unlock industry-wide **efficiencies and productivity**

- **Smart Assistance Systems** will enable people to **combine their work, private lives and continuing professional** development more effectively.
- An enabler **of more creative, smarter and more connected** world in which we are free to enjoy creative thinking and **innovative.**

2. Innovation as the Backbone of Smart Industry 4.0

- The term “Industry 4.0” describes a vision of **“intelligently”** automated factories combined with **Smart Human Resource 4.0** who are equipped with innovative technical competency & skills.

- The **state-of-the-art information and communication technologies** are either replacing traditional industrial processes or are being combined with them, thus changing the production areas.

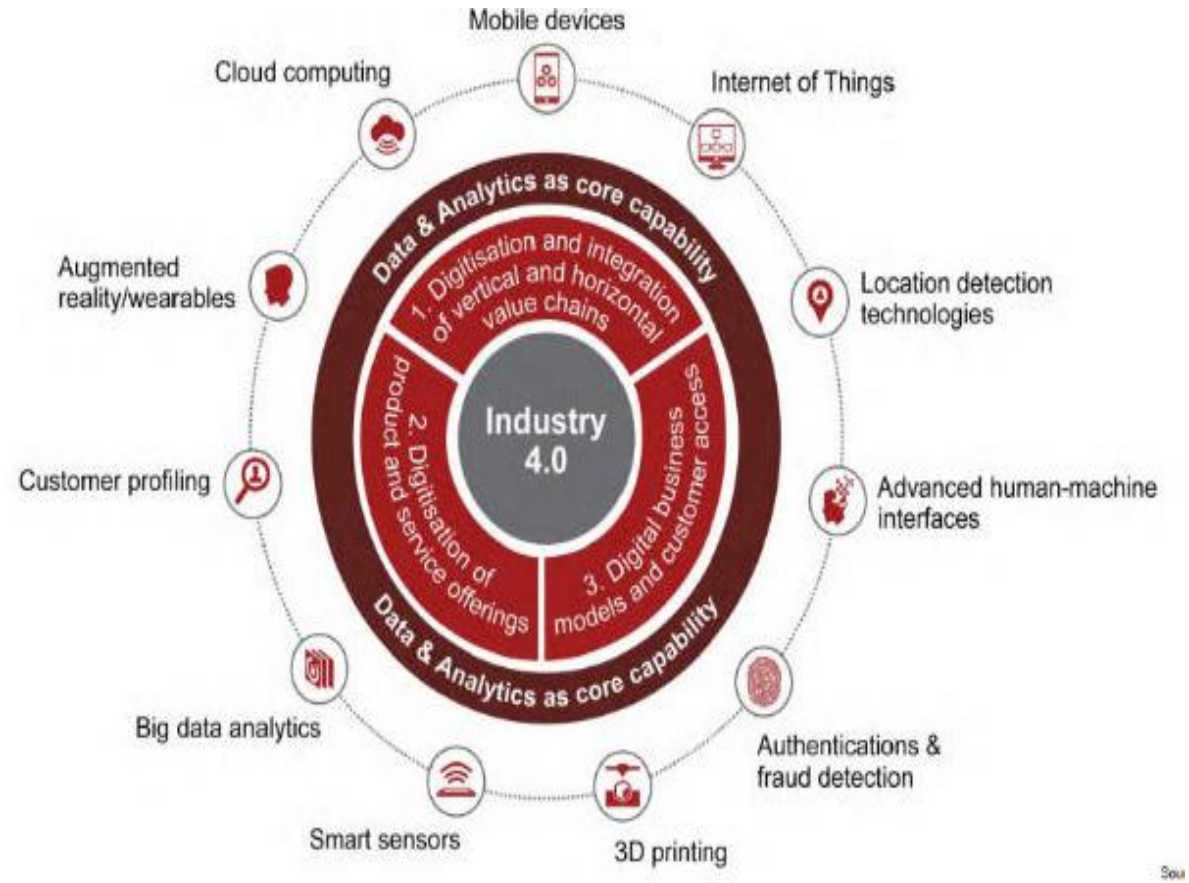
- Technological innovation, such as **real time, adaptive and decentralized Cyber-Physical Production Systems (CPPS)** are most significant in attaining a digital transition towards Smart Industry 4.0.

- **Soft skills of workforce will be more important** e.g. ability to deal with constant changes and completely new tasks, **problem-solving skills, failure analysis**. Rather than **hard skills** which will become obsolete with the emergence of new technologies.

2.1 Key Innovations

- Application of information and communication technology (**ICT**) to digitize information and integrate systems
- **Cyber-physical systems** that use ICTs to monitor and control physical processes, embedded sensors, intelligent robots, (3D printing) devices
- **Network communications** including wireless and internet technologies that serve to link machines (manufacturing plant-- work products, systems and people, suppliers and distributors
- **Simulation, modelling and virtualization** in the design of products
- **Collection of vast quantities of data, analysis** and exploitation through big data analysis and cloud computing

