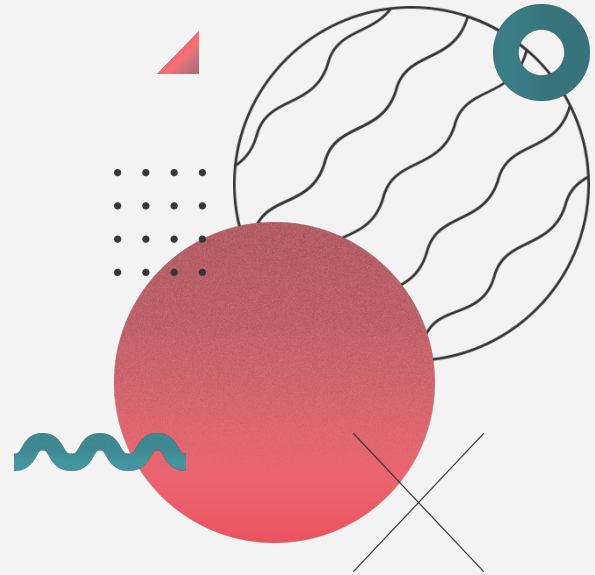


Mendorong *Meaningful Digital Transformation* di Indonesia

Prasetya Dwicahya
COO/Digital Governance
Specialist
Think Policy

SEPTEMBER | 2023



Kerangka Pembahasan

1. Konteks Perkembangan Digital di Indonesia dan Dunia
2. Hal yang Perlu Diantisipasi dalam Konteks Pendidikan
3. Prinsip-prinsip Pengembangan dan Perubahan yang Perlu Dilakukan

