Prospects of 5G Utilization in Our Daily Lives

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Presented At

The 1st International Conference on Management and Science (ICoMS20)
UNPAM, Tangerang Selatan, 30 November 2020

What matters to be Presented ?!

A. MIS and AIM ?!

B. 1G to 5G Time Seq. and Data MINING

C. Big Data MINING

D. 5G General Specs and
5G Progress in Some Dev. Countries

E. 5G Tech. Model in Education

F. Conclusions

A. Management Information System (MIS)

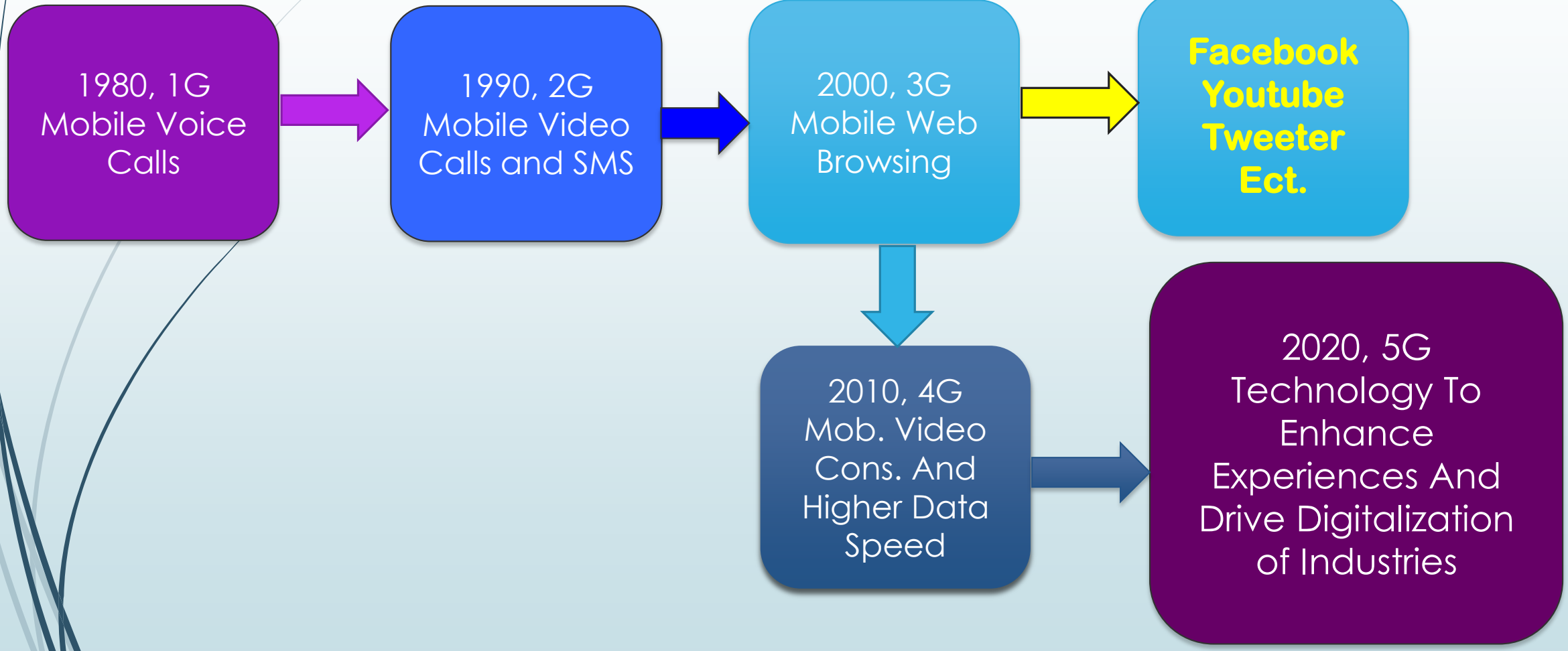
An MIS is a computer system consisting of hardware and software that serves as the backbone of an organization's operations. The MIS gathers data from multiple online systems, analyzes the information, and reports data to aid in management decision-making.

A. AIM of Management Information System (MIS)

To provide information for decision makers on Planning, Organizing, Actuating and Controlling on a sub operation activity at a company and to provide a process of synergy organization.

B. 1G to 5G Time Sequences and DATA MINING

1G to 5G Time Sequences



Humans To Produce Data

Humans produce varieties of data in terms of very big size and quantities (Education)

- Economy
- Business
- Medical
- Sports
- Weather
- Astronomy
- Etc.

Data Growth in the Globe

Astronomy

- Sloan Digital Sky Survey
  - New Mexico, 2000
  - 140TB over 10 years
- Rubin Observatory Survey Telescope
  - Chile, 2020
  - Will acquire 140TB every five days

Kilobyte (**kB**)	10^3
Megabyte (**MB**)	10^6
Gigabyte (**GB**)	10^9
Terabyte (**TB**)	10^{12}
Petabyte (**PB**)	10^{15}
Exabyte (**EB**)	10^{18}
Zettabyte (**ZB**)	10^{21}
Yottabyte (**YB**)	10^{24}

Biology and Medical

- European Bioinformatics Institute (EBI)
  - 20PB of data (genomic data doubles in size each year)
  - A single sequenced human genome can be around 140GB in size

Data Drowning

- Market of Globe **Mobile Phone**
  - 2.9 B smart phone users in 2018
  - 3.5 B users in 2020
- Data quantity in **Web and Social Networks**
  - Google process 100 PB per day using 3M servers
  - Facebook 300 PB users data per day
  - Youtube : to store 1000PB video
  - Etc.