2.2 Components & Impact of IR 4.0



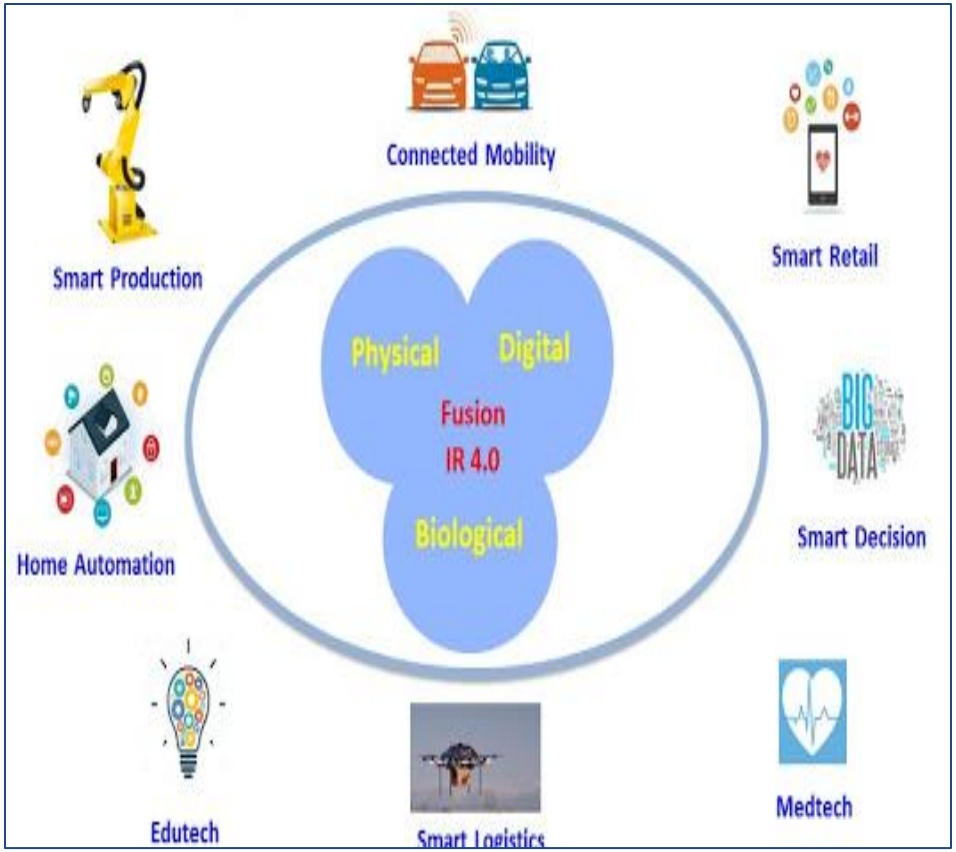
Components of IR 4.0 Responsible For The Transformation
Source (Hobcraft, 2018)

The **efficiency gain of automation** will be large enough that,

in a few short years, **the adoption of given technologies** will be a matter of **survival** for many countries.

3. Opportunities & Risk of IR.40 in Economy & Society

3.1 OPPORTUNITIES – NEW INDUSTRIES



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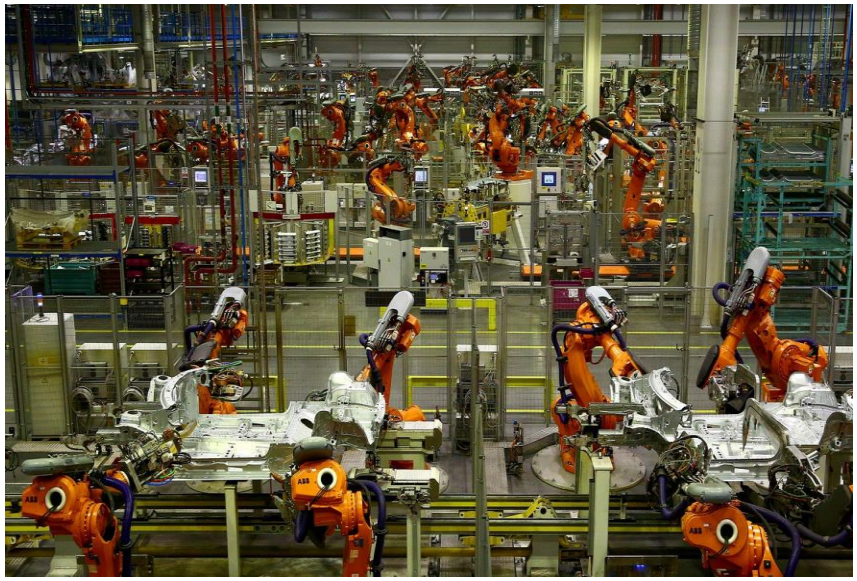
3.2. Area of Risk

1. Productivity & Competitiveness	Value added; machine engineering generate – €32 billion in 2025
2. Employment	- How many new jobs created? - Existing jobs destroyed - Stabilization of employment ?
3. Qualification	Technological change - New requirement of skills (E.g. Abstract thinking, information management, documentation, reading skills)
4. Complex of Big Data/Data Security	Cyber attack may damage - Relationship between countries - SME; Knowledge/data developed could be misappropriate

3.3 What Next ?



IR 5.0

- Involves a human's ability to customize and personalize a product at a mass scale with **advanced robotic capabilities.**

- Involve around **the interactions between man and machine**. **Greater collaboration** between the two will be better equipped to work along with human intelligence.

- **Employee will need to be skilled to provide value-added tasks** in production - wide demand for greater customization and personalization for mass production.

- What Role Will Industrial Robots Play in Industry 5.0?