Tidak ada penurunan dari pertumbuhan data

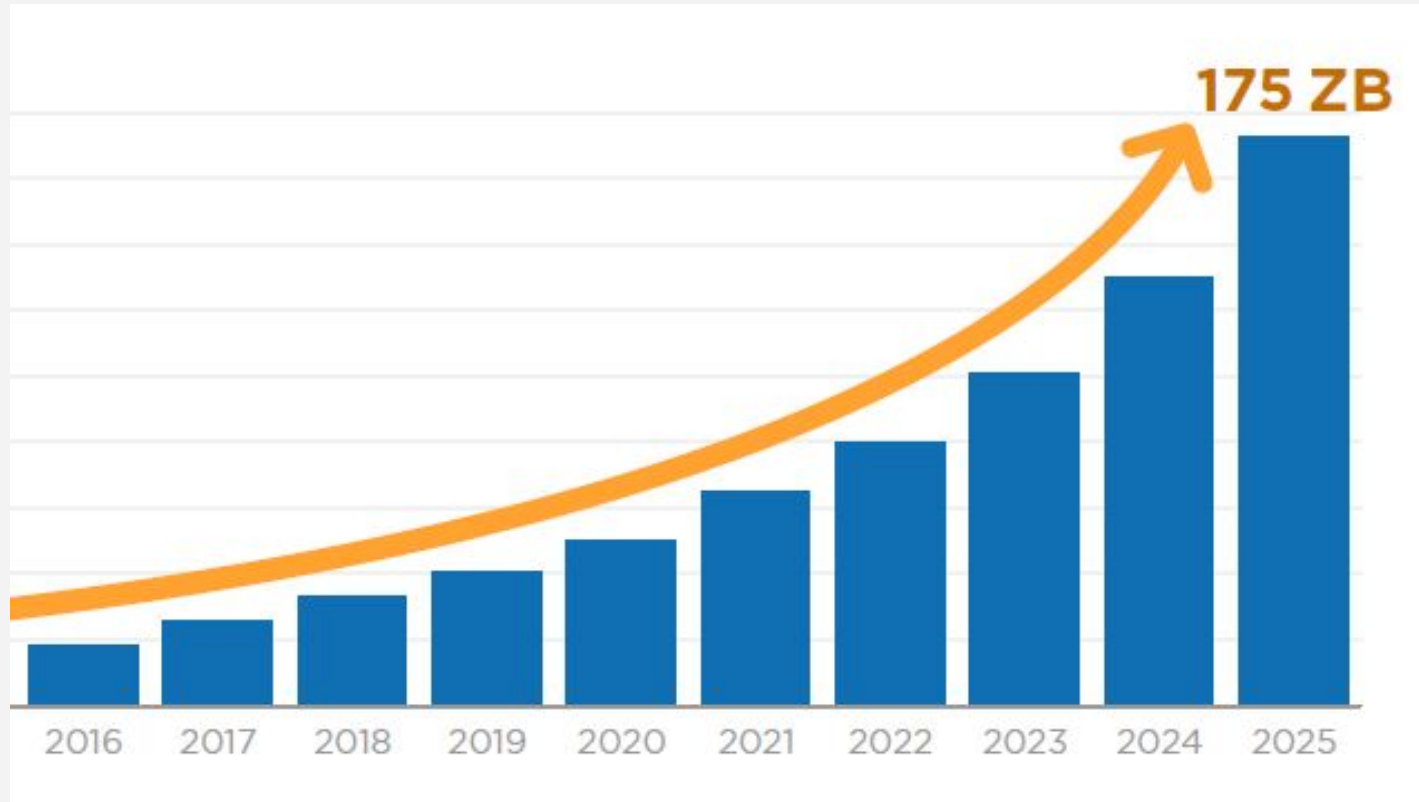


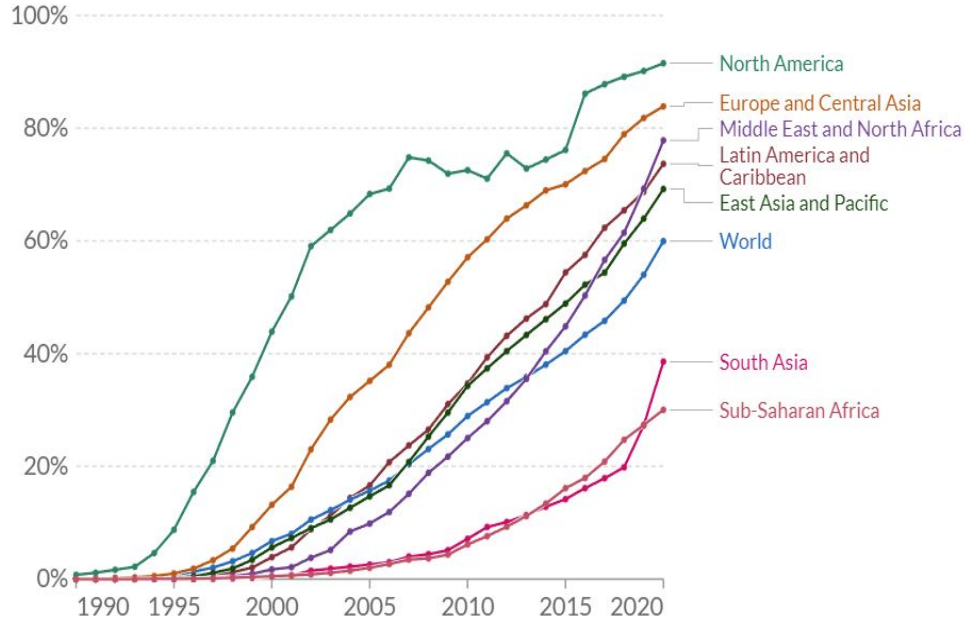
Image source: <https://www.datanami.com/2022/01/11/big-growth-forecasted-for-big-data/>

Share of the population using the Internet

Internet users are those who have used the Internet from any location in the last three months.

Our World
in Data

+ Add country



Source: International Telecommunication Union (via World Bank)

OurWorldInData.org/internet • CC BY

Pertumbuhan data tidak dapat dipisahkan dari pertumbuhan pengguna internet

Secara global, semua semakin memiliki akses atas internet

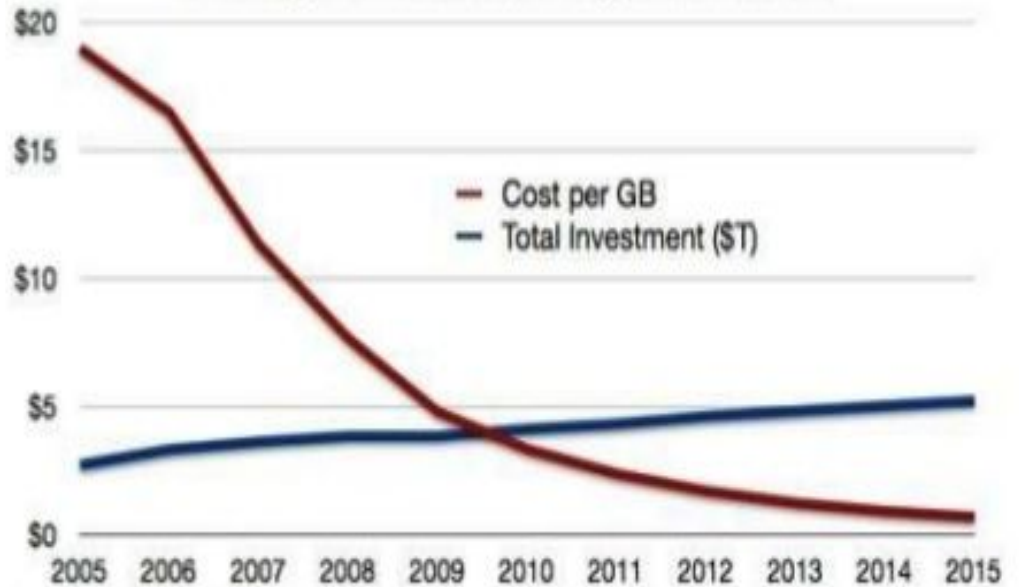
Ada yang tahu berapa jumlah pengguna internet sekarang?

