STPD6014
FALSAFAH PENYELIDIKAN
(Research Philosophy)

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Sumber diubahsuai dari Mohd Yusof Hj Othman, Institut Islam Hadhari

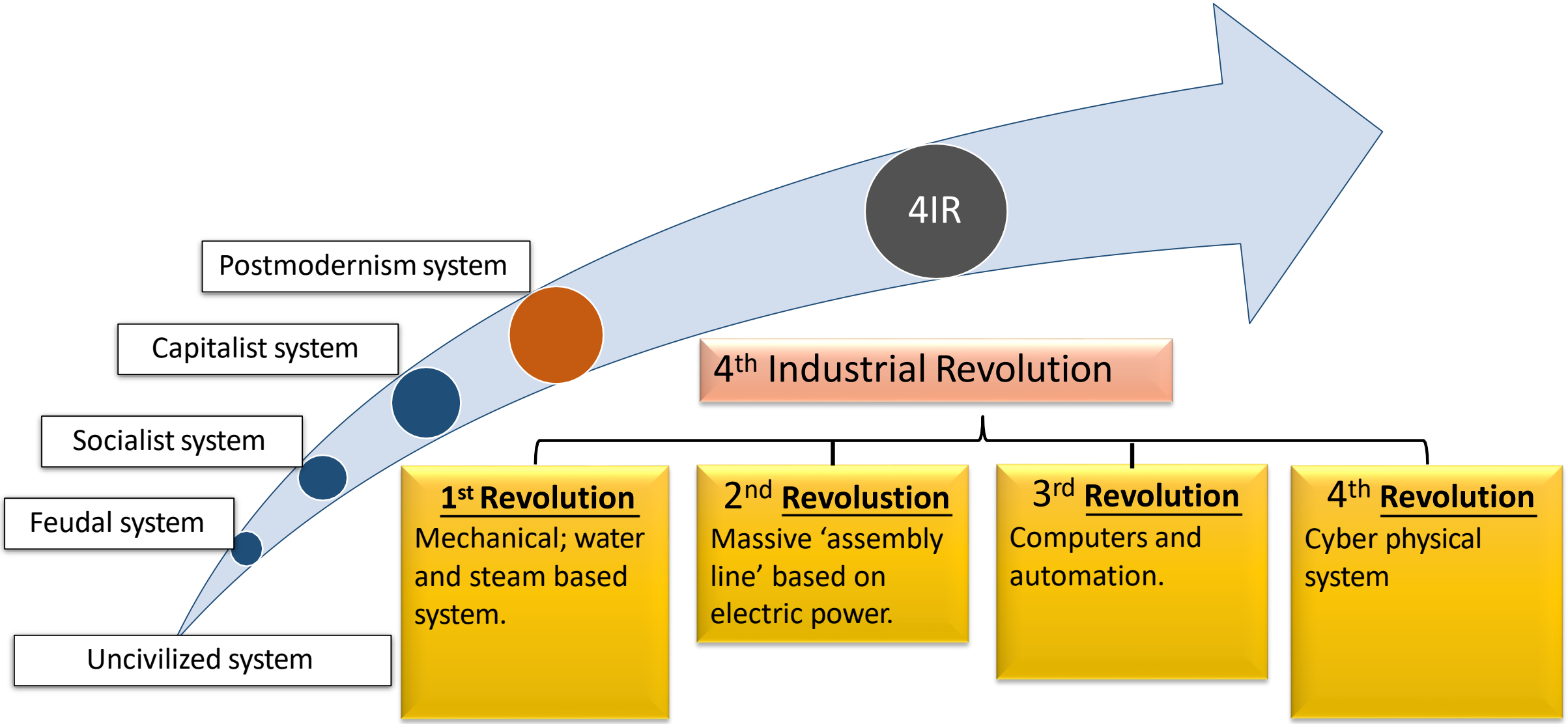
OBJEKTIF *(Objectives)*

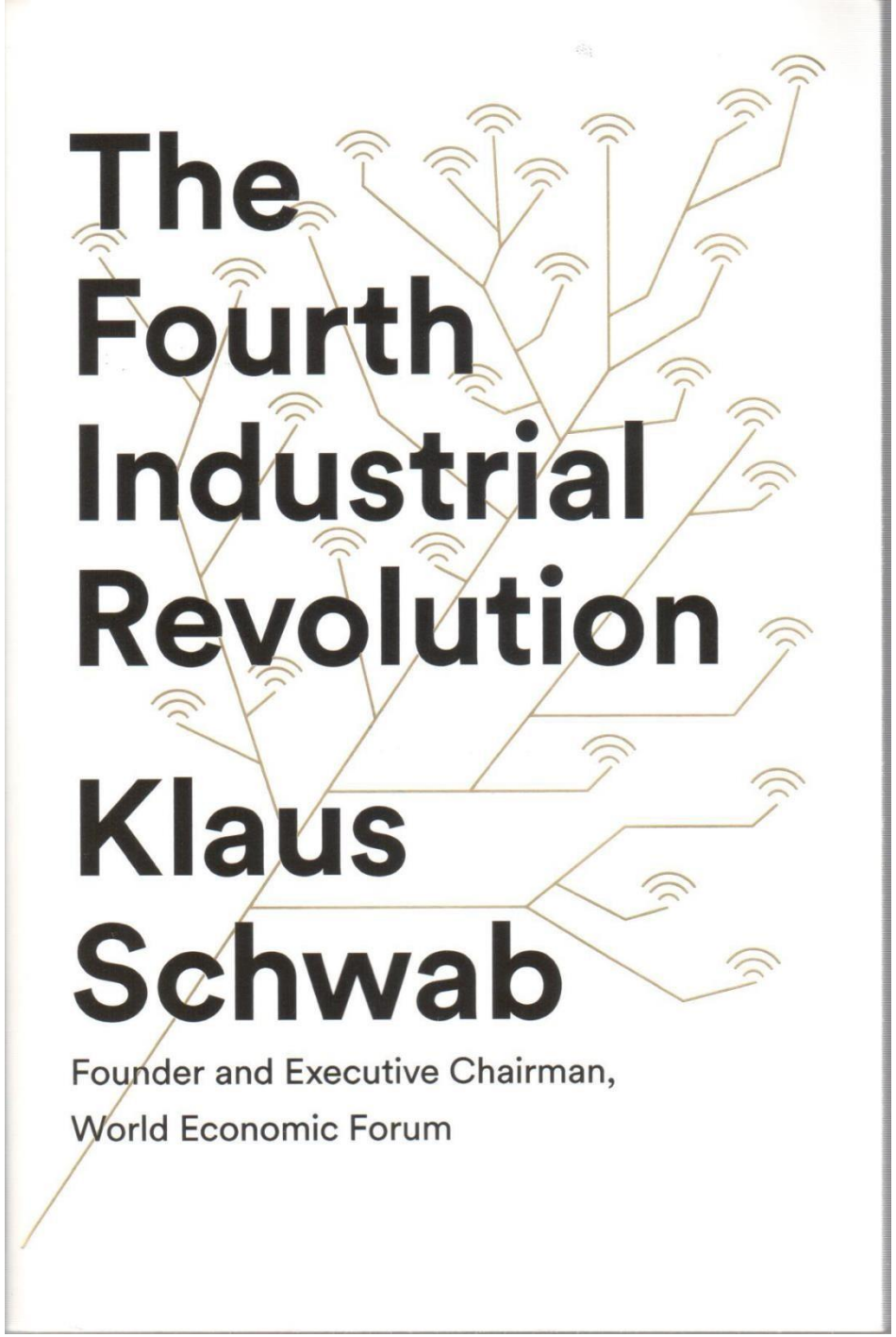
Selepas mengikuti kuliah saya, sdra/i diharap akan memahami
(After attending this lecture, I hope you will understand),

- Pengertian penyelidikan
  (The meaning of research).
- Jenis-jenis penyelidikan
  (Types of research).
- Apakah penyelidikan saintifik?
  (What is scientific research?)
- Apa yang seharusnya dilakukan untuk menjalankan penyelidikan?
  (What should a researcher do when conducting a research?)
- Bagaimana penyelidikan menyumbang kepada pembangunan ilmu, diri, masyarakat dan tamadun?
  (How research contributes to the development of knowledge, empower ourselves, society and civilization?)

Why we conduct Research?