Help close the design loop. Through efficiently automating - the entire production process, **humans are left free to create and innovate without having to worry about production constraints.**

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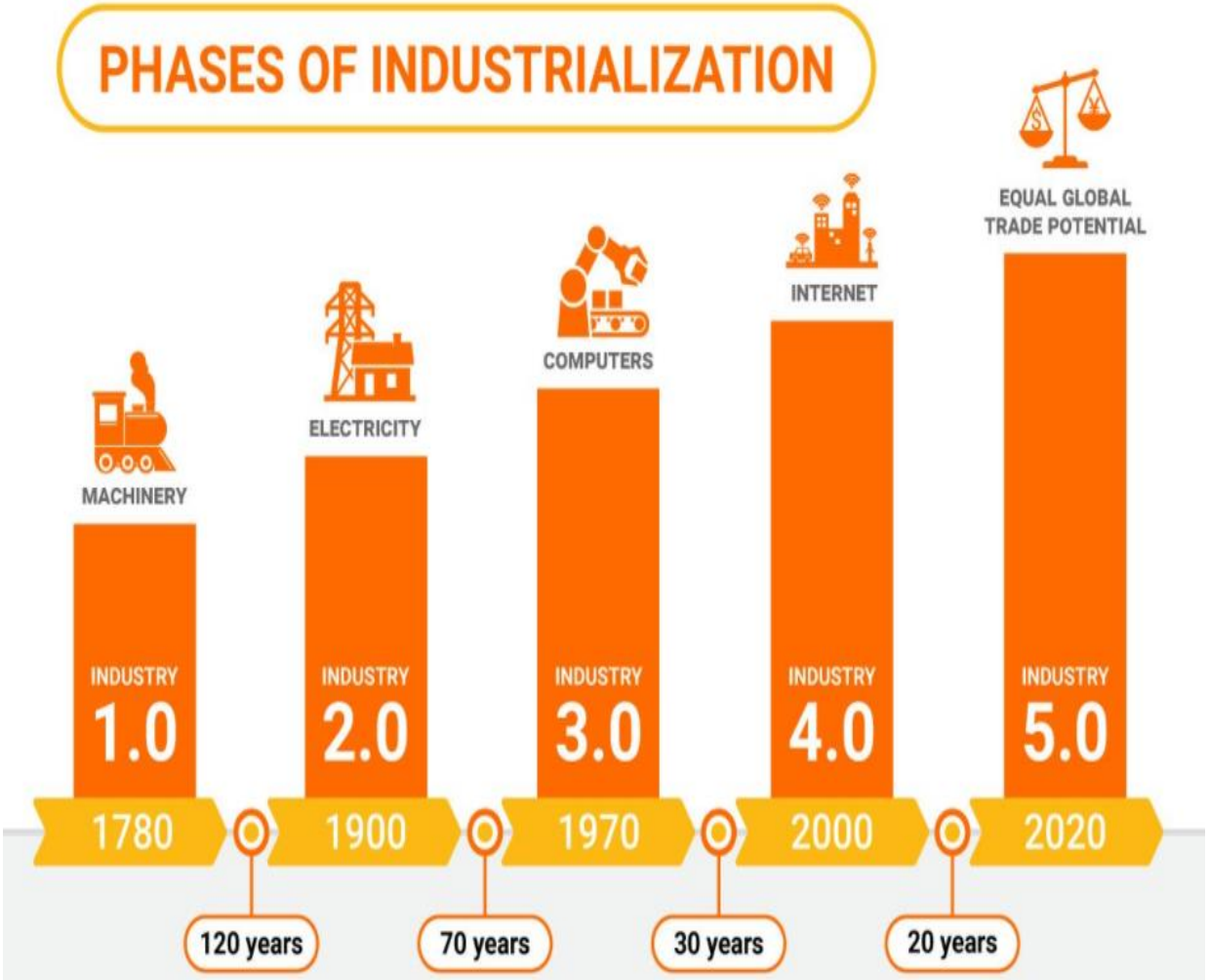
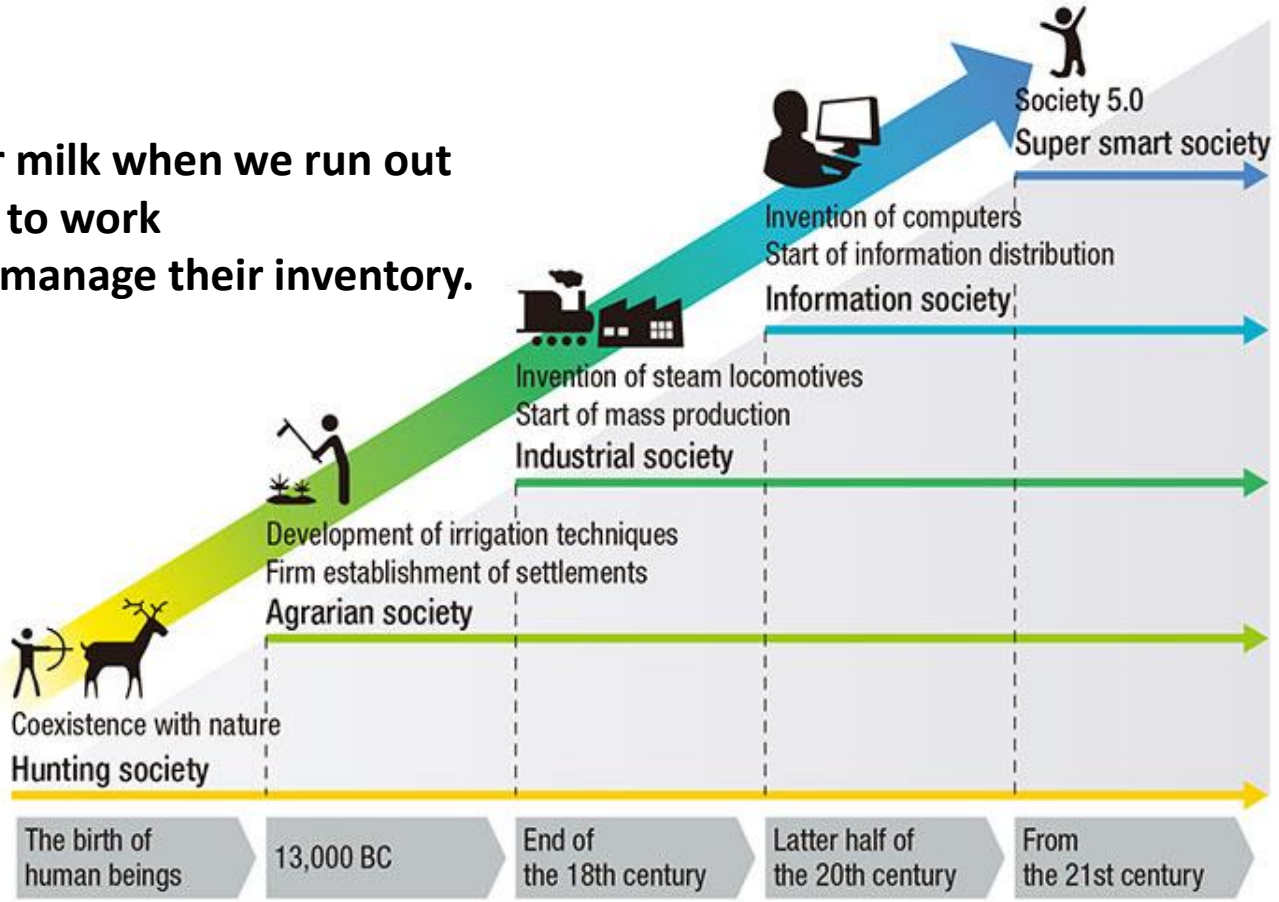