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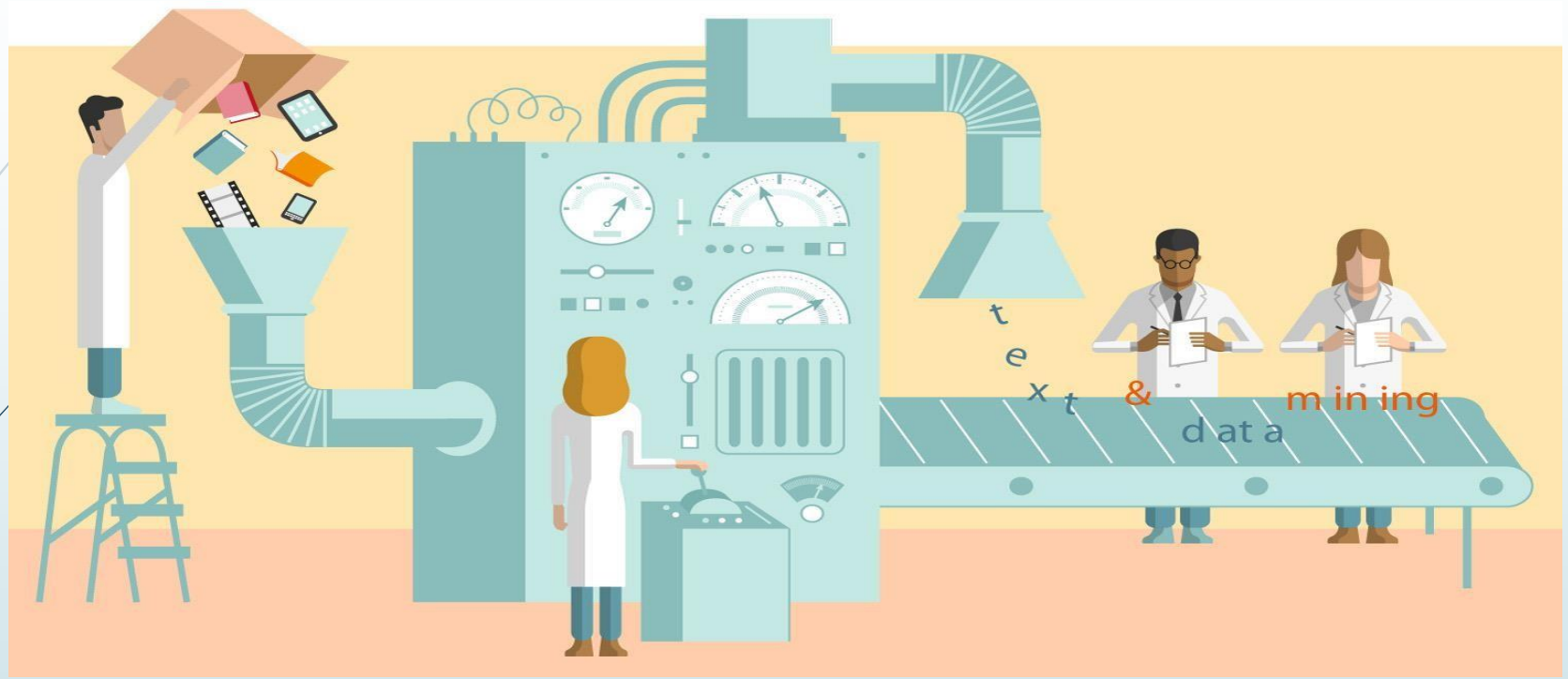
Data Drowning but Poor/Starving of Knowledge

- We are **drowning in data**, but **starving for knowledge**!
  - *(John Naisbett, Megatrends, 1988)*