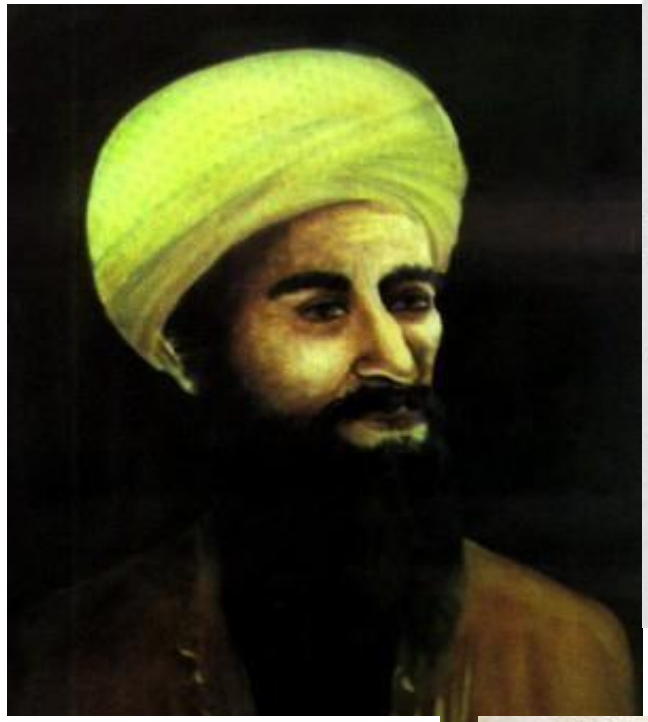
THE HISTORY OF INDUSTRIAL REVOLUTION

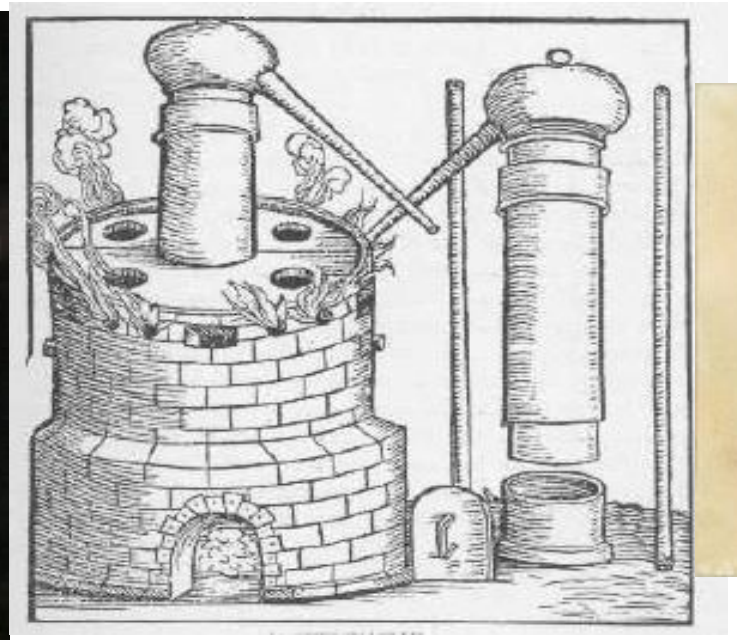


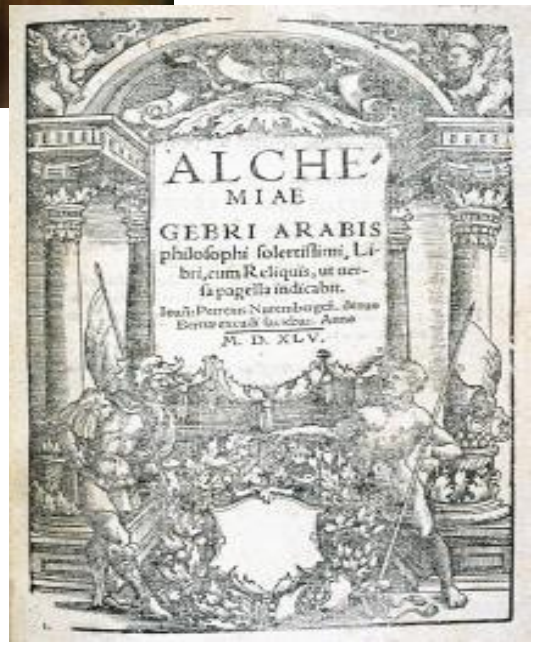


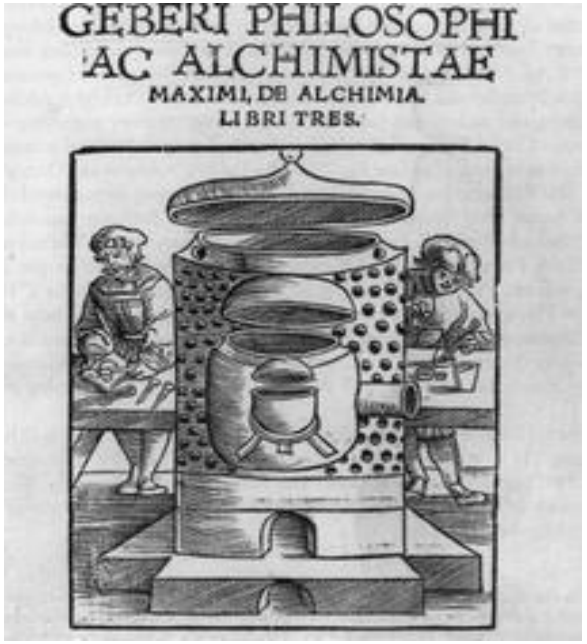
Klaus Schwab, 2017; Penguin Random House, UK