- 1760 AD – 1840 AD in England
- 1800s-1900s in France Germany
- 1840s -1920s in United States
- 1950s-in 2010s in Germany, EUs, Japan, Korea, Australia

3.3 JAPAN: SOCIETY 5.0 : SUPER SMART SOCIETY

E.g.
Our fridges will order milk when we run out
Our cars will drive us to work
Our warehouses will manage their inventory.



Economic and social innovation by deepening of Society 5.0

Source: Prepared based on materials from the Japan Business Federation (Keidanren)

4. Competitive Position of Malaysia for Transit Towards Smart Manufacturing 4.0

- The **Readiness for the Future of Production Report 2018, by WEF**, highlights that **Malaysia is in the "Leader"** quadrant.
- Malaysia is "positioned well for the future" to take the transition towards **Smart Manufacturing 4.0.**

- The **Global Manufacturing Competitiveness** Index 2016 ranked Malaysia at **17th place** among **40 countries**.
- On the technology and innovation side, the **Global Innovation Index 2017** ranked Malaysia at **37th globally among 127 countries.**

2015- MIMOS & China's Shanghai's Changda Invst Mgmt –L aunced National IOT Plan

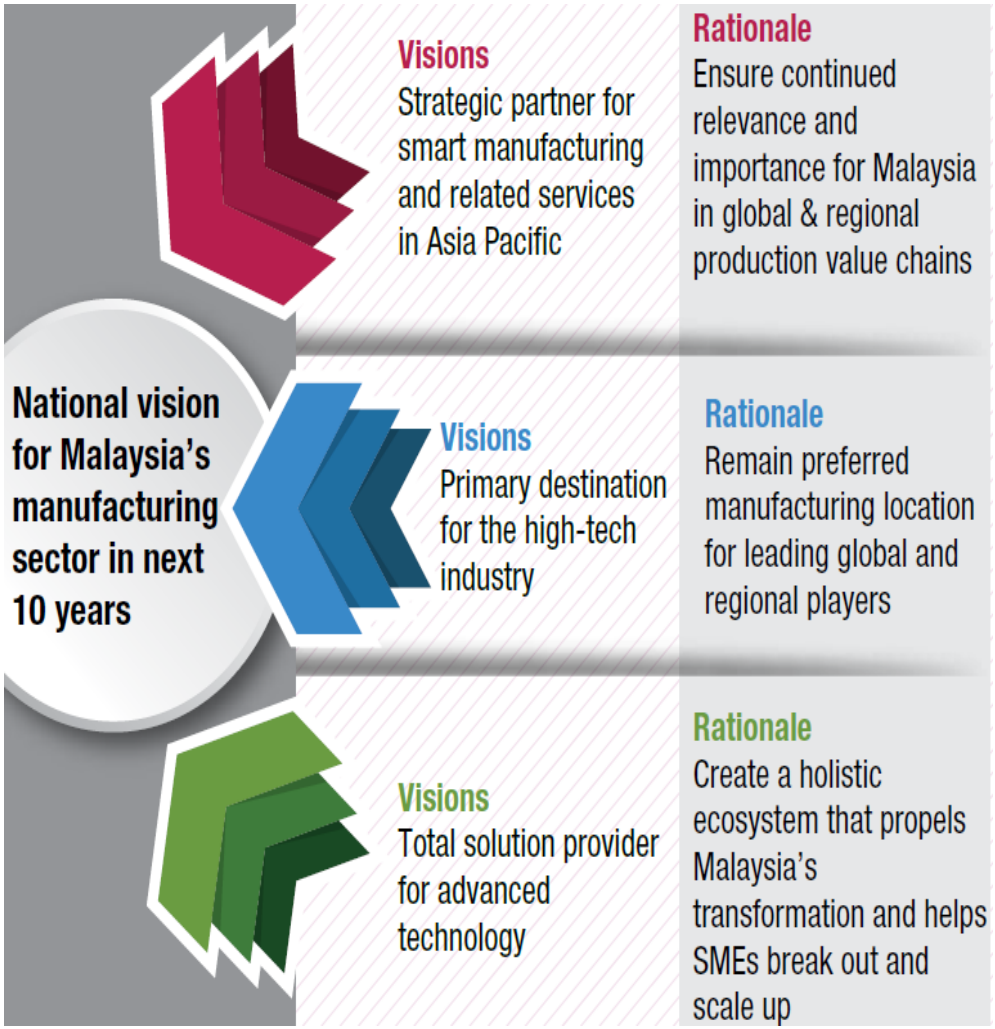
- **In Asia,** it stood as one of **the top 5 Asia's** economies and positioned itself next to Singapore in ASEAN.