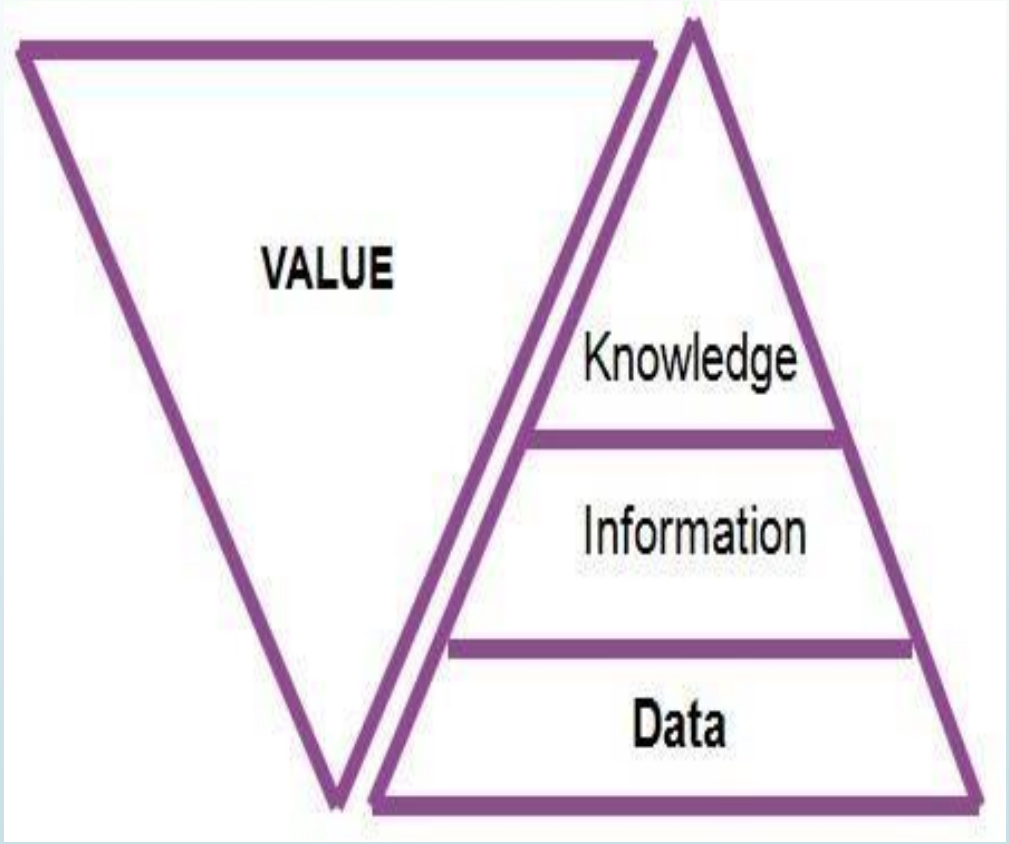
C. Big Data MINING

To Mine Data Into A Knowledge



To Change Data into Knowledge

- By using that knowledge, humans are able to:
  - Estimate and predict what happening in the future.
  - Assist process and policy decision.
  - Etc.



Data at a Certain School

- Thousands students at the Campus taken from the Acad. Inf. System
- Is the Information to be a useful knowledge ? Not at all !
- What the Knowledge Looks Like ? Formula, Path, Rules.

NIM	Gender	Nilai UN	Asal Sekolah	IPS1	IPS2	IPS3	IPS 4	...	Lulus Tepat Waktu
10001	L	28	SMAN 2	3.3	3.6	2.89	2.9		Ya
10002	P	27	SMA DK	4.0	3.2	3.8	3.7		Tidak
10003	P	24	SMAN 1	2.7	3.4	4.0	3.5		Tidak
10004	L	26.4	SMAN 3	3.2	2.7	3.6	3.4		Ya
...									
...									
11000	L	23.4	SMAN 5	3.3	2.8	3.1	3.2		Ya

Graduation Prediction of Students

NIM	Gender	Nilai UN	Asal Sekolah	IPS1	IPS2	IPS3	IPS 4	...	Lulus Tepat Waktu
10001	L	28	SMAN 2	3.3	3.6	2.89	2.9		Ya
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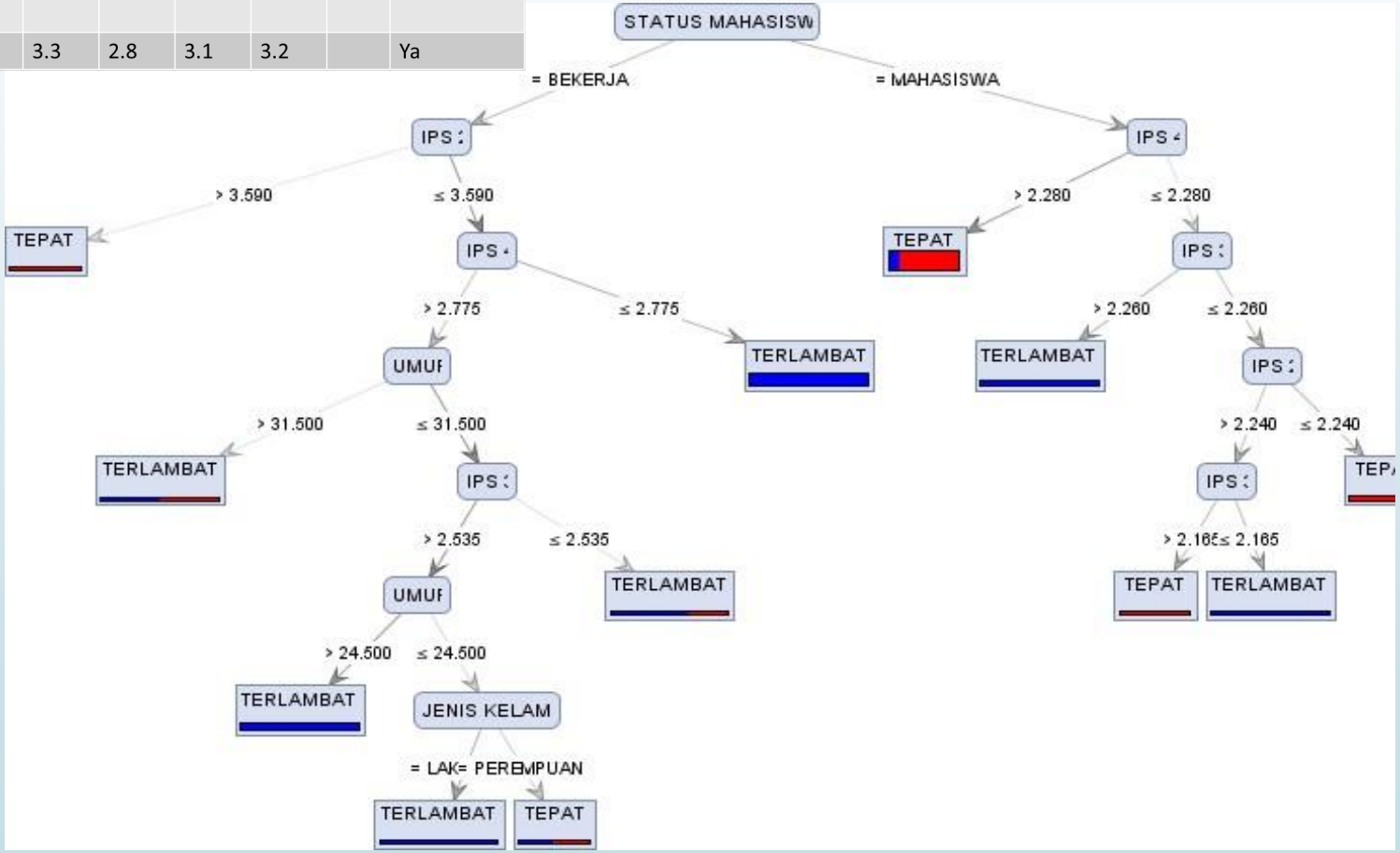