Image source: <https://ourworldindata.org/internet>

Sehingga
sangat
mudah dan
murah
untuk
mengolah
data

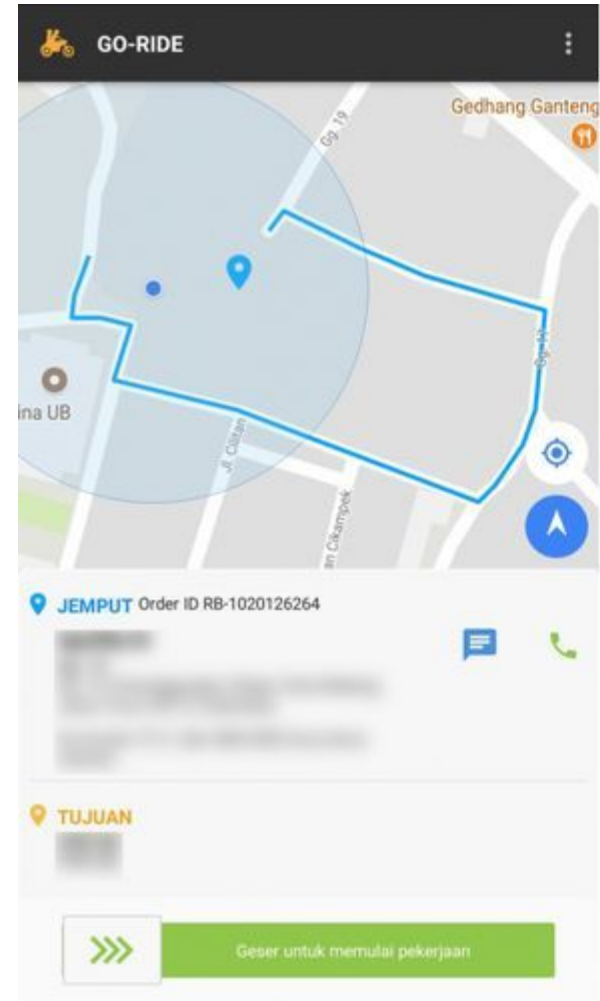
Storage Costs are Declining

The Digital Universe Paradox:
Falling Costs and Rising Investment



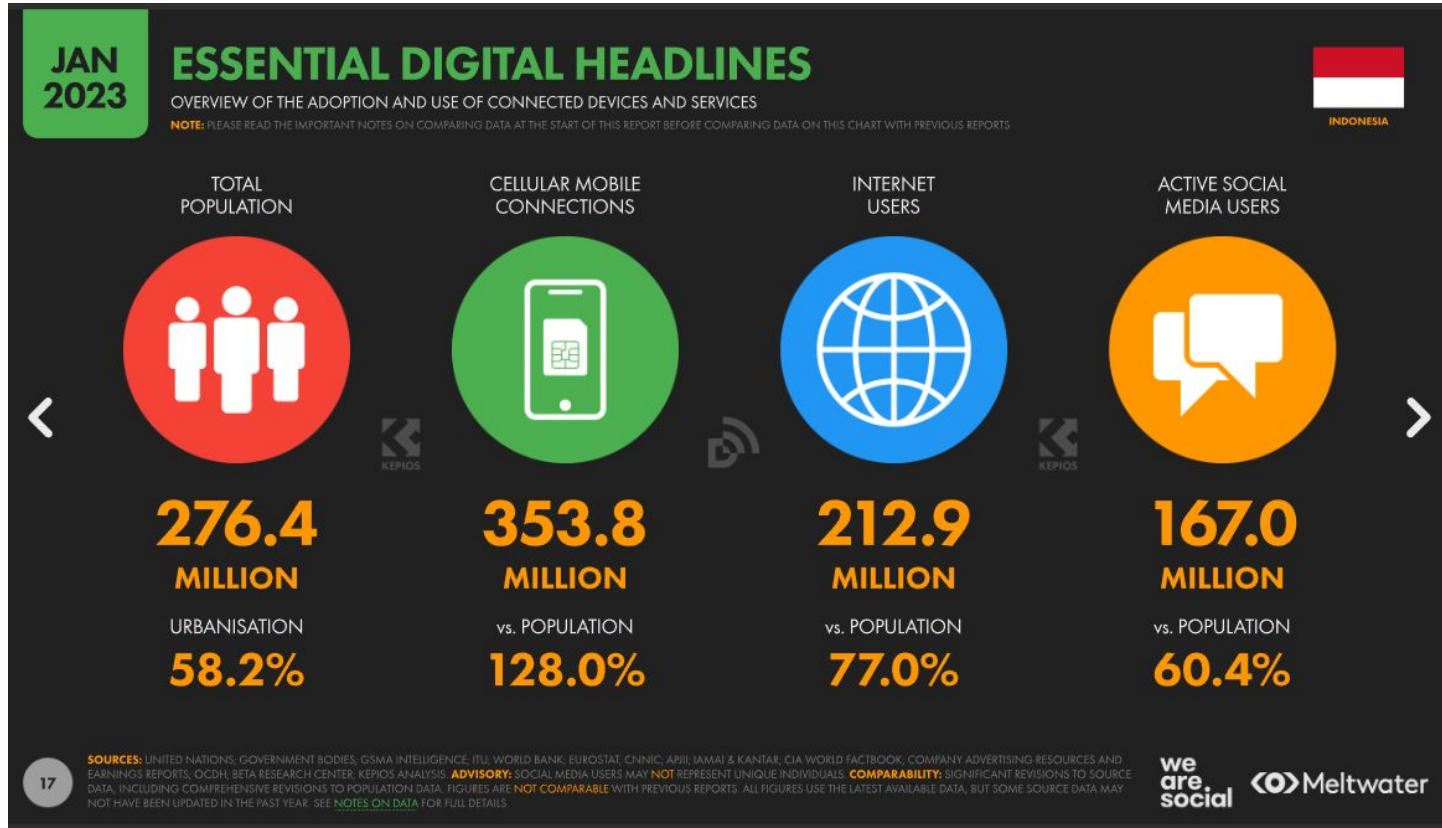
Source: IDC's Digital Universe Study, sponsored by EMC, June 2011