5. National Industry 4.0 Policy Framework

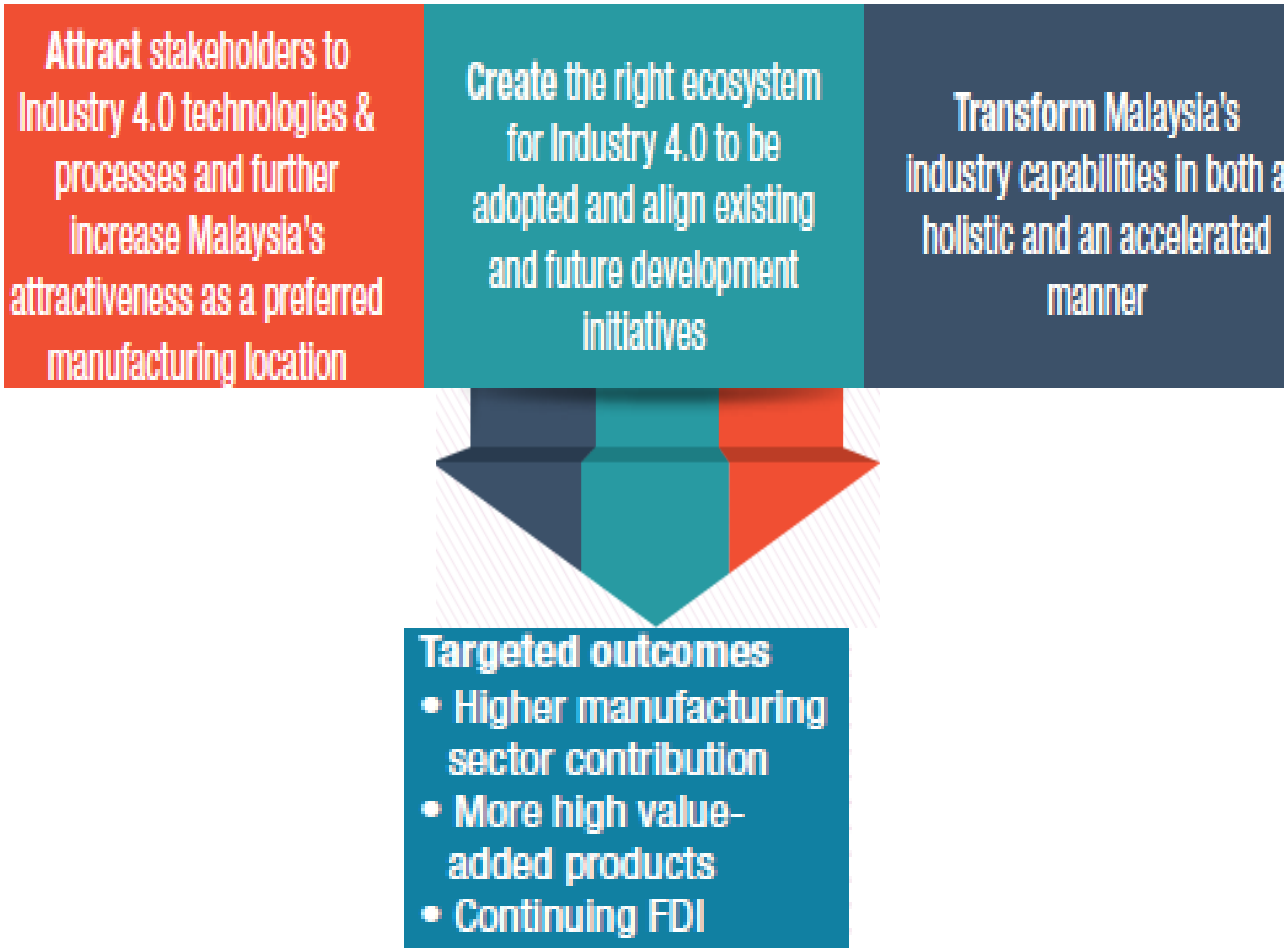
MY-i4.0

The Malaysia government has put in placed the **National Industry 4.0 Policy Framework** (My-i4.0), that provides a comprehensive transformation agenda for the manufacturing sector.