History of Industrial Revolution



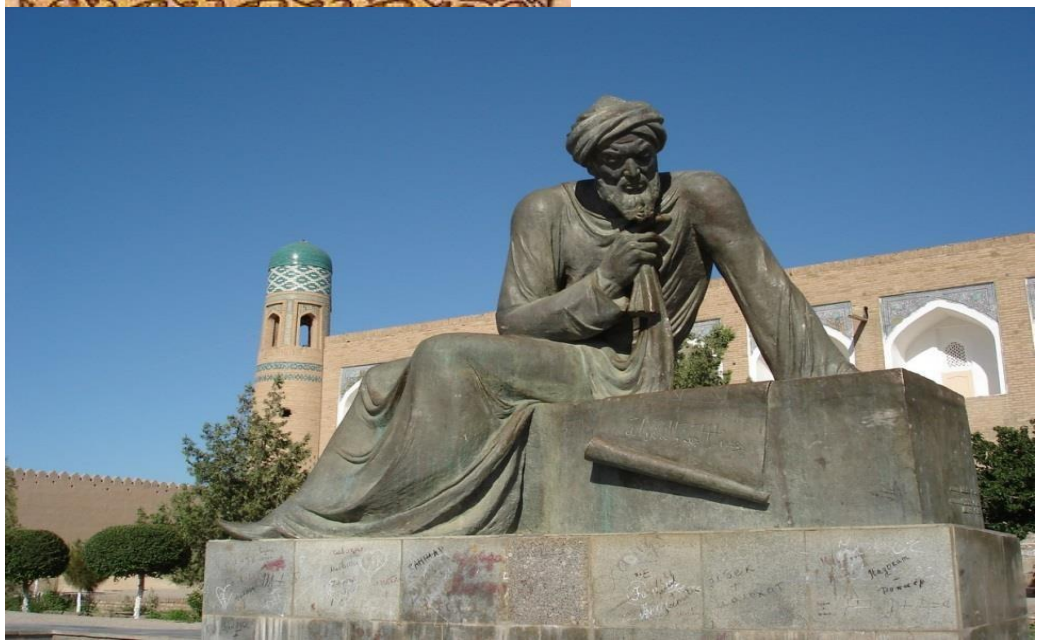




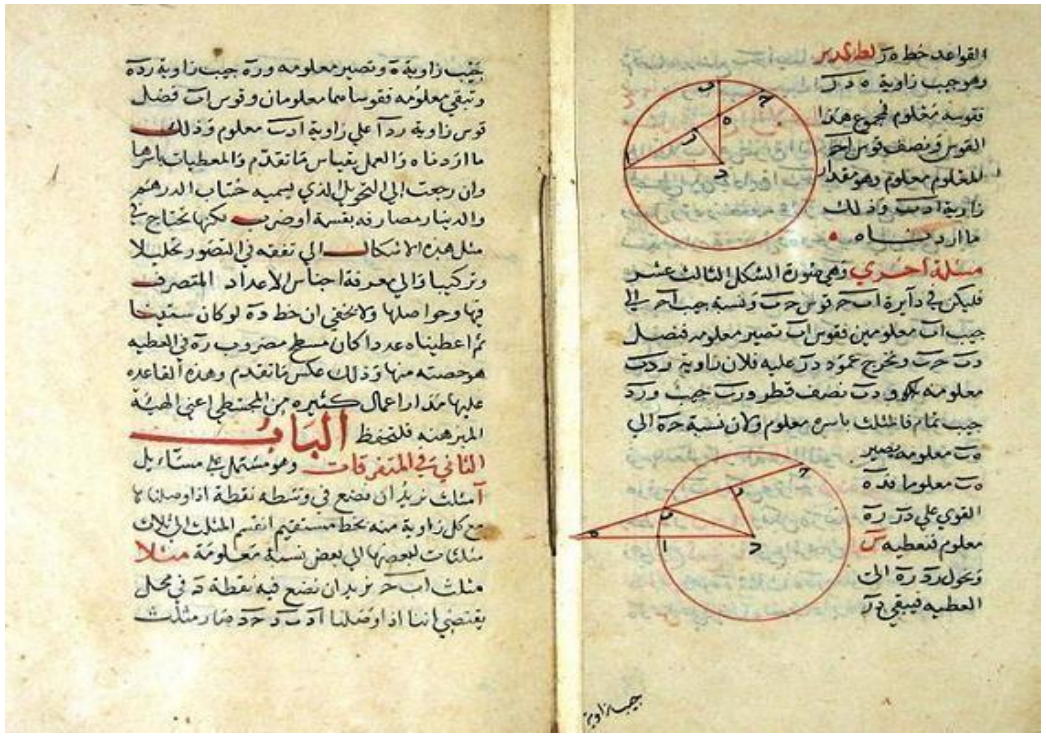


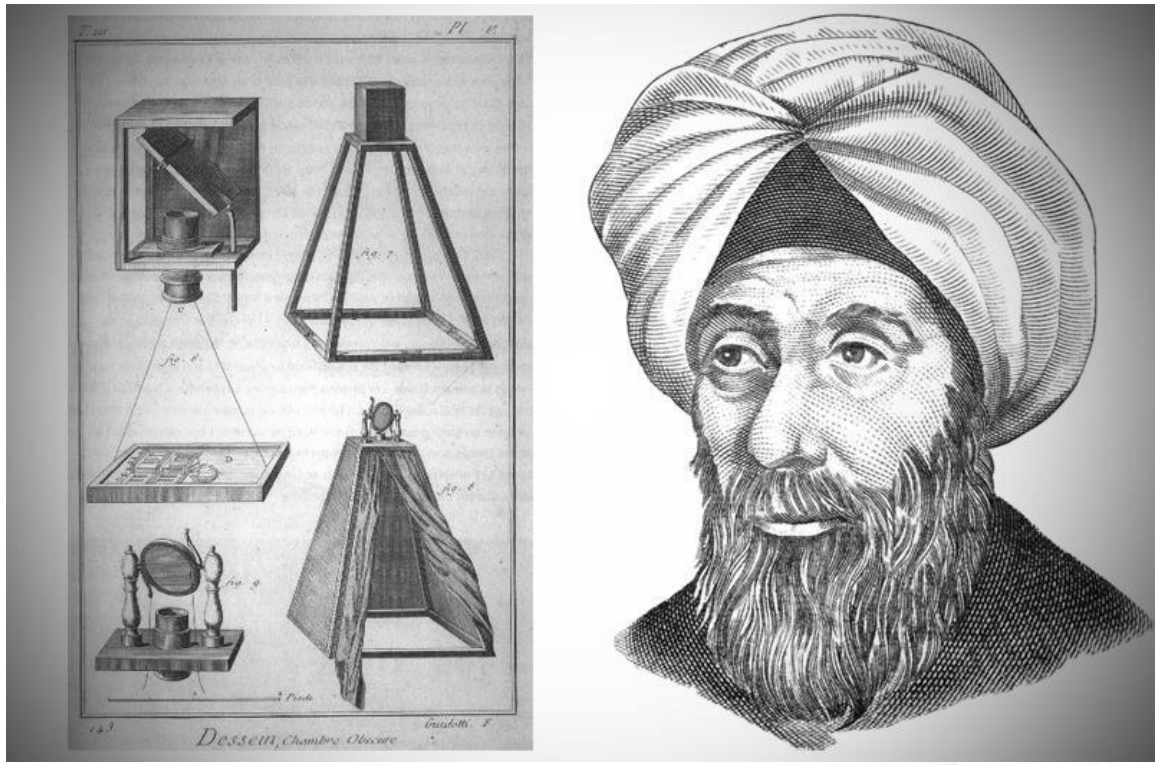
722: Jabir bin Hayyan (Gaber) dilahirkan. Beliau dianggap '*father of Chemistry*'. Saintis pertama membangunkan makmal kimia. *1st scientist develop Chemistry labratory*.


كتاب الجبر والمقابلة

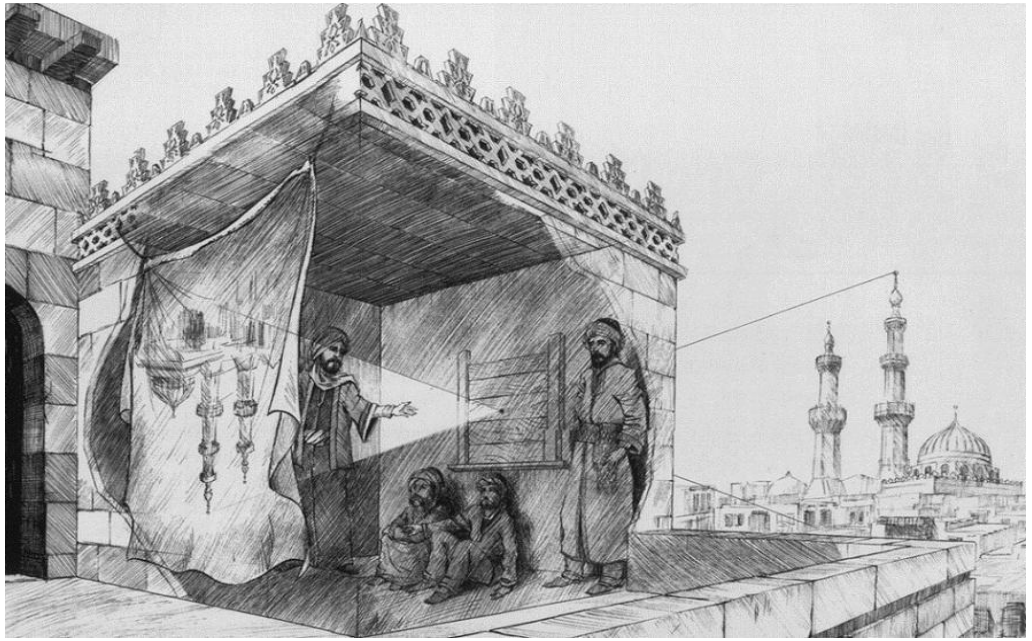


780: Ahli matematik al-Khwarizmi dilahirkan. Bukunya *al-Gebra wal Muqabala* dikembangkan sebagai algebra moden. (*Mathematician who wrote al-Gebra wal Muqabala, developed as modern algebra and algorithm*)



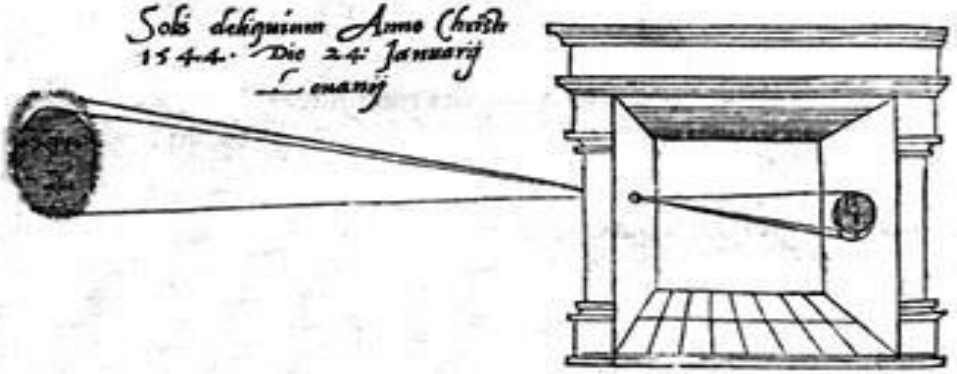


Optical instruments and the 1st camera (*camera obsecura*) was invented by Ibn al-Haitham (965-1041), which later translated into Latin.



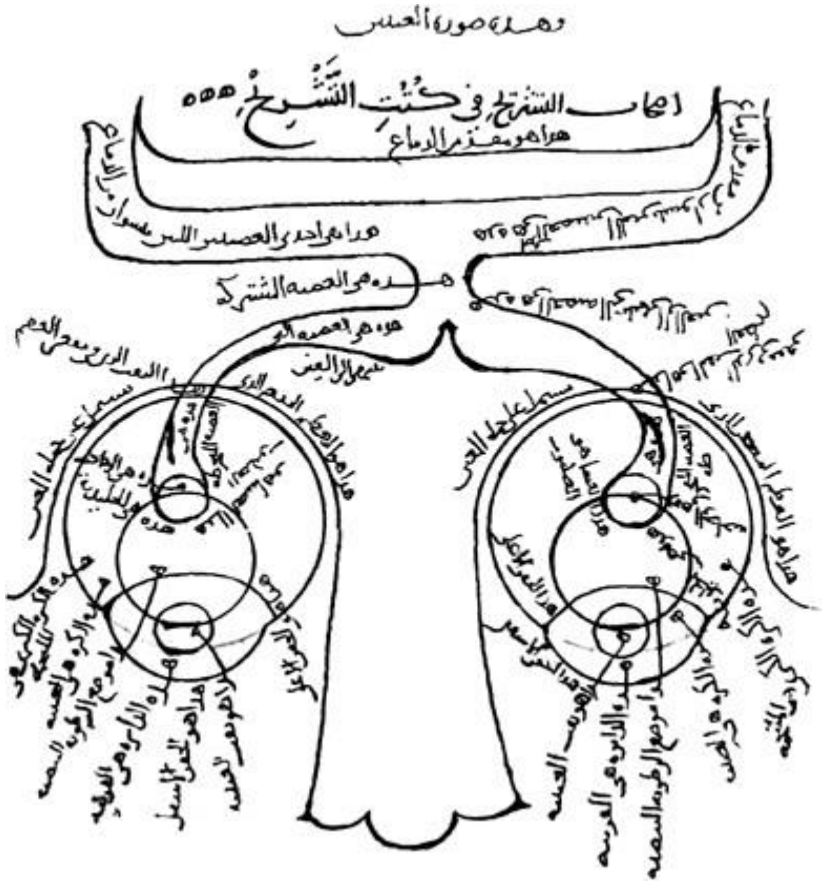
illum in tabula per radios Solis, quàm in cœlo contingit: hoc eſt, ſi in cœlo ſuperior pars deliquiũ patiatur, in radiis apparebit inferior deficere, vt ratio exigit optica.

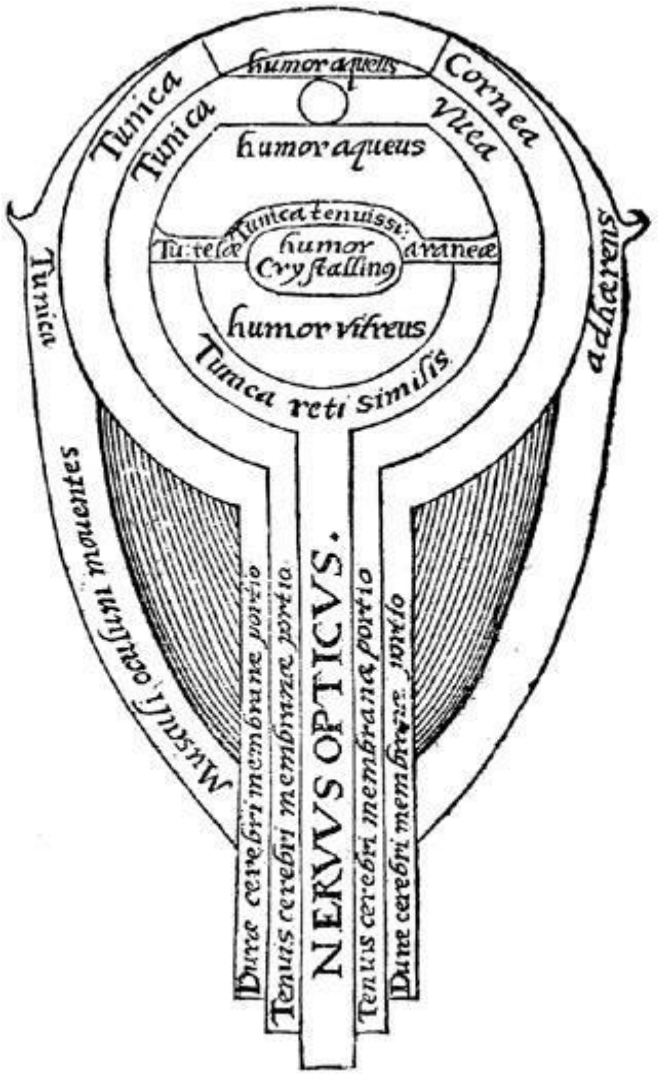
Solis deliquium Anno Chriſti 1544. Die 24. Januarij Louanij