Dan melahirkan berbagai layanan yang tidak kita pikirkan sebelumnya



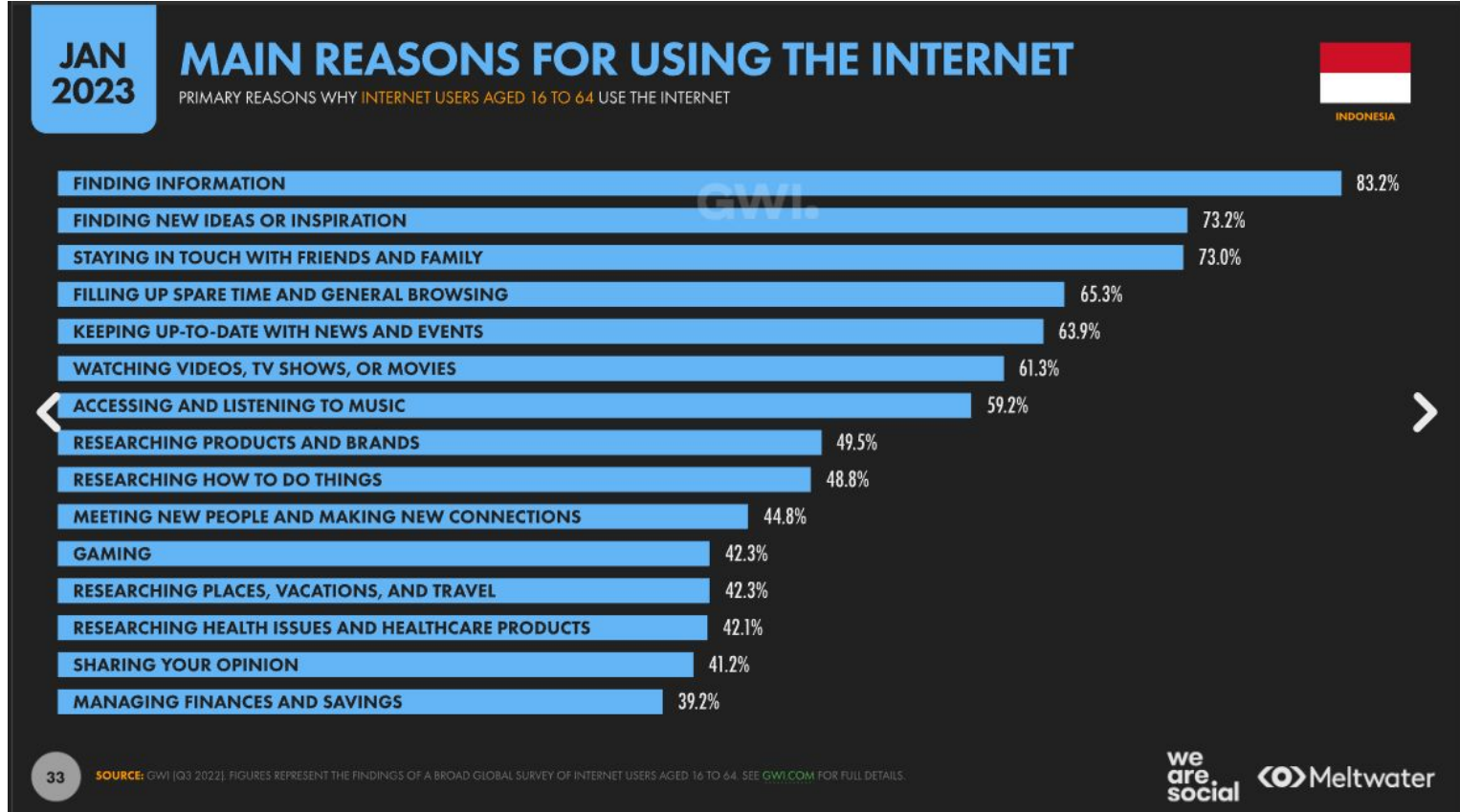
**Kita hidup di dalam *data*
*economy***

Ini adalah Indonesia di ranah digital



<https://datareportal.com/reports/digital-2023-indonesia>

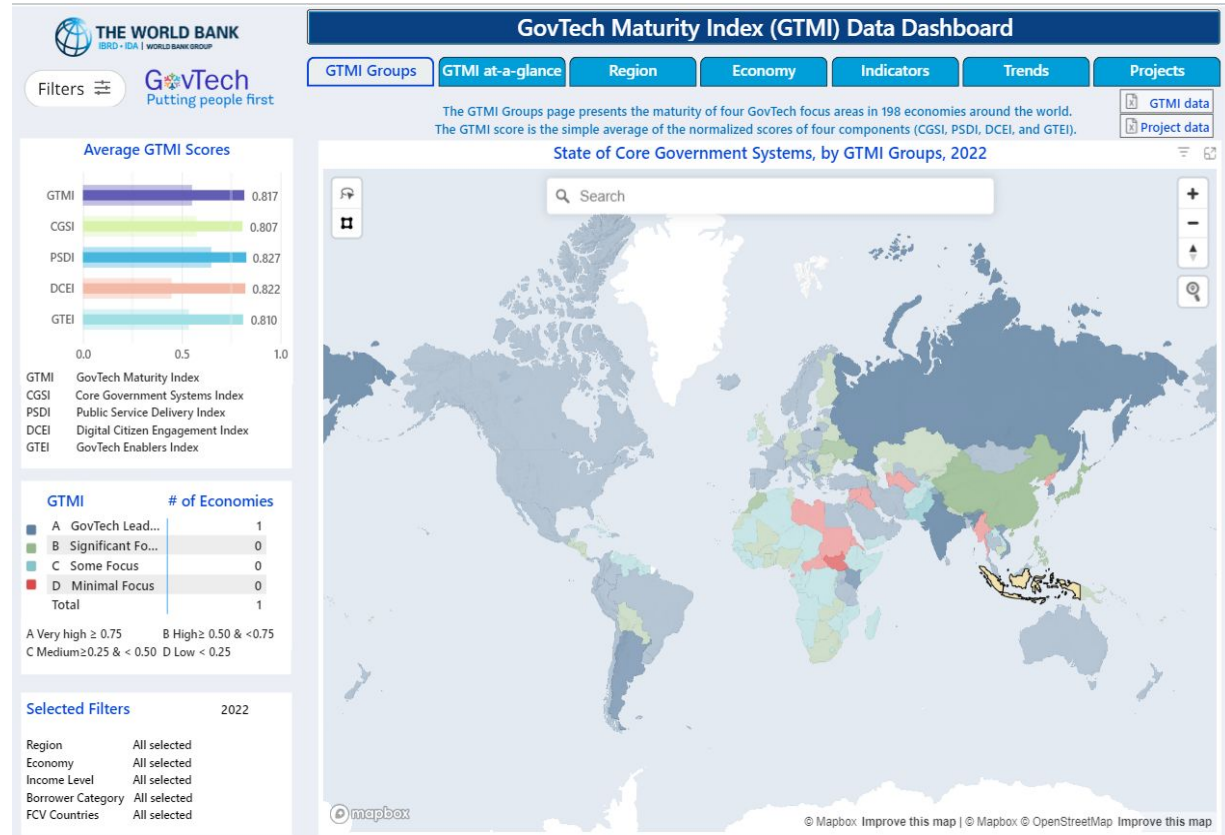
Dan alasan utama kita menggunakan internet