From Stupid Apps to Smart Apps

- Stupid Applications

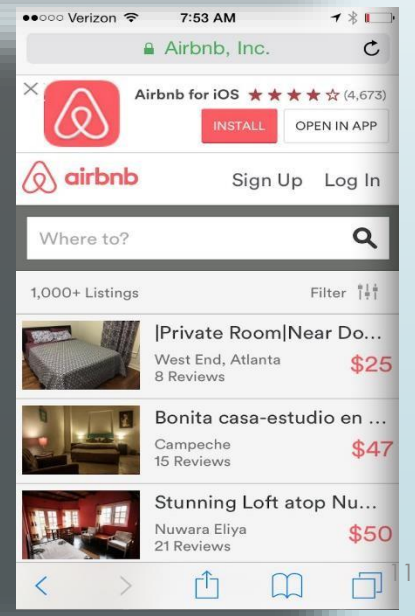
Smart Applications

1. Academic Information System
2. Registration System (Election)
3. Reporting System (Office Wealth)

1. Graduation Prediction System of Students
2. Election results prediction
3. Corruptors prediction system

Knowledge Management Companies

- Gojek – transportation company with no taxies/motor bikes at all,
- Google - world's largest media/advertising company Without Content,
- Alibaba - the most valuable retailer and No Stocks/warehouse at all,
- Airbnb - the world's largest accommodation provider, Without hotels/inns,
- Etc.



D. 5G General Specs and 5G Tech. Progress in Some Dev. Countries

Difference of 4G and 5G Technology

Full Shape	4G	5G
Bandwidth of Data	2 Mbps to 1 Gbps	1Gbps and higher as per request
Band of Frequency	All access convergence containing MC-CDMA, OFDMA, network-LMPS	BDMA and CDMA
Technologies	Technologies Integrated IP, integration seamless of broadband LAN/WAN/PAN and WLAN	4G + technologies of advanced focus on OFDM modulation used in 5G
Multiple Access	CDMA	4G + BDMA

NOTES: *MC-CDMA: Multi Carrier Code Division Multiple Access; BDMA: Beam Division Multiple Access; OFDMA: Orthogonal Frequency Division Multiple Access; LMPS: Link Management Protocol System; W/LAN: Wireless/Local Area network; WAN: Wide Area Network; PAN: Personal Area Network; UHD: Ultra High Definition.*

4G and 5G Differences (Simple Way)

Matter	4G	5G
Frequency	V	100 times faster
Capacity	V	Many-many devices connect to the network
Latency	ms	Virtually zero
Reliability	V	Super fast

The Prospect of 5G Technology (Canada, May 2020)

- Canada's education system needs a transformation, and experts say **5G technology – with its increased speed and reliability – could help make it happen more quickly.**
- **"I think education needs to be disrupted, a little bit of creative destruction," says Ryan McLaughlin,** a senior economist and research analyst at the Information and Communications Technology Council of Canada (ICTC).
- 5G will help power transformative technologies such as artificial intelligence (AI), augmented reality (AR) and virtual reality (VR) that are changing our economy, including how we learn. **The COVID-19 public health crisis has forced educators to set up digital classrooms, exposing some of the shortfalls in today's technology that will be more heavily relied on in the future.**

The Prospect of 5G Technology (Ed Tech Challenge, USA, May 2019)

- 5G takes everything 4G LTE does and makes it better, faster, and more reliable. We'll be able to connect significantly more devices and perform tasks at higher speeds with almost unnoticeable delays.
- Mixed-reality content and video require high bandwidth and low latency to perform optimally. 5G will help and students may tour the human body or visit other planets in VR. With AR, they can explore concepts through touch, pinching and zooming through the Earth's layers as fast as they think it.
- Smart Classroom IoT Saves Teachers Time and Setting up devices and gathering feedback in class takes time, even when everything works perfectly. With the Internet of Things (IoT) on 5G, teachers can automatically log in as soon as they enter the classroom.
- Download Videos in Seconds and Gen Z loves video, and it makes sense when YouTube is also their preferred educational resource. Downloading a high-definition video on 4G can take minutes to an hour. With 5G, downloading a feature-length movie will take seconds, maybe less, according to NBC News.