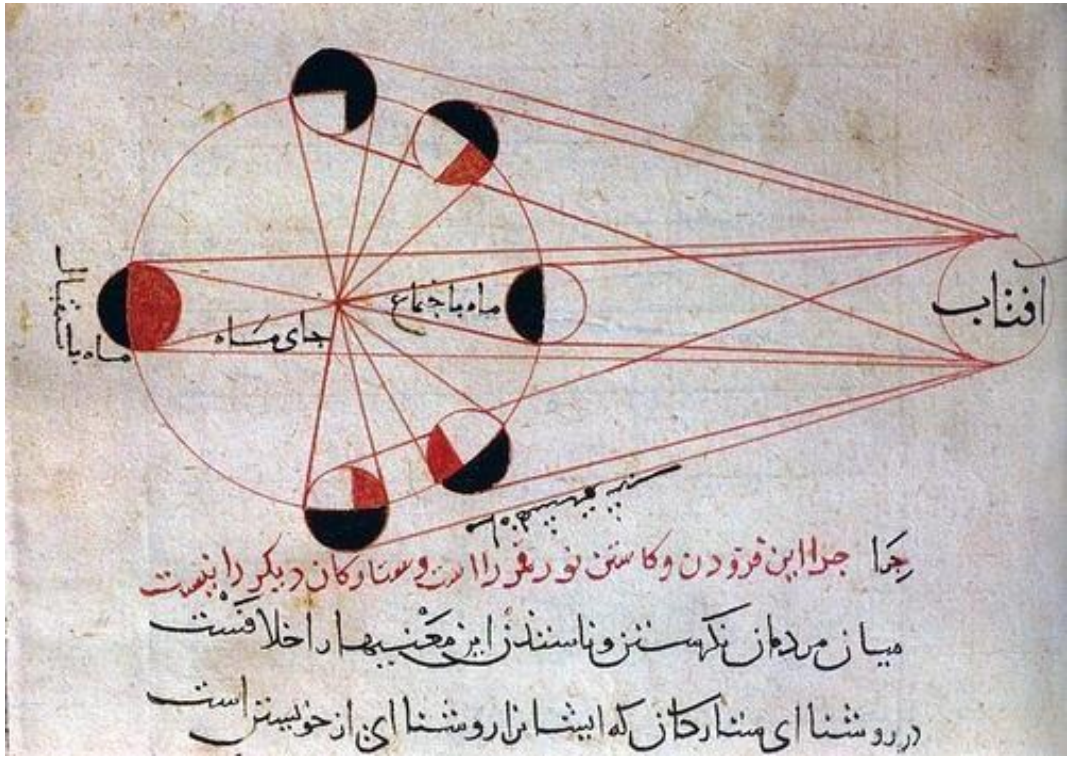
Sic nos exactè Anno .1544. Louanii eclipſim Solis obſeruauimus, inuenimusq; deficere paulò plus q̃ dex-

The structure of eyes by al-Haitham; *Opticae thesaurus Alhazeni Arabis* ...(1572). Welcome Library, London

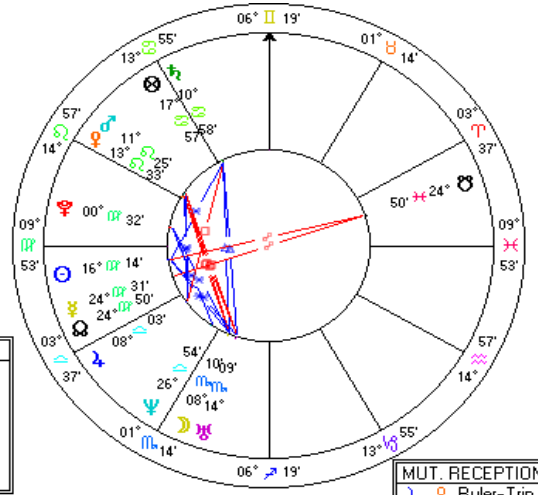




Al-Biruni's (973-1047) explanation on esclipes



Al-Biruni
Natal Chart (2)
Sep 4 0973
5:05 am LMT -4:01:28
Khiva, UZBEK
41°N24' 060°E22'
Geocentric
Tropical
Regiomontanus
True Node



Day of ☿	Hour of ♄
12th Hour of Night	
Last Hr ☽	-24 mins
Next Hr ♃	+32 mins

Hs	Alm.	Hs	Alm.
1	☿	7	♃
2	♄	8	♂
3	♂	9	☽ ♀
4	♃	10	☿
5	♂ ♄	11	☽
6	♄	12	☉

MUT. RECEPTIONS

♃ ♀	Ruler-Trip
♀ ☉	Ruler-Face
♃ ♀	Ruler-Face
♃ ♄	Exalt-Exalt
♃ ♄	Exalt-Term
♀ ♃	Trip-Term

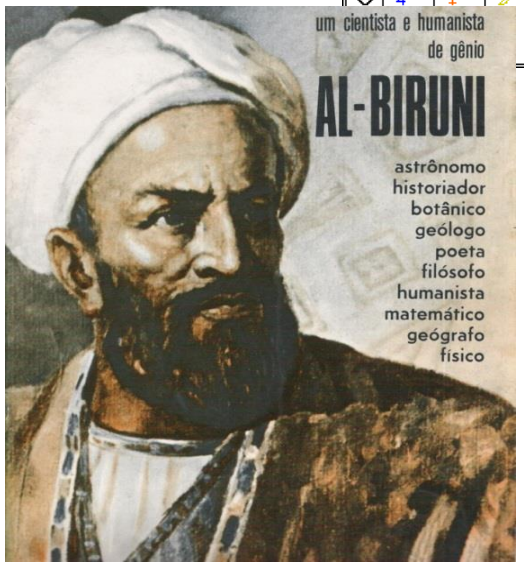
ESSENTIAL DIGNITIES

Pt	Ruler	Exalt	Trip	Term	Face	Detri	Fall	Score
☽	♂	--	☽ +	♃	♂	♀	☽ -	-1
☉	☿	☿	☽	♃	♀	♃	♀	+0 p
☿	☿ +	☿ +	☽	♂ m	☿ +	♃	♀	+10
♀	☉	--	♃	♀ +	♃	♄	--	+2
♂	☉	--	♃	☿ m	♃	♄	--	+0 p
♃	♀	♄ m	☿	♀	☽	♂	☉	+0 p
♄	☽	♃ m	☽	♃	☿	♄ -	♂	-5 p
♅	♂	--	☽	♀	☉	♀	☽	--
♆	♀	♄	☿	♂	♃	♂	☉	--
♇	☿	☿	☽	☿	☉	♃	♀	--
☊	☿	☿	☽	♂	☿	♃	♀	--
☋	♃	♀	☽	♂	☿	♂	☿	--
				♀	☉	♃	♀	--
				☿	♃	♃	♉	--
				☿	♃	♄	♂	--

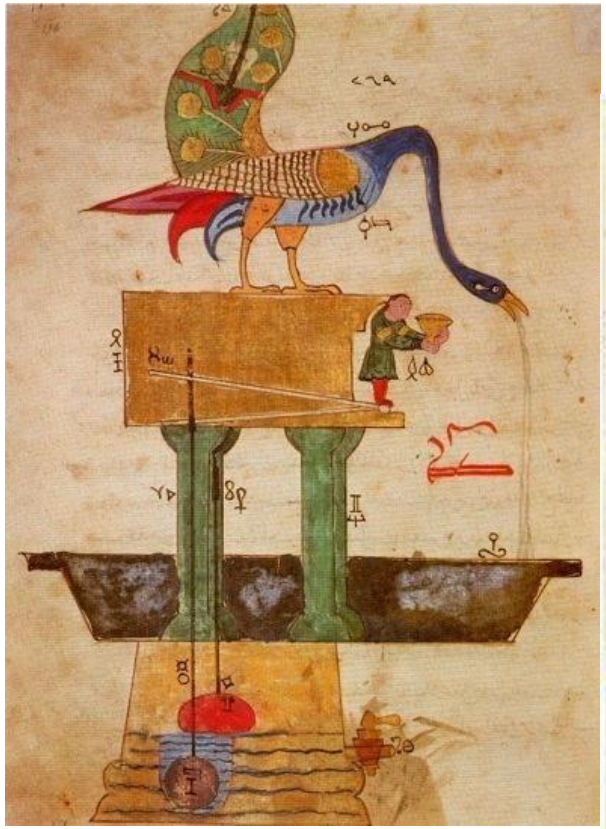
PLANETARY SECT

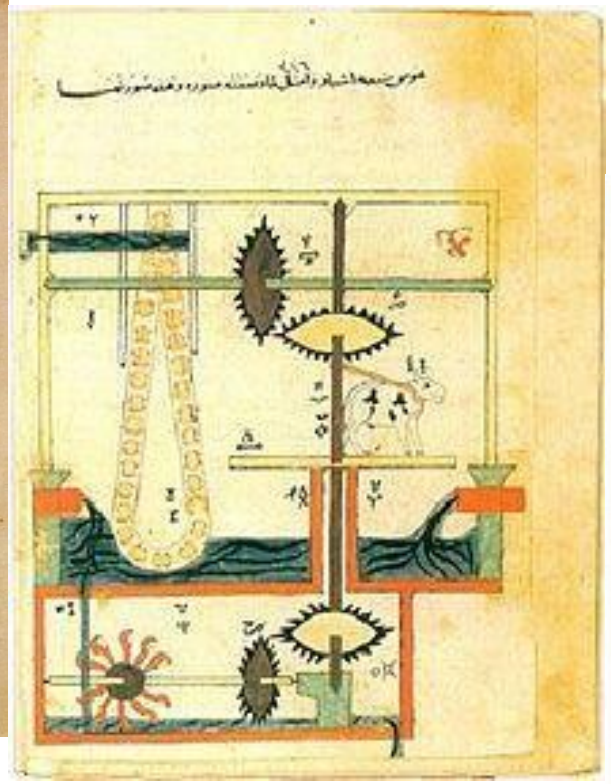
Planet	Cht	Plc	Sgn	Condition
☉ D	N	N	N	Ex Cond
☽ N	N	D	N	
☿ N	N	D	N	
♀ N	N	N	D	
♂ N	N	N	D	
♃ D	N	D	D	
♄ D	N	N	N	Ex Cond