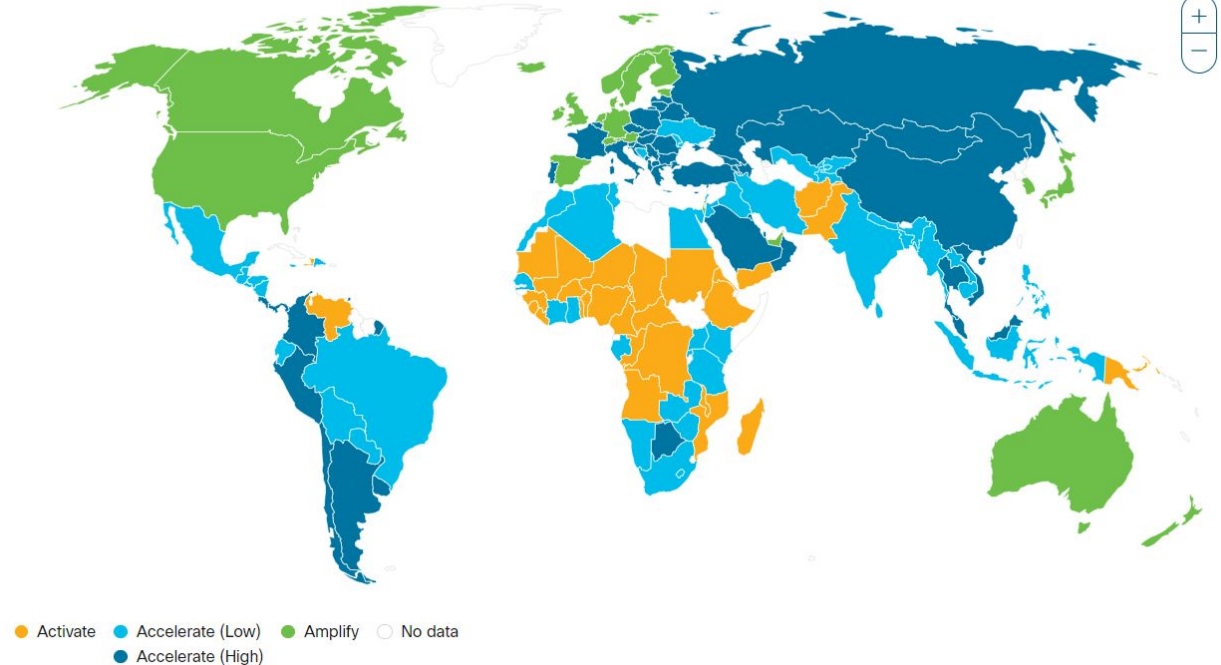
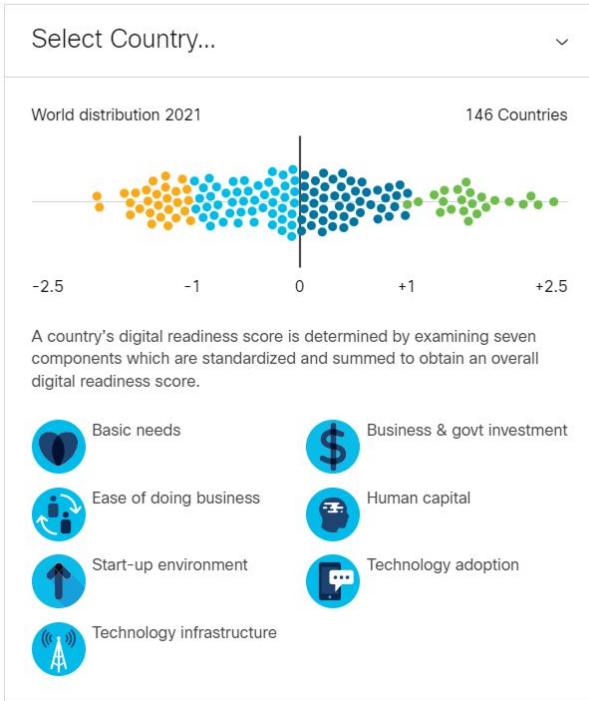
<https://datareportal.com/reports/digital-2023-indonesia>

Dari segi pengelolaan digital terutama di dalam sektor pemerintahan, Indonesia bisa dikatakan terus mengalami peningkatan dibandingkan negara-negara di tingkat ekonomi yang serupa

Pengelolaan digital di pemerintahan tentunya tidak lepas dengan seberapa baik data dikelola di dalam pemerintahan juga karena digital dan data adalah satu kesatuan yang tidak terpisahkan



Dari kesiapan digital, bisa dikatakan Indonesia termasuk yang semakin berbenah diri walaupun masih banyak aspek-aspek struktural lain yang perlu untuk dibenahi



INCREASE IN INTERNET ACCESS AMONG ADULTS (15+)