5G Prospects in Indonesia (Nov. 2019)

- 5G cellular network technology is expected to enter Indonesia in 2022.
- "We'll be able to implement 5G services no later than 2022," said Association of Indonesian Cellular Operators (ATSI) chairman Ririek Adriansyah during a discussion in Jakarta on Wednesday as quoted by news agency Antara.
- Local cellular operators have been conducting 5G network trials since 2017, but most of them are directed at industrial rather than commercial users. Such trials are expected to run until 2020.
- To set up 5G networks in 2022, ATSI aims to hold frequency auctions in 2020.

5G Prospects in Indonesia (Nov. 2019)

For internet users, there were 89.32 M in 2015 and 126.89 M in 2020, almost 50% of the current population 273 M. The 19% internet user growth for the period of 2015-2020 is the fastest in the World. The internet users are predicted to be 139.54 M in 2022.

In Global economy, 5G technology is expected to create approximately $3.6 T in economic output and 22.3 M jobs by 2035 in the global 5G value chain alone. For potential economic digital in Indonesia, the Bank of Indonesia predicted US$ 150 B or 2,064 T Rupiahs in 2025 which met with Mc Kinsey popular research. The 5G also possibly contributes ultimately 9,5% to GDP (Gross Domestic Product) of around 2,874 T Rupiahs in 2030.

5G Utilization in China (August 2020)

- Chinese operators will build 800,000 5G base stations and have more than 200 million 5G subscribers by the end of 2020, Yang Chaobin, president of Huawei's Wireless Network Solutions unit, said during an industry conference on Thursday.
- The executive said that 5G subscribers in China would represent 70% of the global subscriber base by end-2020. China now has 400,000 5G base stations and 100 million 5G users, said Yang.
- They are also actively promoting cross-industry collaboration. By fusing 5G with AI, cloud, and computing, they have launched multiple innovative services, including AR/VR and cloud gaming. Leveraging in-depth integration with vertical industries, including port, mining, and steel manufacturing, actively exploring digital transformation to create value beyond connectivity for enterprises," the executive said.

5G Utilization in Japan (Nov 4, 2020)

- TOKYO -- Two of Japan's major mobile carriers, SoftBank and KDDI, plan to invest a total of $38 billion into fifth-generation wireless networks in Japan over the next decade, Nikkei has learned, as the country looks to play catch-up in deploying the ultrafast technology.
- 5G technology is expected to affect a wide range of industries from internet services to the automotive sector, bolstering Japan's economy as a whole in coming years.
- Two trillion ($19 billion) yen to set up a 5G network that spans 350,000 base stations in 10 years, becoming the first Japanese telecommunications company to reveal a long-term network strategy.
- 50,000 base stations by March 2022 from less than 10,000 currently, on setting up 5G service in densely populated areas. To have 200,000 base stations by around 2025, ensuring constant 5G access for all in the country.

5G- Coalition USA-Japan (July 23, 2020)

- With the Tokyo Olympics postponed because of the covid-19, Japan will delay its high-profile promotion of 5G commercial service this month. But the United States and Japan are still well-positioned for the intensifying race to harness the technology.
- If not for the coronavirus pandemic, the world would be enjoying the Tokyo Olympic Games this week. Japan's telecommunications industry had planned to take advantage of the fanfare to bolster its launch of 5G mobile commercial service, complete with autonomous cars, 3D athlete tracking, and a virtual stadium—plans that have also been shelved for now. Yet the holdup is temporary. While the global pandemic has delayed Japan's 5G rollout, the virus will likely lead to increased demand for 5G over time.
- The coronavirus is spreading amid intensified technological competition between the United States and China, which is creating new opportunities for European, Japanese, and U.S. companies to collaborate.

5G Technology in Singapore (May 7, 2019)

- IMDA (Infocomm Media Development Authority) is facilitating the deployment of the commercial network through the 5G spectrum allocation and regulatory framework, a 5G public consultation was launched on 7 May 2019.
- **Maritime**
  - IMDA has partnered sector leads, Maritime and Port Authority of Singapore ("MPA") and PSA, to identify problem statements and explore the usage of 5G for the maritime sector, such as, the use of drones, autonomous vessels, automated guided vehicles, communication etc.
  - **Industry 4.0**. To accelerate Singapore's Industry 4.0 transformation, A*STAR and Singtel and JTC will deploy 5G at A*STAR's Advanced Remanufacturing and Technology Centre (ARTC) as part of Industry 4.0 efforts.
- 5G Talent Development; IMDA will work with the industry to provide training of frontier 5G tech skills through the Tech Skills Accelerator (TeSA) initiative and 5G Test beds and R&D and ecosystem.