D=Diurnal, N=Nocturnal



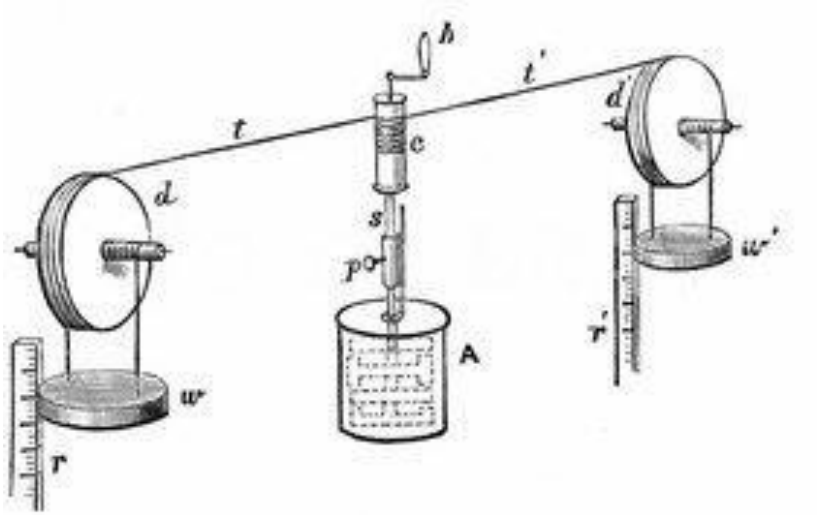
ISMAIL AL-JAZARI (1136-1206)
Pengasas kejuruteraan berasaskan air *(The father of water based engineering)*

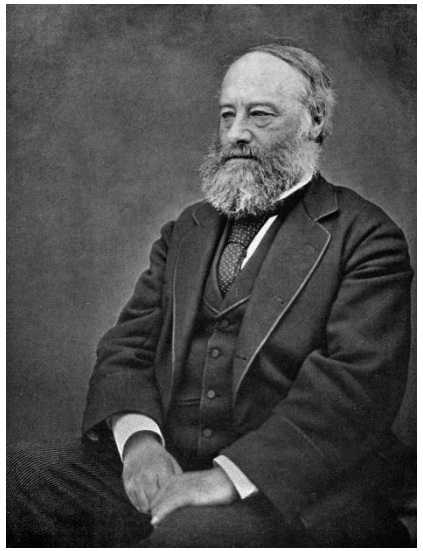


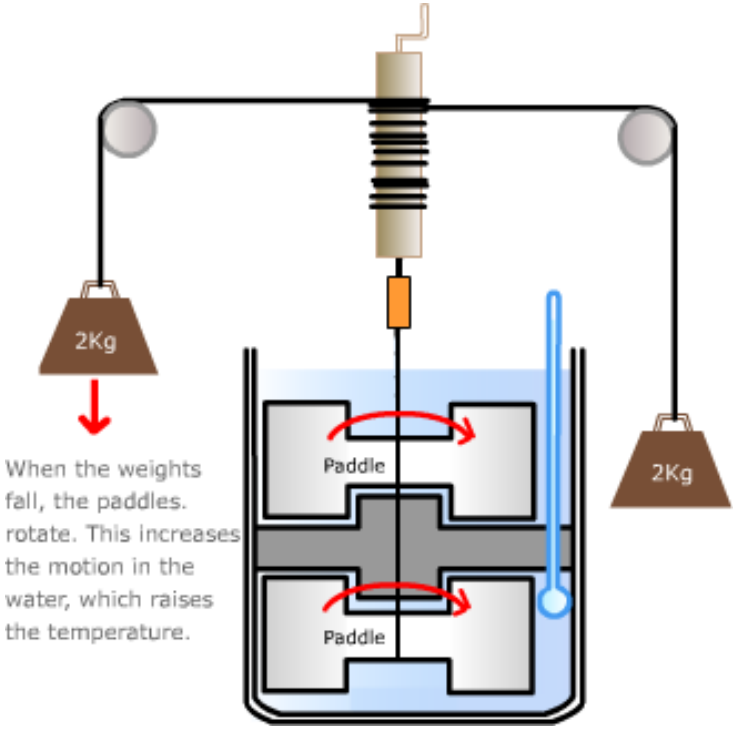


4th Industrial Revolution from Western Perspective

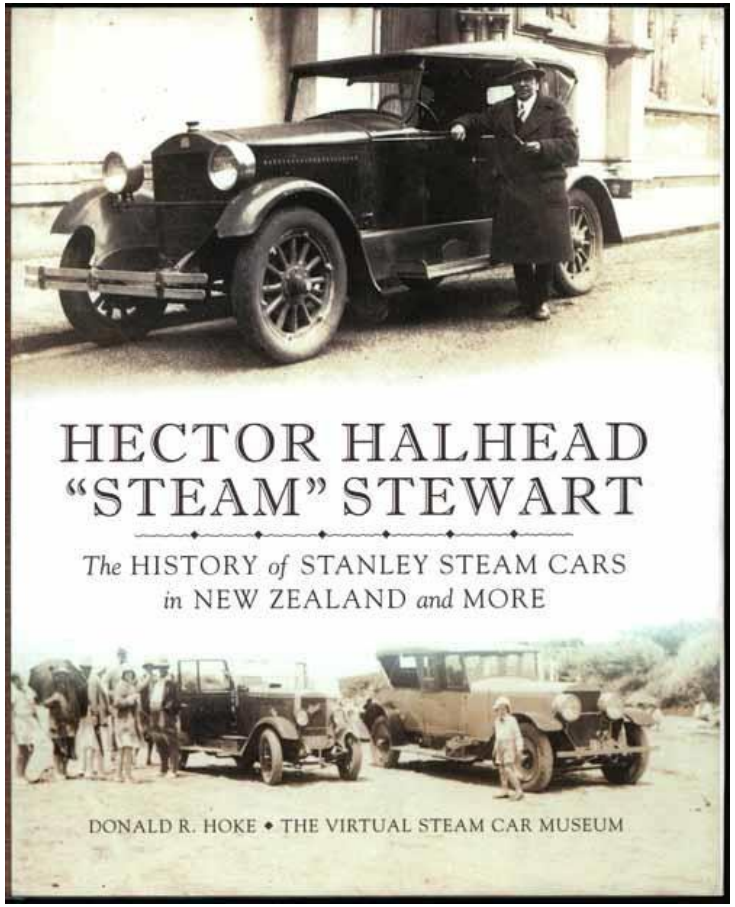
James Prescott Joule (1818-1889), ahli fizik berbangsa Inggeris menemui kaedah menukarkan tenaga haba kepada tenaga mekanik (*the English physicist discovered that heat and mechanical energy can be interchanged*)





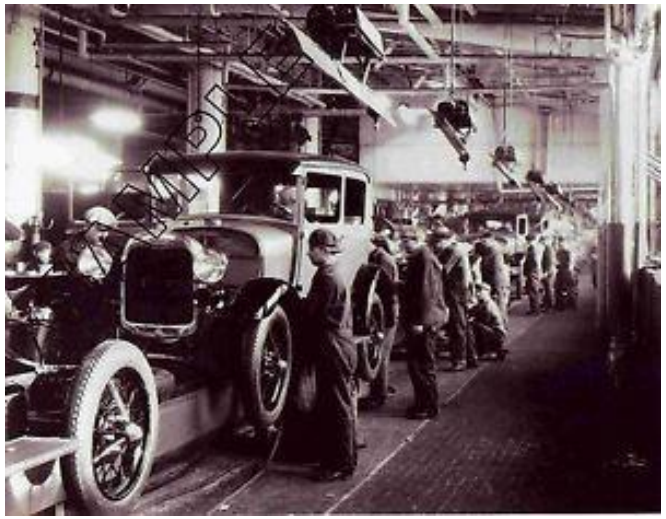


PENGGUNAAN TEKNOLOGI HABA-MEKANIK DALAM KENDERAAN MELAHIRKAN REVOLUSI INDUSTRI PERTAMA (*The use of heat-mechanics in transport producing 1st Industrial Revolution*)