2011



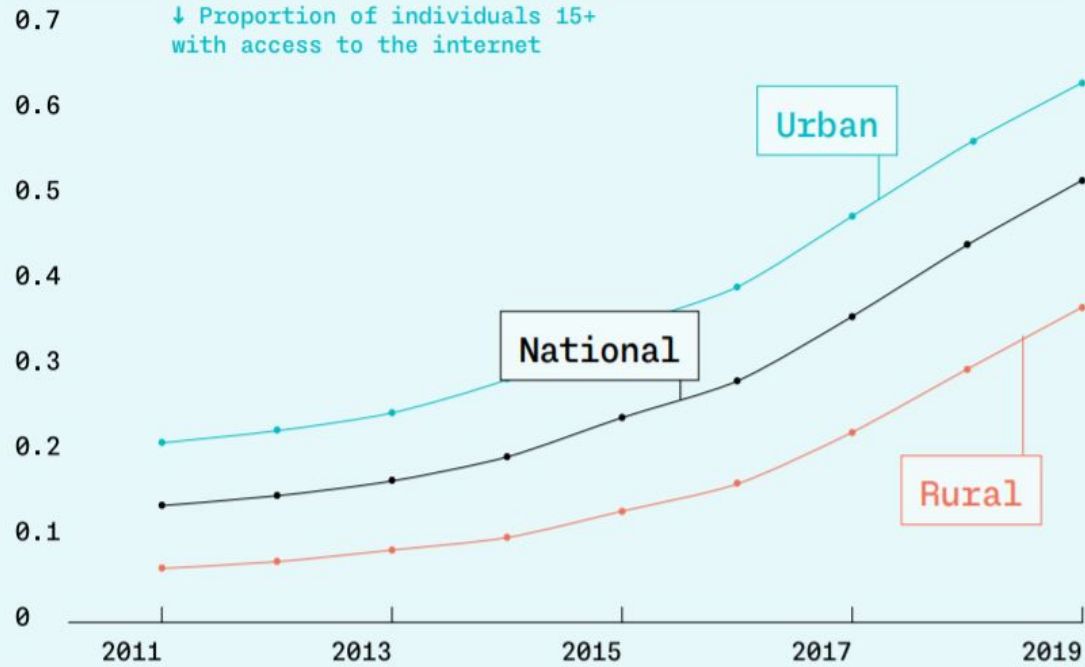
13%

2019

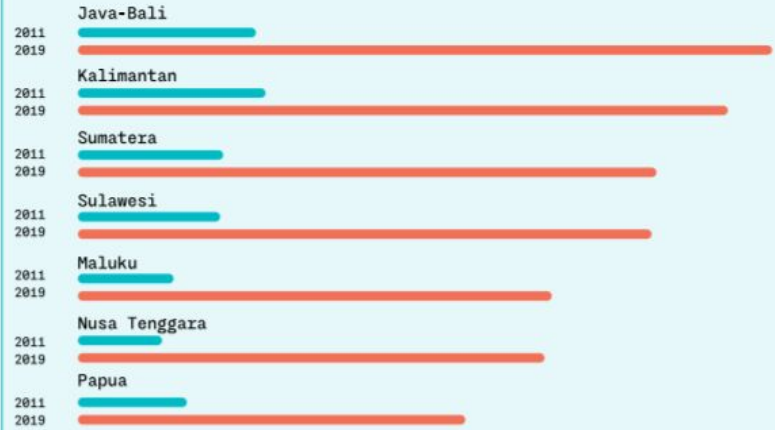


51%

But **many** yet to get on board



↓ Proportion of adults with access to the internet, by island regions in 2011 and 2019



↓ Proportion of adults with access to the internet in 2019, by decile of per capita consumption