5G Technology in RoK (Aug. 2020)

- South Korea reaches 8.65 million 5G subscribers at end-August 2020 according to data released by the Ministry of Science and ICT.
- The number of 5G subscribers represents an increase of 10.2% compared to the previous month, resulting in the fastest monthly gain since August of last year. Korean operators SK Telecom, KT and LG Uplus launched commercial 5G services in the country in April last year.
- According to the latest available government data, SK Telecom ended August with 3.98 million 5G subscribers, followed by KT, with 2.63 million and LG Uplus, with 2.04 million.
- According to a report by local newspaper *Korea Herald*, a total of 562,656 5G customers have downgraded their mobile plans to 4G. According to the report by Hong Jung-min, a lawmaker who belongs to the Science, ICT, Broadcasting and Communications Committee at the National Assembly, many 5G subscribers have gone back to 4G services because the new network system failed to offer quality connection and coverage.
- In July, Korean mobile operators SK Telecom, KT and LG Uplus agreed to invest a total of KRW 25.7 trillion ($22.2 billion) through 2022 to boost 5G infrastructure across the country. This investment will primarily focus on enhancing 5G quality in Seoul and six other metropolitan cities.

E. 5G-Tech. Model in Education

The Prospect of 5G Technology (Smart Education Concept of Integrated in Huawei Model)

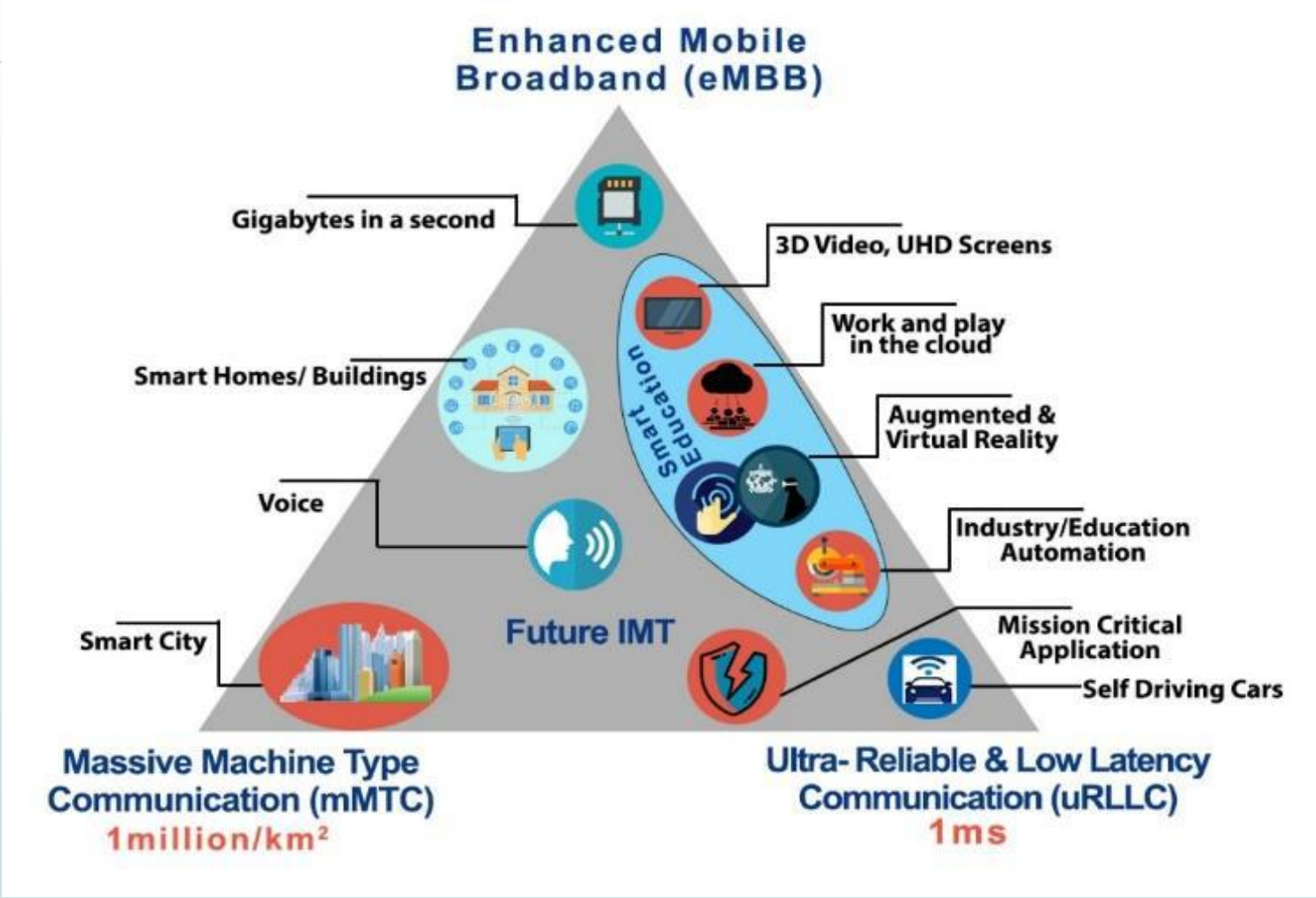


Figure 2. 5G-Huawei model based on IMT-2020

The Advantages of 5G Technology

Table 1. Classification of demand scenarios from educational institutions.