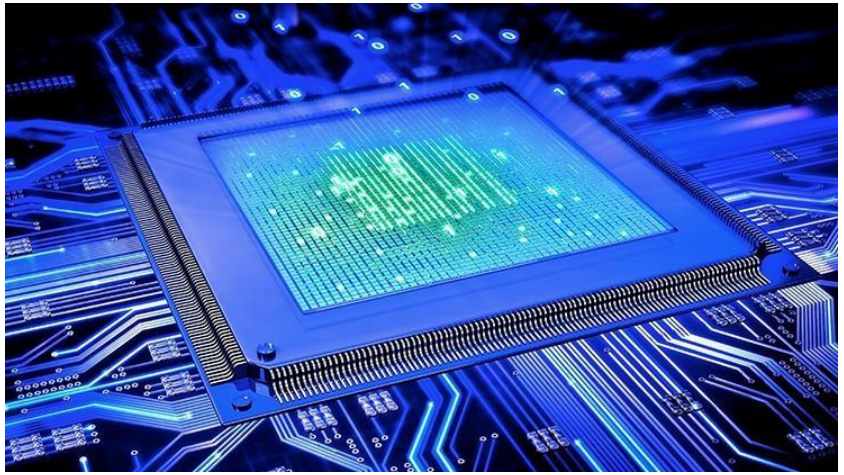


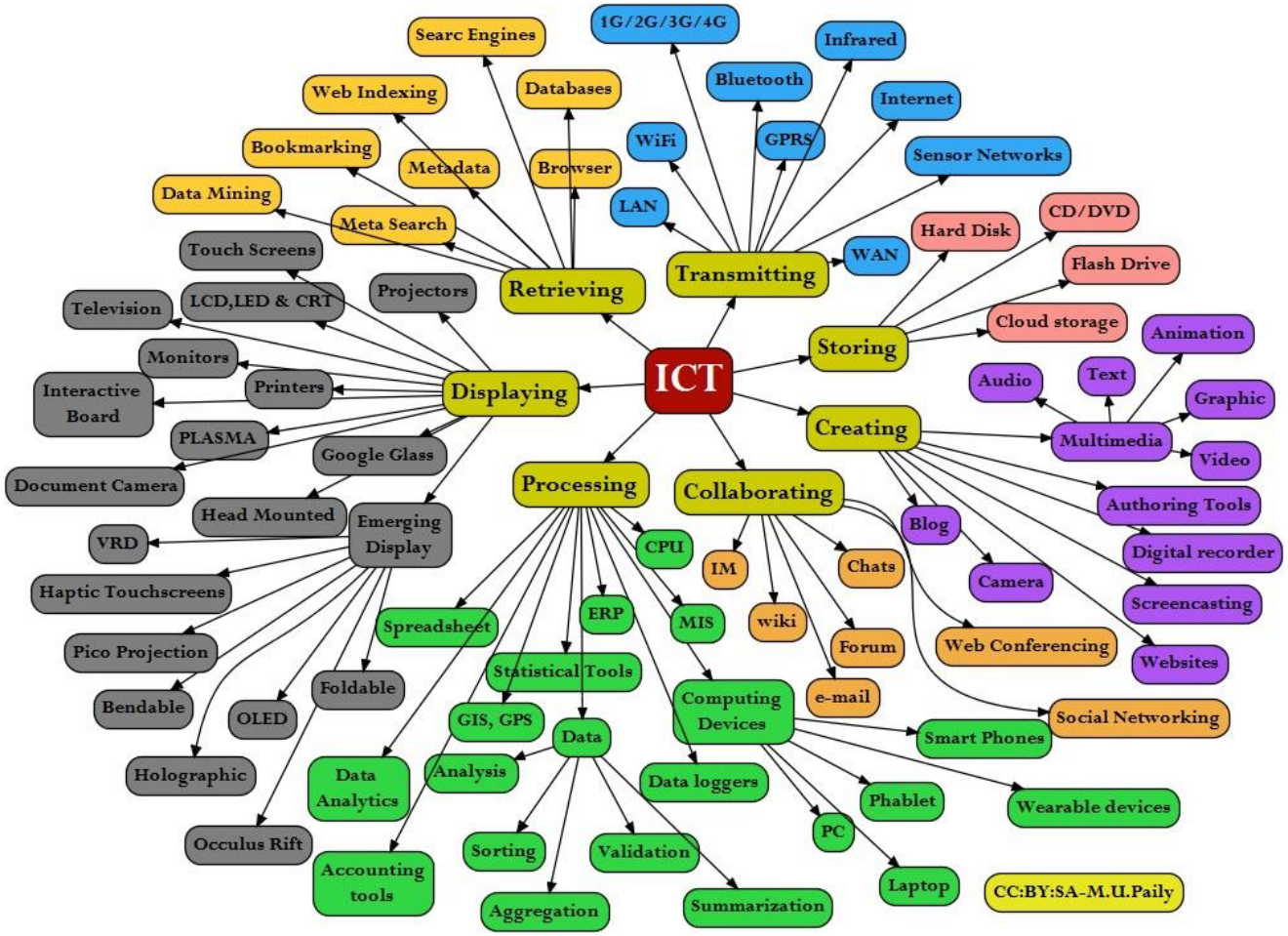
TENAGA DIHANTAR MELALUI KABEL DARI PENJANA ELEKTRIK (*Energy can be conducted through cable from generators*)

PENEMUAN TENAGA ELEKTRIK TELAH MEMPERCEPATKAN TEKNOLOGI PEMBUATAN BERSKALA BESAR DALAM REVOLUSI INDUSTRI KE-2 (*The discovering of electrical energy producing mass productions through assembly line – 2nd IR*)



TEKNOLOGI MAKLUMAT & KOMUNIKASI MEREVOLUSIKAN INDUSTRI KE-3
(*ICT revolutionized 3rd IR*)





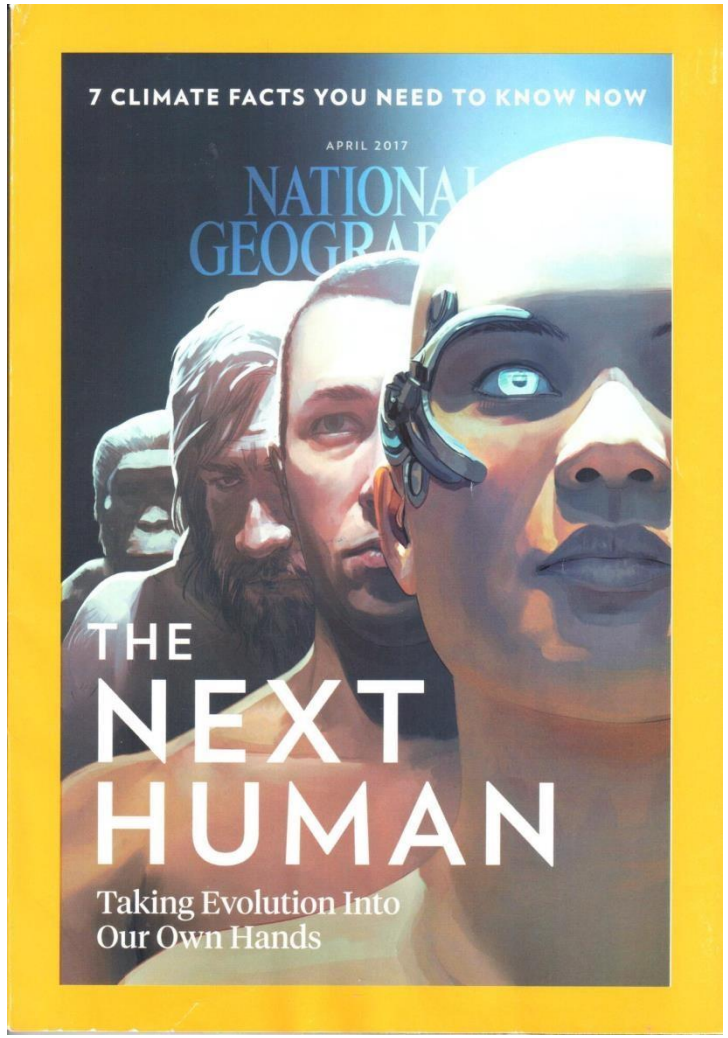
21 '*TIPPING POINTS*' IN 4IR (WEF2015)

2018	2021	2022	2023	2024	2025	2026	2027
• Big data for all applications	• Robotic & services.	• Internet of things (IoT). • Internet and automation. • 3D printing and manufacturing.	• Implant technology. • Big data for decision making. • digital existence. • Government and its chain • Superconductor in pockets.	• 'Human' computer. • 3D printing & health. • Home connected system). • Advanced IoT (Internet of Things)	• 3D printing & consumer products. • AI & white collar workers. • Economic smart partnership.	• Driverless vehicles. • AI in decision making • Smart cities.	• Blockchain'