Indonesians *who are connected* use the internet quite **intensively**

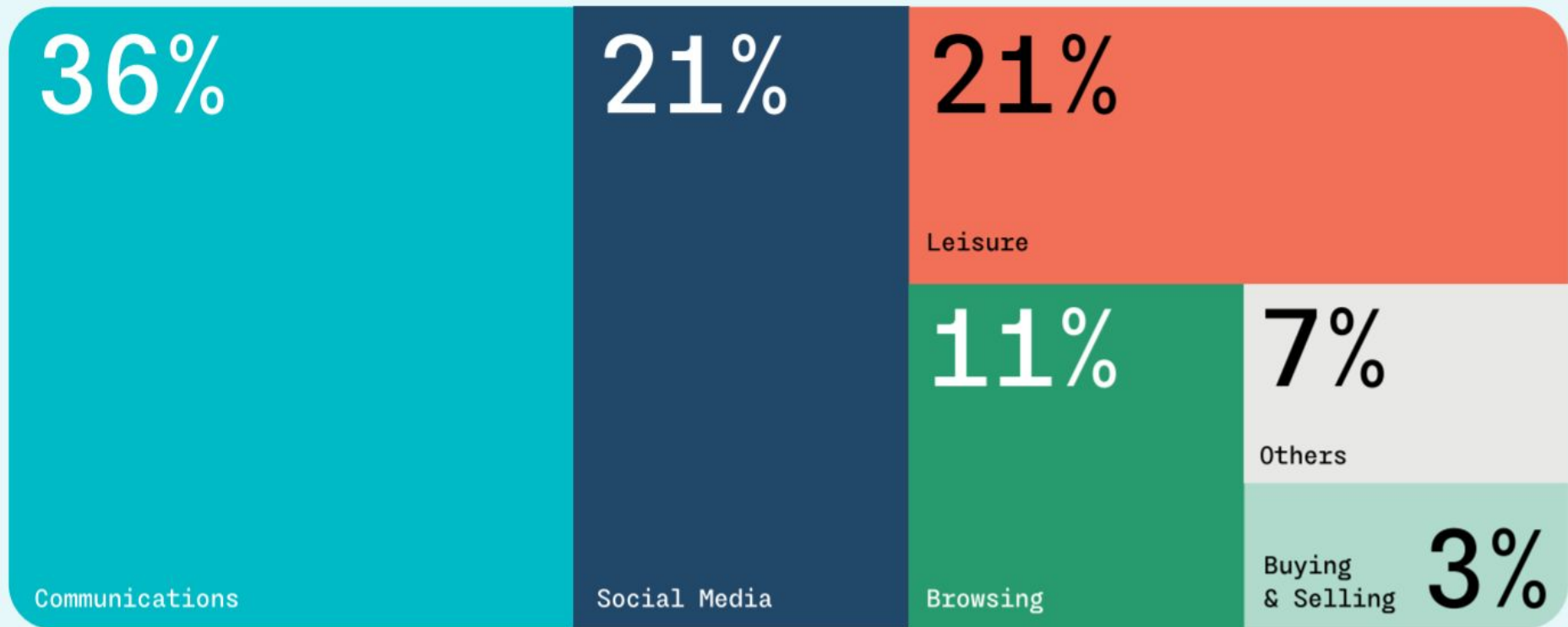


FIGURE 0.2

Some parts of the country are still lagging

PROPORTION OF ADULTS WITH ACCESS TO THE INTERNET, BY ISLAND REGIONS IN 2011 AND 2019

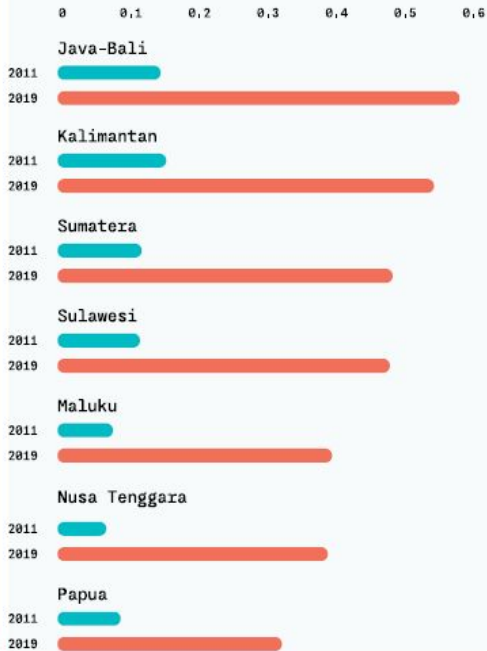
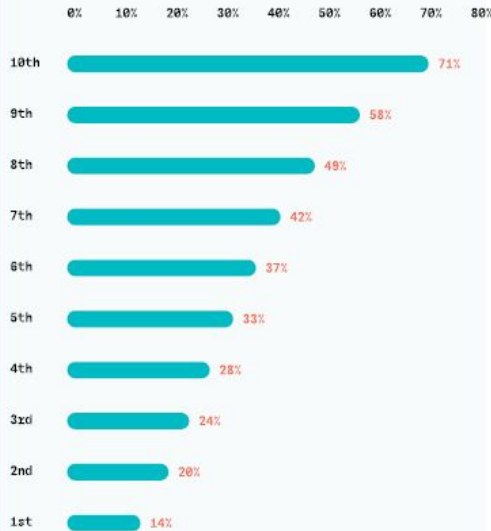


FIGURE 0.3

Richer Indonesians have better access

PROPORTION OF ADULTS WITH ACCESS TO THE INTERNET IN 2019, BY DECILE OF PER CAPITA CONSUMPTION



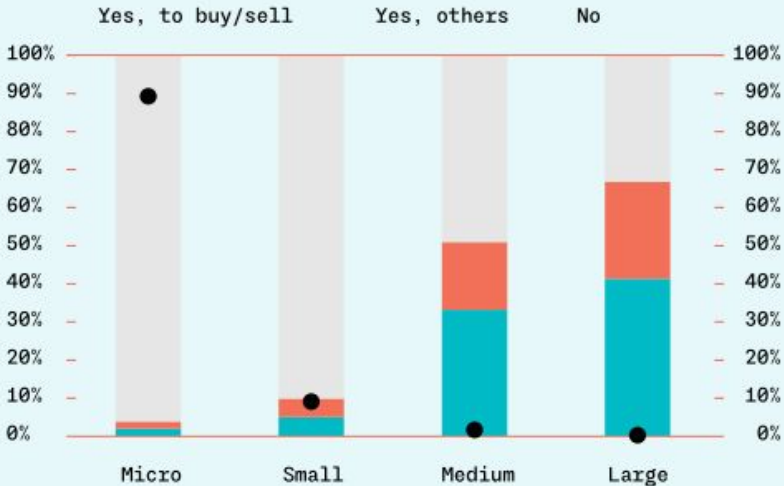
Source: World Bank staff calculations based on various years of Susenas.

Note: Connection to the internet is defined based on whether adults reported having access to the internet in the past three months (including accessing social media apps such as Facebook, YouTube, Instagram, Twitter, and WhatsApp).

Kesetaraan dalam kebermanfaatan adalah sesuatu yang perlu untuk diperjuangkan. Terutama untuk memastikan bahwa kebermanfaatan tersebut bisa tersebar di daerah-daerah lain

Dan jika tidak dikelola dengan baik, justru akan memperparah ketimpangan yang ada

↓ LEFT AXIS SHARE OF NON-AGRICULTURAL ENTERPRISES THAT USE THE INTERNET, BY SIZE
↓ RIGHT AXIS THE SHARE OF ENTERPRISES OUT OF TOTAL NUMBER OF ENTERPRISES (DOT)