Industrial Sector – 2015
37 % GDP
38 % Employment
From Electronics, Automotive, & Construction

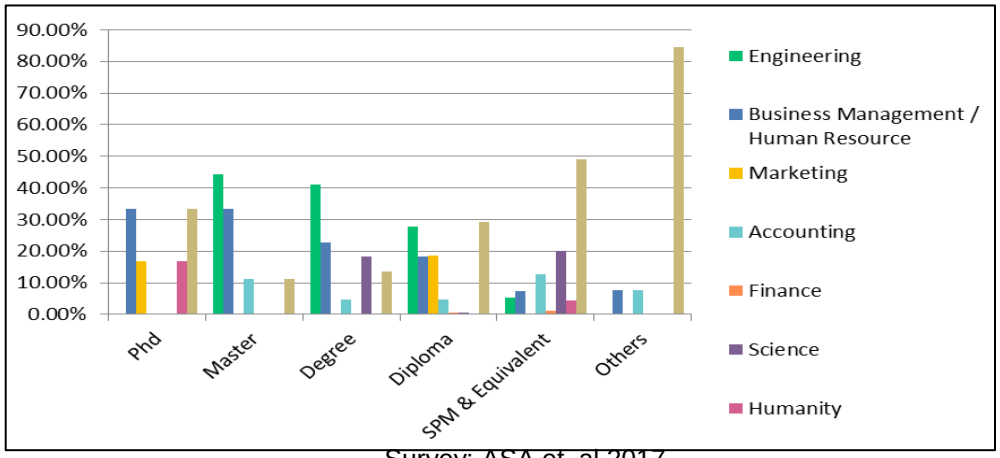


5.1 Vision & Objectives of MY-i4.0

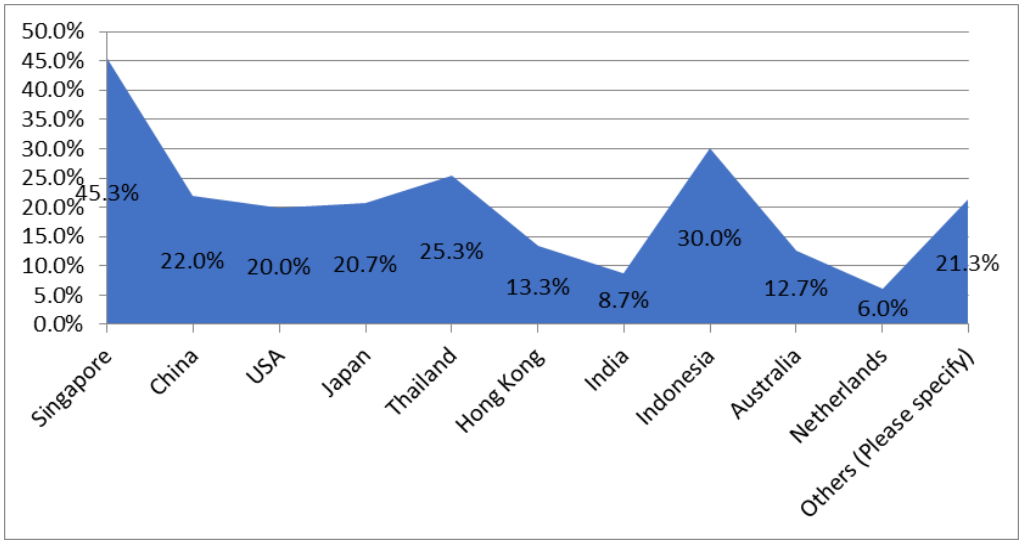


6. Initiative: Formation of Entrepreneurship Education Policy

Qualification & Specialization



Survey; ASA et. al 2017



Survey; ASA et. al 2017

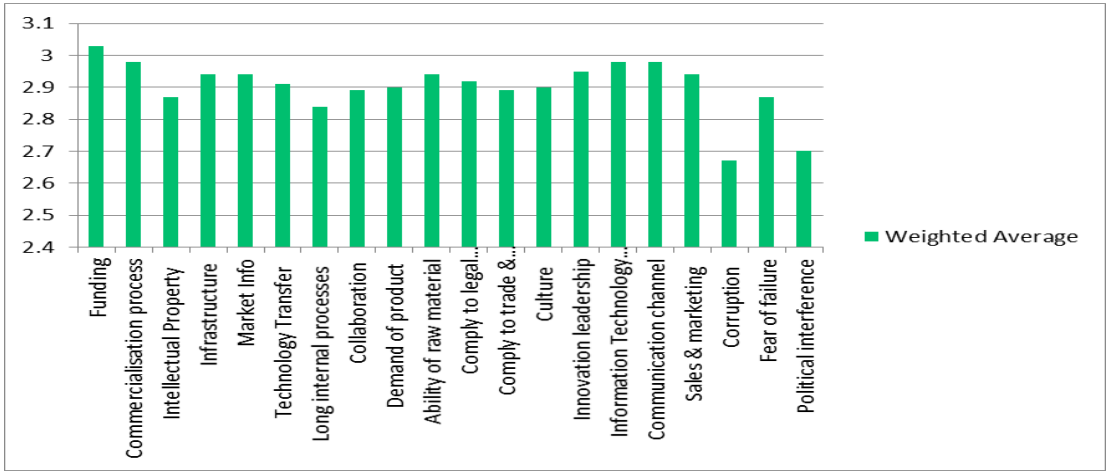
Youth Entrepreneurs as Global Player - Research Findings - April 2017

A survey on the perceived **Quality of Malaysian graduates** by **200 top employers** highlighted that **communication skill, creativity, critical thinking, analytical skill, problem solving and ability to work independently as among the skill deficits** in fresh graduates affecting their employability. (TalentCorp, 2014).