Future Technology in the Era of 4IR

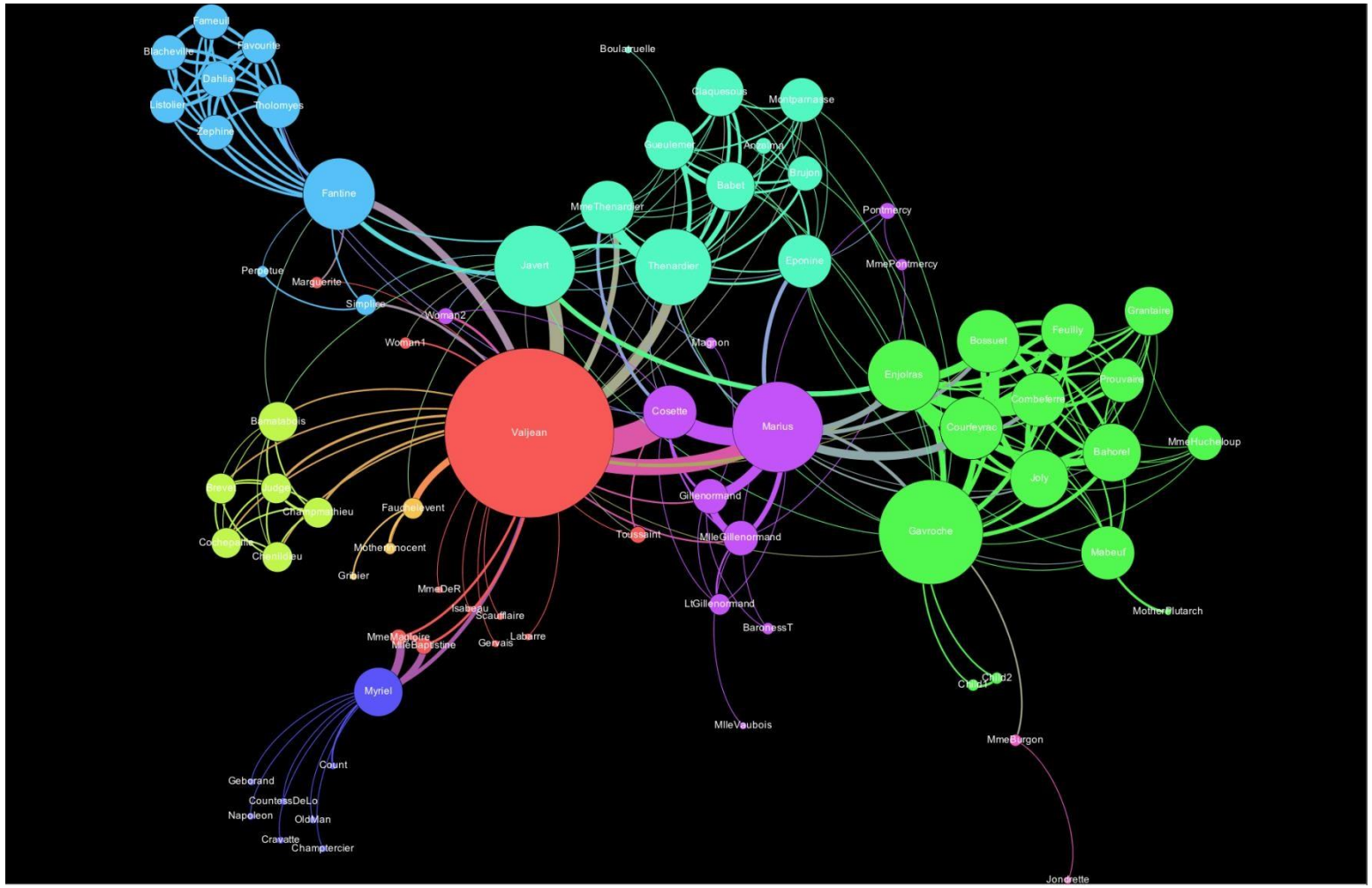
S&T DEVELOPMENT IN 4IR

- 4IR elements – human jobs (responsibilities) are taken over by machine,
  - ‘Big Data’ – Cyber physical system.
  - 3D printing.
  - UAV technology – now, taken over by drone technology.
  - Driverless vehicles.
  - Brain-net.
  - ‘Humanoid’
- How do you relate this with human development, such as spiritual and emotional development?



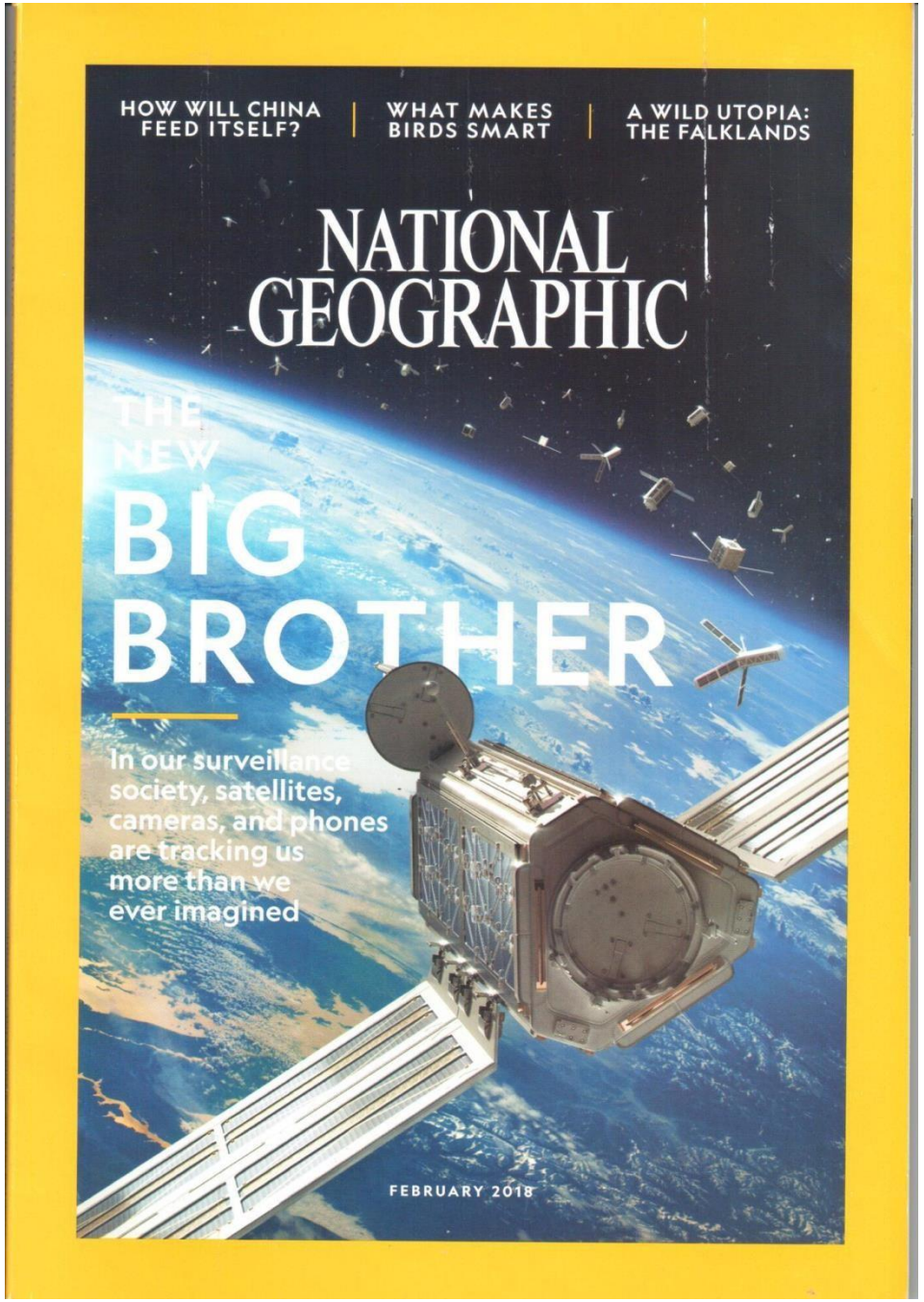
National Geographic: April, 2017

BIG DATA INTERCONNECTED: CYBER INFRASTRUCTURE

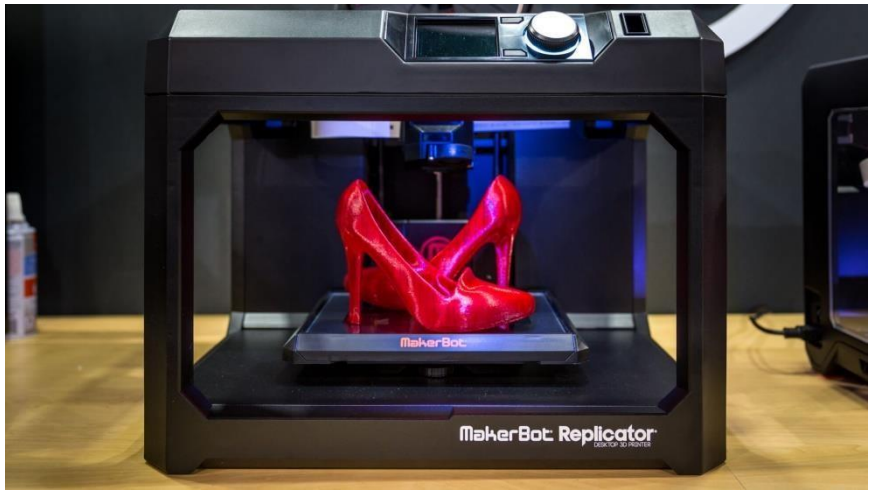


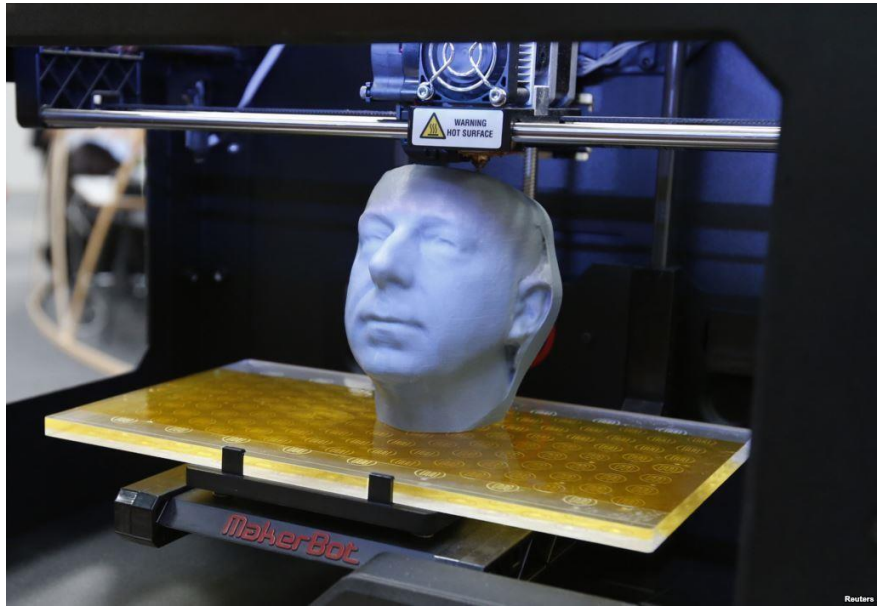
We are connected and we are being watched anywhere we go and anything we do. Our privacy will be prevailed to the system we invented.