	eMBB	mMTC	uRLLC
Primary and secondary schools Training institutions	Remote interactive teaching Teaching effect AI-embedded evaluation	Teaching effect AI-embedded evaluation	Remote interactive teaching Remote listening and evaluation
Vocational colleges Military colleges	VR/AR teaching	Intelligent campus management	VR/AR teaching
Colleges and universities	Teaching effect AI-embedded evaluation	Intelligent campus management Teaching effect AI -embedded evaluation	—

eMBB= Enhanced Mobile Broad Band; Massive Machine Type Communications (mMTC)
Ultra Reliable and Low Latency Communication (uRLLC)

The Advantages of 5G Technology

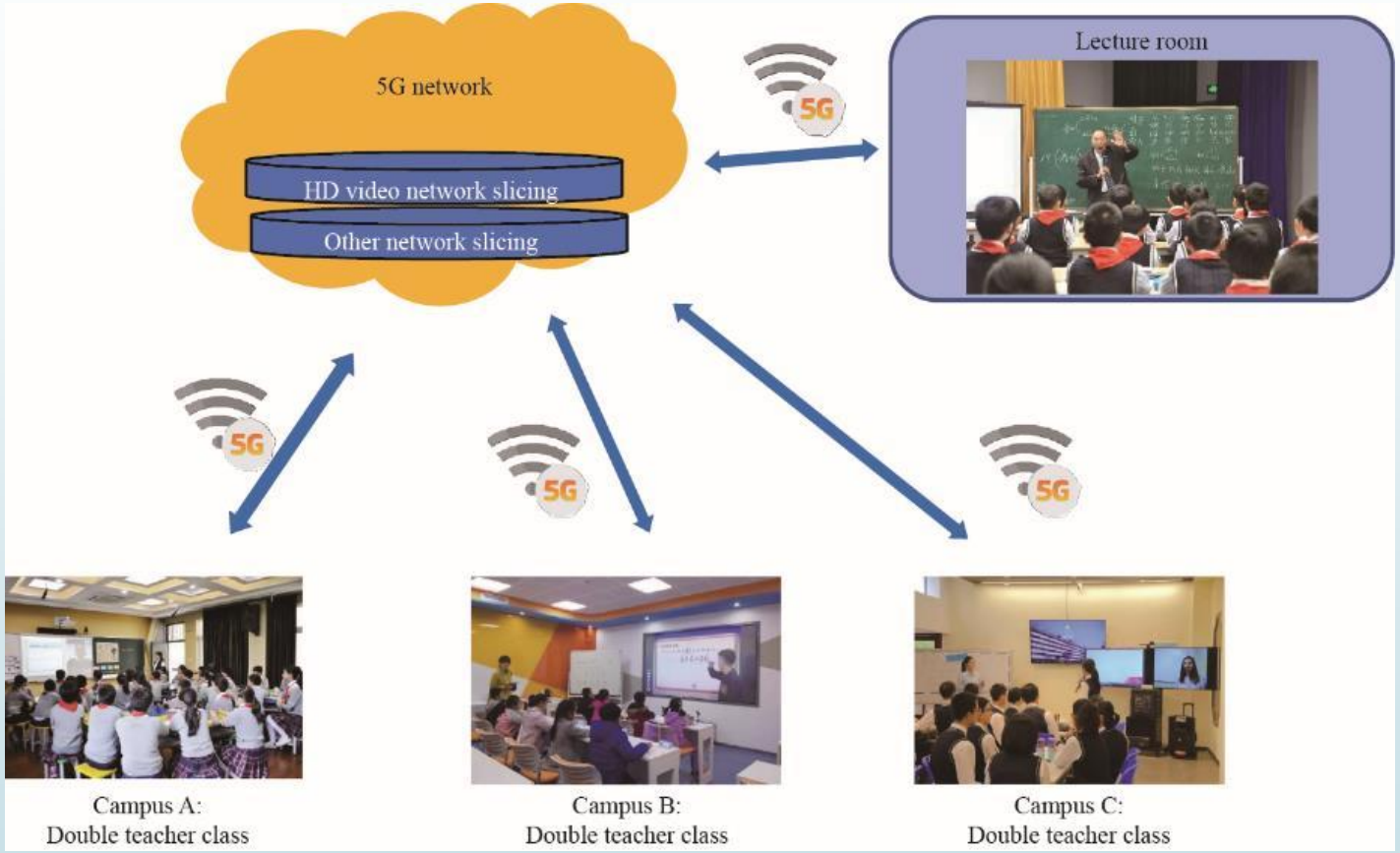


Figure 3. An overview of remote interactive teaching based on a 5G network.