Capturing Global Market

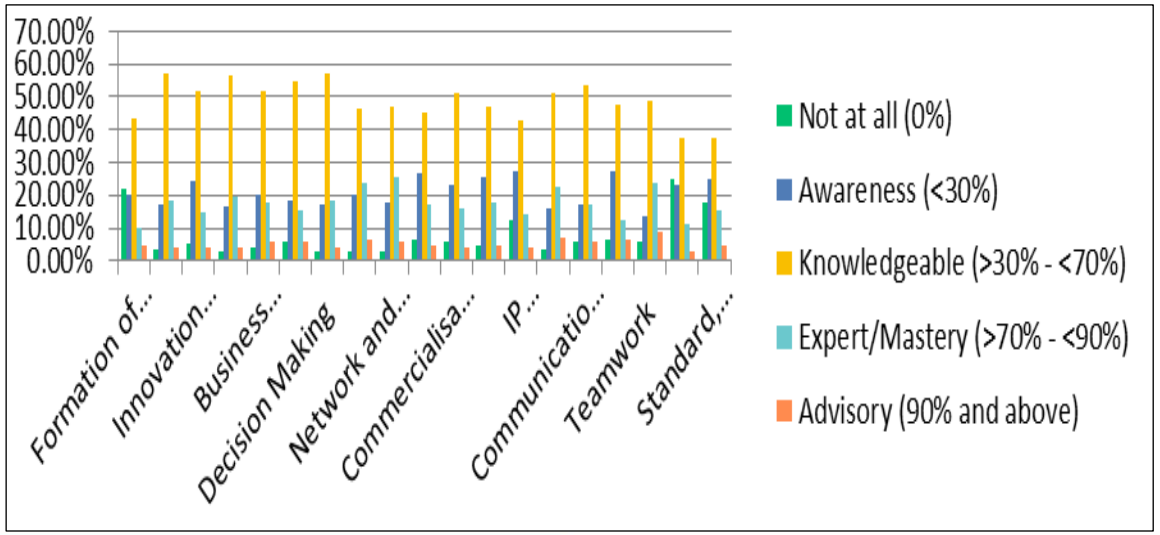
Youth Entrepreneurs as Global Player - Research Findings

Barriers & Challenges Faced by Youth Entrepreneurs



Survey; ASA et. al 2017

Innovation & Entrepreneurial Capability



7. The Way Forward
Entrepreneurship Education Policy

- Entrepreneurship education **was first introduced to STEM students** at Malaysia's public universities between **2000-2010** for its economic benefits.

- The move is respond to the **Asian financial crisis 1996/1997, the world economic recession 2010/2011,** slow growth of the industrial sector, fluctuation in international trade cycles, competitive globalised economy and divergent business environment.

- The **economic value** of supporting **the development of entrepreneurship** has been seen by policy makers as making **a real and sustainable investme**nt in the future prosperity of the country. (Ahmad and Buchanan 2015)

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- Subsequently, the **Industrial Revolution 4.0 (IR 4.0)** has given a **new impetus to educational transformation** with far greater needs to produce graduates with strong entrepreneurial mind and skills of higher creativity, innovations, competitiveness and agility.

- This has necessitated profound changes to be made in major aspects of **education including entrepreneurship education's policy content,** pedagogy, delivery, and structure/management of Education 4.0 which are shaped by innovations and will indeed have to train students **to produce innovations** (Abdul Haseeb, 2018; Sani 2018; Devezas *et. al* 2016)

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- In line with the **Entrepreneurship Action Plan of Higher Education Institutions (2016-2020), the** ministry **targets 80% of students to have entrepreneurial exposure while studying, 9% to register a business during studies and 3.5% of** graduates to choose entrepreneurship as a career.

- One of the challenges of Industry 4.0 is to have the industry and the **academia act as one to fulfil industry and graduate needs**. The role of higher education institutions is to prepare students for the changes brought by Industry 4.0.

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- However, **a substantial number of higher education institutions are still facing difficulties in implementing entrepreneurship education effectively.**

- Major issues identified are the commitment towards entrepreneurship education **by both educators and students, lacking of proper entrepreneurship training for educators as well as insufficient educators' qualification and curriculum exposures** (Rahim *et. al*. 2015) particularly in producing professional practice workforce.

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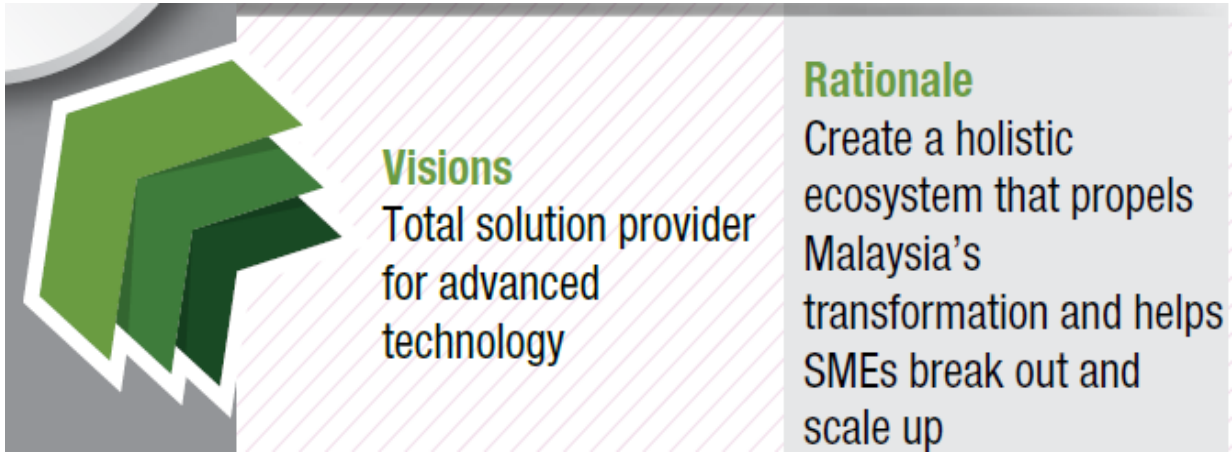
- This in line with **the Malaysia Education Blueprint (Higher Education) 2015 - 2025**, which comprises 10 thrusts including to producing entrepreneurial graduates who are holistic and balanced.