National Geographic (Feb 2018)



3-D PRINTING


MakerBot
MakerBot Replicator
DESKTOP 3D PRINTER


WARNING
HOT SURFACE
MakerBot
Reuters

DRONE TECHNOLOGY

DRONE TAXI SERVICES

DRIVERLESS VEHICLES

HUMANOID – HUMAN ROBOT

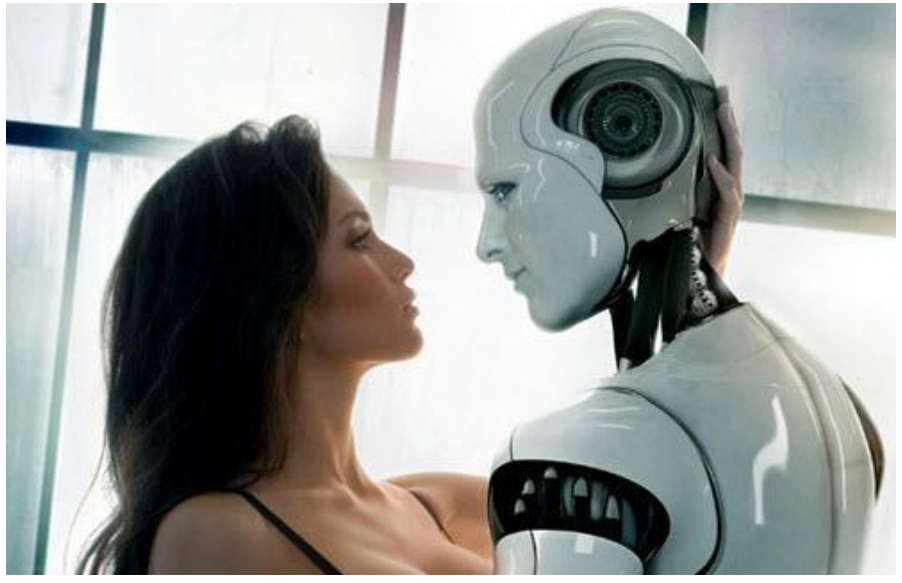
HUMANIZING HUMANOID

Chinese man 'marries' robot he built himself

Zheng Jiajia had grown tired of pressure to get married so he turned to Yingying, a robot spouse he constructed last year

Zheng Jiajia, 31, decided to 'marry' Yingying after failing to find a suitable human alternative. Photograph: Qiangjing Evening News

The Guardian; 4 April 2017



WHY DO YOU NEED RESEARCH?

- Understanding nature and human behaviours (science).
- Getting benefit from nature in our surrounding (technology).
- For betterment of our lives; new products, new services, comfortness.
- Improving and empowerment of our economy and standard of life.
- Research is power – developed countries invest more in research, developemnt, innovation and commercialization (RDI&C).

R&D IN S&T IN MODERN/ CONTEMPORARY WORLD

R&D Indicators

- Research grants (*geran penyelidikan*); % R&D/KDNK *(%R&D/GNP)*
- No. of research workers/10,000 workers (*bil pekerja penyelidik/10,000 pekerja*).
- Penerbitan ilmiah *(Research Publications) – journals, proceedings, books, conferences, and related activities.*
- Harta intelek *(Intelectual Property) – patterns, modules etc.*
- Pengkomersilan *(Commercialization of R&D products).*

WHAT IS (RE)SEARCH?

APAKAH PENYELIDIKAN?
(What is research?)

- Search

➢Look, or feel, or go over for what may be found. (*mencari, atau merasa atau mendapatkan sesuatu*)

➢Looking for something (*mencari sesuatu*).

➢Investigation (*menyiasat*)

- Research

➢endeavour to discover new, or collate old facts (*usaha untuk mendapat sesuatu yang baru, atau mengumpul dan menyemak fakta lama*).

➢To look in detail, or to search intensively (*mencari secara terperinci, atau menyiasat secara intensif*).

(*Oxford Dictionary*)

APAKAH PENYELIDIKAN?
(What is research?)

- **Research** is a human activity based on intellectual investigation and aimed at discovering, interpreting, and revising human knowledge on different aspects of the world. Research can use the scientific method, but need not do so.
- **Scientific research** relies on the application of the scientific method, a harnessing of curiosity. This research provides scientific information and theories for the explanation of the nature and the properties of humans.

APAKAH PENYELIDIKAN?
(What is research?)

- **Scientific method** is a body of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge. It is based on gathering observable, empirical and measurable evidence subject to specific principles of reasoning. A scientific method consists of the collection of data through observation and experimentation, and the formulation and testing of hypotheses.

WHY WE CONDUCT ACADEMIC RESEARCH?

- ‘Academic research should never be at the behest of market forces,’ Alex Rossiter of UK's University and College Union (UCU) told *Chemistry World*
- ‘The whole beauty of research in the science sector is that you do research to find things out, and you can't always have a preconceived goal beforehand. Our concern is that these new impact indicators will actually achieve the opposite of what they set out to’

16 December 2009

- ‘Research is about skill, dedication, professionalism, and sometime luck - you have to take a punt’. ‘You have to give the best minds the facility to make the discoveries. You have to give them the money and not constrain them all the time.’

Lee Cronin, University of Glasgow

JENIS PENYELIDIKAN
(Types of Research)

- Penyelidikan asas.

  'Kerja ahli sains/penyelidik yang bertujuan untuk memahami rahsia atau tabii alam yang bersifat terkehadapan (*frontier*). Misalnya usaha untuk memahami sifat gen, sifat atom dsb.'
- *Basic/fundamental research.*

  'The works of scientists that aim to understand the natural phenomena; in frontier knowledge. For examples to understand the nature of atom and other elementary particles, cell, genetic etc.

JENIS PENYELIDIKAN
(Types of Research)

- Penyelidikan gunaan.

  'Mengkaji penggunaan penyelidikan asas yang kemudiannya dapat digunakan untuk keperluan tertentu. P&P yang dilakukan termasuklah langkah-langkah yang perlu diambil untuk menghasilkan produk baharu atau proses baharu untuk dikomersialkan'

- *Applied Research.*

  'To study how to apply findings from basic research. The R&D conducted includes the steps to be taken to produce certain products, or new processes to produce products that can be utilized/commercialized.

APAKAH FALSAFAH PENYELIDIKAN?
(What is The Philosophy of Research?)

- Philosophy of Research (Falsafah Penyelidikan) is,

  Love or passion to conduct research or finding things or investigate systematically, intellectually and improving the degree of knowledge on certain phenomena being observed.

  (Suka, gemar dan merasa seronok untuk melakukan penyelidikan, kajian dan penyiasatan secara sistematik, intelek dan meningkatkan darjah pengetahuan tentang fenomena yang dikaji)

QUALITY OF RESEARCH

PENYELIDIKAN BERKUALITI
(Quality of Research)

- Ada wawasan and misi (*has clear objectives, vision & mission*).

➢ Terfokus (*Specific & Focus*).

➢ Dapat diukur kemajuannya (*Measurable*).

➢ Dapat dicapai (*Achievable*)

➢ Realistik (*Realistic*)

➢ Mengambil masa (*Time consuming – be patient*).

PENYELIDIKAN BERKUALITI
(Quality of Research)

- Kenapa kita lakukan penyelidikan?
- Sejauhmana kepentingan penyelidikan yang dilakukan?
- Apakah kita mempunyai potensi untuk melakukannya?
- Sejauhmana penyelidikan tersebut dapat menyelesaikan masalah?
- Sejauhmana penyelidikan tersebut dapat meningkatkan ilmu?

- *Why do I conduct the research?*
- *How important the research to us, to our nation?*
- *Do we have the ability to conduct the research?*
- *How the research can solve our problem?*
- *How the research can enhance our knowledge?*

PENYELIDIKAN BERKUALITI
(Quality of Research)

- Mempunyai perancangan yang rapi (*good strategic planning*).

➢ Kekuatan *(Strengths)*

➢ Kelemahan (*Weaknesses)*

➢ Peluang *(Opportunities)*

➢ Kekangan *(Threats)*

MENDAPATKAN MAKLUMAT
(Getting Information)

- Maklumat apa yang saya perljukan?
- Siapa pembawa maklumat tersebut?
- Sejauhmana maklumat tersebut benar?
- Bagaimana menentukan kesahihan maklumat tersebut?
- Apakah parameter yang boleh mengubah maklumat tersebut?

- *What information I need?*
- *Who give you the information?*
- *Is the information reliable? – can you believe it?*
- *How to determine the authenticity of the information?*
- *What parameters that can change you reading/data/ information?*

PENYELIDIKAN BERKUALITI
(Quality of Research)

- Keterampilan yang mampan (*competencies*).

➢ <u>Intangible</u>

✓Berfikir *(Thinking skill).*

✓Komunikasi (*Communication)*

✓Pengurusan aktiviti *(Time management/managing research activities)*

➢ <u>Tangible</u>

✓Membaca *(Reading)*

✓Melakukan eksperimen *(Conduct experiment)*

✓Mendapatkan maklumat *(Getting information)*

✓dan sebagainya *(Others…..)*

MAKNA MAKLUMAT
(The Meaning of Information)

- Apa makna maklumat yang diperoleh?
- Setiap maklumat tidak semestinya memberikan hanya satu makna?
- Siapa pentafsirnya?
- Apa pandangan sebelum ini?
- Apakah ada pandangan lain?
- Bagaimana lingkungan mempengaruhi pentafsiran maklumat?

- *What is the meaning of the information or data obtained?*
- *Each information does not necessarily give just one meaning?*
- *Who is the interpreter?*
- *What was the view before?*
- *Are there other views?*
- *How the environment affects the interpretation of information?*

PENYELIDIKAN BERKUALITI
(Quality of Research)

- Pemantauan yang rapi
  - Sasaran atau matlamat
  - Status kajian yang dilakukan
  - Kaedah kita melaksanakan penyelidikan
  - Peraturan, tatacara dan prosedur
  - Pengubahsuaian yang perlu dilakukan

- *Monitoring. Look at your,*
  - *Objective or goal.*
  - *Status of your research.*
  - *Methodology of research.*
  - *Regulation, procedure and process.*
  - *Any adjustment that has to be considered.*

KESIMPULAN
(Conclusion)

- Penyelidikan adalah keperluan dalam hidup kita.
- Penyelidikan membantu membangun masyarakat.
- Penyelidikan membangun negara.
- Penyelidikan membangun tamadun.
- Penyelidikan membangun ilmu.
- Hanya dengan penyelidikan manusia dapat memahami makna fenomena alam dan mengambil manfaat darinya.

- *Research is part of our life.*
- *Research helps develop society.*
- *Research contributes toward nation building.*
- *Research contributes toward development of any civilization*
- *Research generates knowledge.*
- *Only with research man can understand the phenomena and get benefit in this world.*

PENYELIDIKAN BERKUALITI
(Quality of Research)

- Etika, adab dan akhlak yang terpuji *(ethics – research ethics).*

  (*akan dibincang kemudian – will be discussed in detail later)*

TERIMA KASIH

(*THANK YOU*)

WASSALAM