The Advantages of 5G Technology

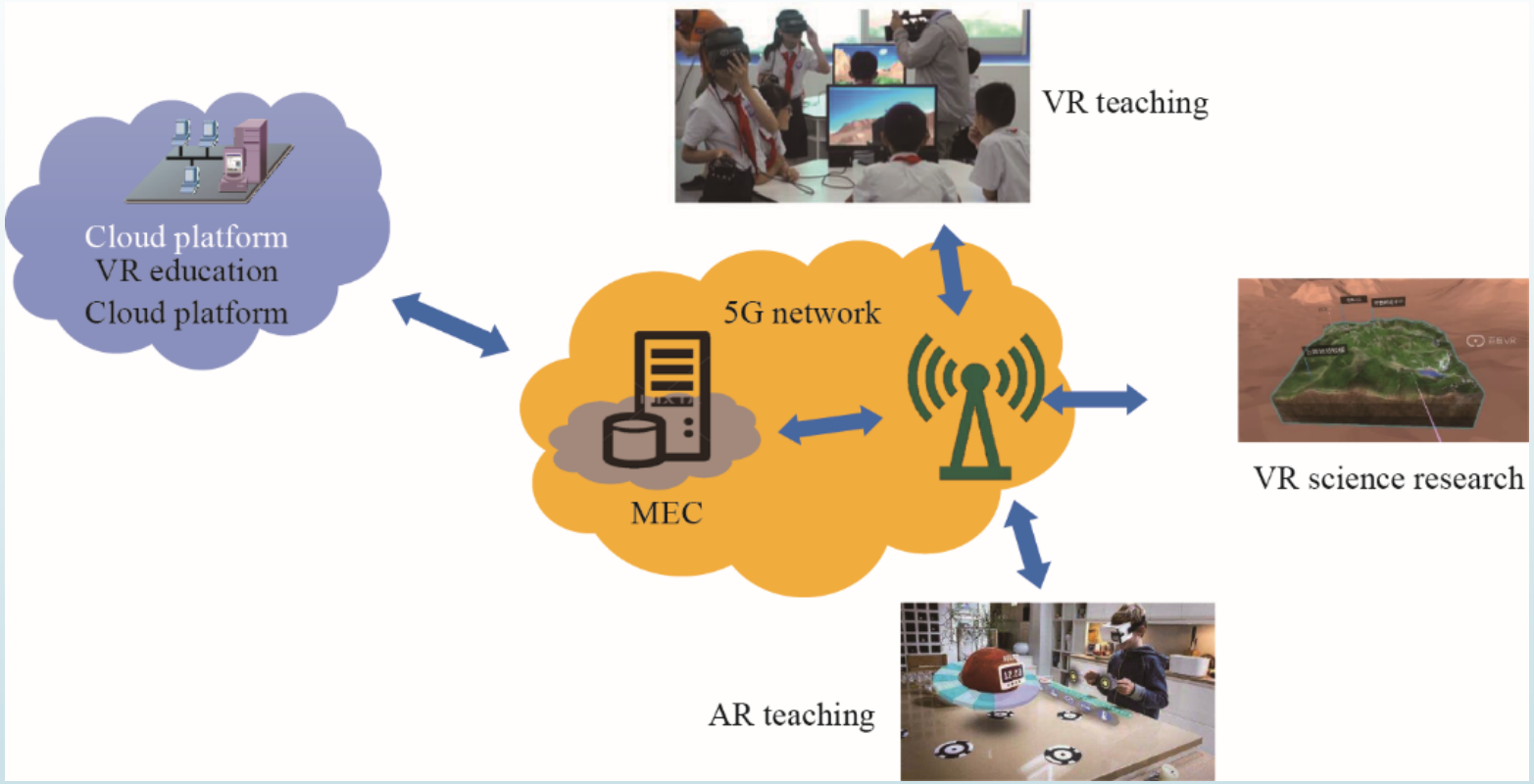


Figure 4. An overview of VR/AR teaching based on the 5G network.

Nuclear Engineering Technology (NET) Very Complicated

1. Nuclear Design of All Things (calculation, simulation and experiments)
2. Licensing is the most important step to be done accurately and fast. A lot of documents are to be soon evaluated and recorded
3. Construction. There are so many progress of the project that should be soon evaluated and recorded (2D and 3D Models)
4. Commissioning and Operation. These two matters should be recorded and reviewed fast and accurately. Otherwise the Reactor can not be licensed to be operated soon.
5. **Indeed, The Role of 5G Technology is A Must for NET.**

F. CONCLUSIONS

1. Like or Dislike, 5G Technology should be accepted for multipurpose utilization in the near future,
2. Developed countries (Canada, China, Japan, RoK, Singapore, US etc.) and Indonesia have made big efforts to implement 5G Tech. on industry and other purposes in the near future,
3. Education is one of the most important matters in our daily lives, so 5G Technology combined with AI for education should be done in five years or very soon.

F. CONCLUSIONS

4. LAST BUT NOT LEAST, 5G-Technology commercial operation needs a lot of finance, so *State Owned Enterprises* (BUMN) and private companies must fully involve in the 5G Software and Hardware arrangement to make sure the 5G to be available in 2022 at the latest. OTHERWISE, ours will be FAR BEHIND theirs (Canada, China, Japan, RoK, Singapore, US etc.).

THANK YOU
TERIMA KASIH

ANY QUESTION?

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