National Industry 4.0 Policy Framework (My-i4.0), that provides a comprehensive transformation agenda for the manufacturing sector in 2030.



Key enables :
Knowledge Creation & Entrepreneurship

7.1 RESEARCH OBJECTIVE

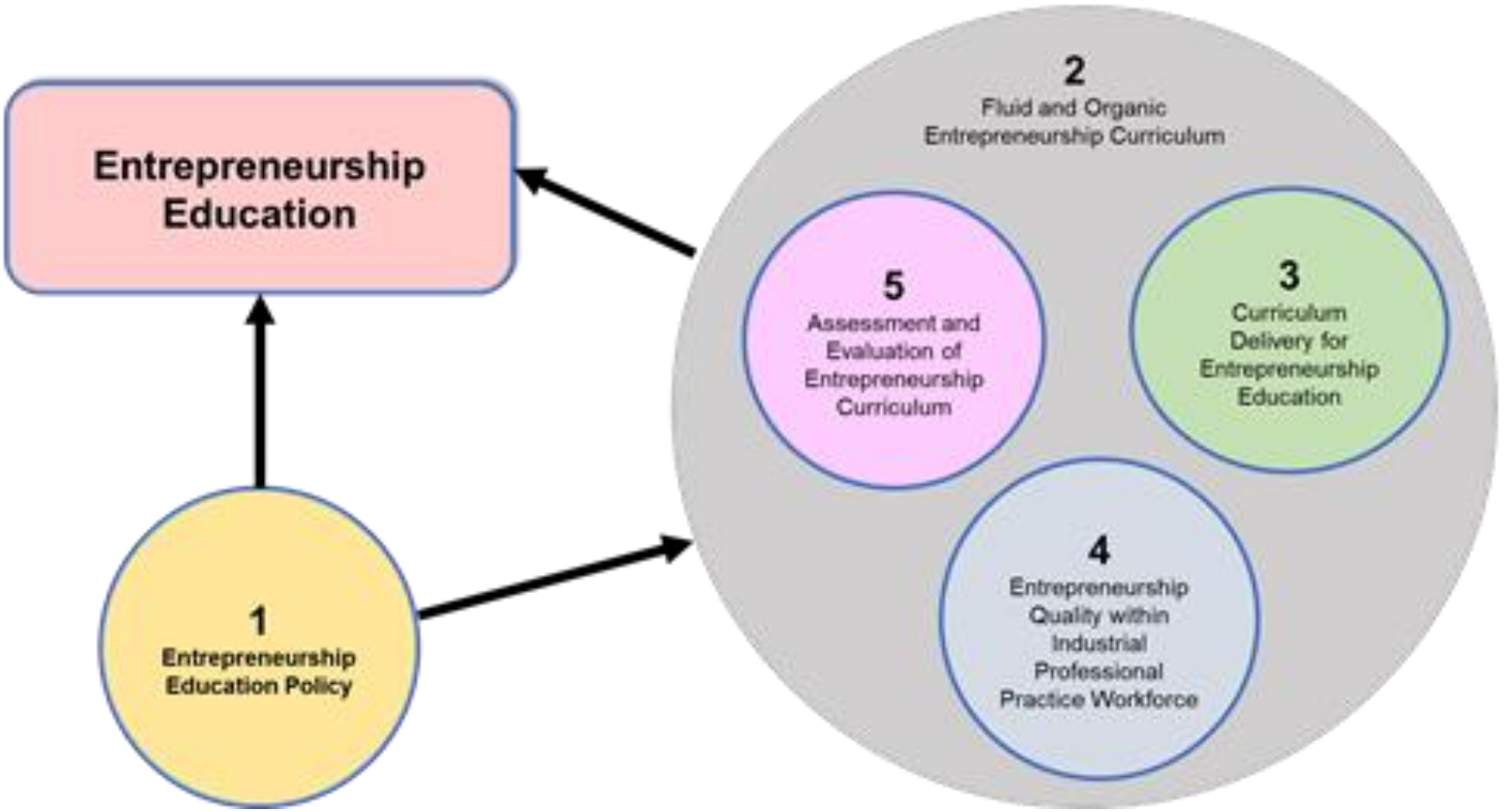
Therefore, the objective of this research is;

To **formulate and enhance existing policies related to entrepreneurship education** through ;

- evaluate the current progress of the entrepreneurship education in STEM and TVET programs
- addressing the needs for a robust yet agile entrepreneurship education under the banner of "fluid and organic“ holistic curriculum
- Curriculum structure & delivery
- Assessment, monitoring and quality.

7.2 RESEARCH CONNECTIVITY

DIAGRAM/WORKFLOW



8. CONCLUSION

- Malaysia is recognised as **one of the 25 top global leading economies** to reap the potential benefits from the 4IR. (MITI's Minister -2018.)

- The overarching strategy to **"Attract, Create and Transform (ACT)"** as propounded in MITI's **"National Industry 4.0 Policy Framework or "My-I4.0"** will help to ensure Malaysia maintaining its long-term competitive advantage.

- The future is very promising and certainly there is value in Industry 4.0, but each company has to decide what it wants and find the most cost effective route to get there.

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- Therefore, all major manufacturing stakeholders from the government, industry and academia should **seriously collaborate** in IR 4.0 implementation and putting in place the **new manufacturing ecosystem.**

- The **readiness is depending on the each industry sector development and advancement** in technology development, adoption, technological innovation, trade capabilities - exports. As well as government support in providing sufficient infrastructure, facilities and intervention in each sector.

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Thank You