Source: Economic Census 2016, WB staff calculations

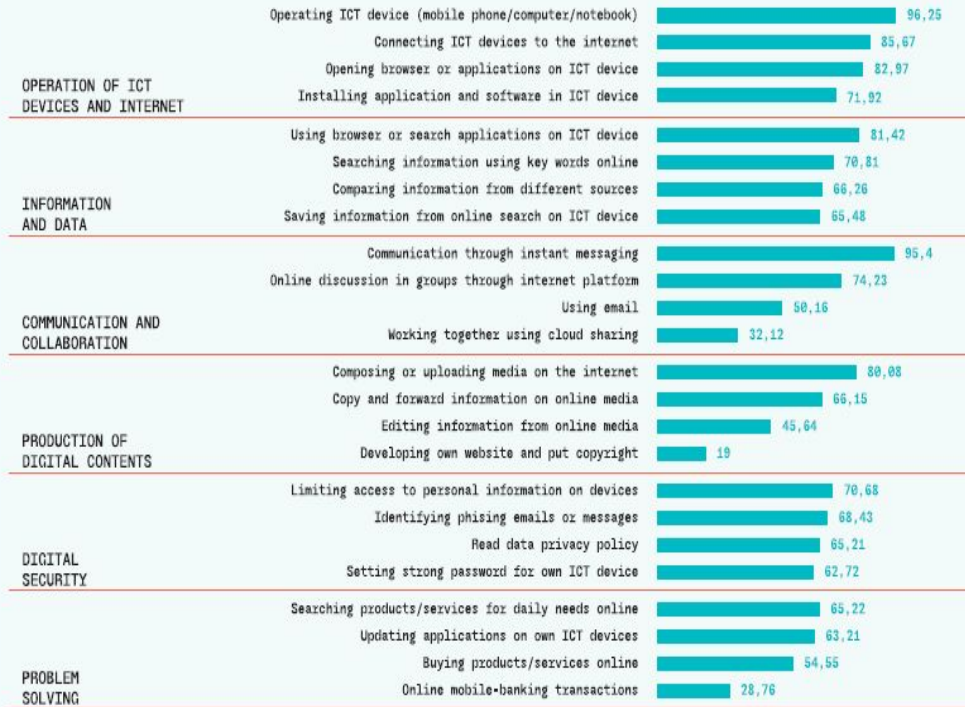
↓ Share of households with enterprises who use the internet for their business operations, by income status



Source: WB Digital Economy Household Survey, 2020

FIGURE 2.18

Core digital skills among internet-using adults in Indonesia



Source: World Bank Digital Economy Household Survey, 2020

Dan dari banyak semua pengguna internet, tidak semuanya memiliki keterampilan dalam membangun/memfaatkan secara lebih dalam

Perubahan Iklim adalah Contoh Isu dengan Konsekuensi Besar yang Menyentuh Semua Sektor

Dampak Krisis Iklim terhadap Kesehatan Masyarakat

☠️ **Dampak krisis iklim**
Kesulitan memenuhi kebutuhan hidup karena polusi, kekeringan, dan lemahnya ketahanan pangan.
📉 **Populasi dunia terdampak**
13 juta orang per tahun.



☠️ **Dampak krisis iklim**
Kematian karena malnutrisi, malaria, diare, dan suhu panas.
📉 **Populasi dunia terdampak**
250.000 orang per tahun.



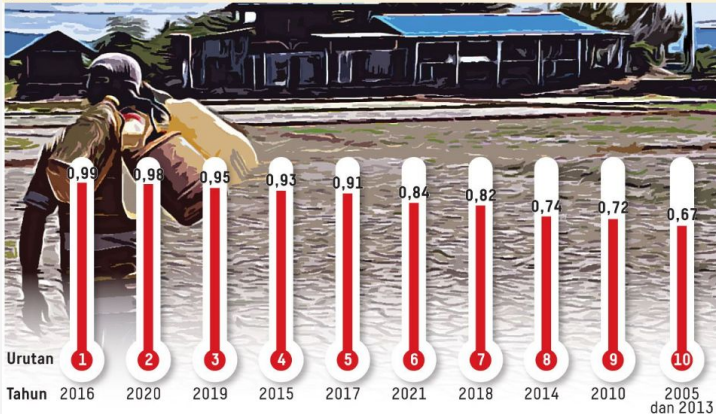
☠️ **Dampak krisis iklim**
Proporsi penduduk yang hidup di lingkungan udara tercemar.
📉 **Populasi dunia terdampak**
Lebih dari 90 persen populasi global.



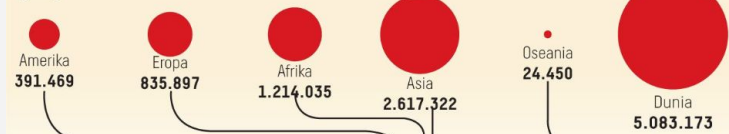
☠️ **Dampak krisis iklim**
Kematian prematur karena minimnya akses makanan dan tidak meratanya distribusi makanan.
📉 **Populasi dunia terdampak**
11 juta orang per tahun.



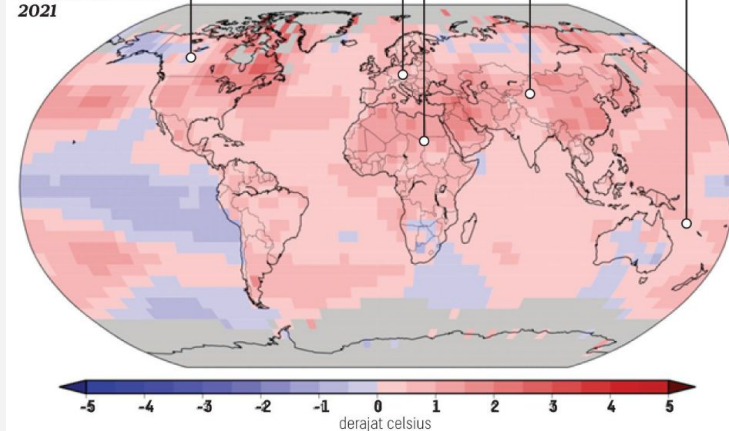
Tahun Terpanas Sepanjang Periode 1880-2021 (derajat celsius)



Estimasi Kematian Karena Gelombang Panas dan Beku 2000-2019 (jiwa)



Suhu Rata-rata Permukaan Bumi 2021



Sumber: WHO, NOAA, dan jurnal *Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study* (2021); Diolah Litbang Kompas/YOS



FOTO: KOMPAS/ RONY ARIYANTO NUGROHO; INFOGRAFIK: ISMAWADI

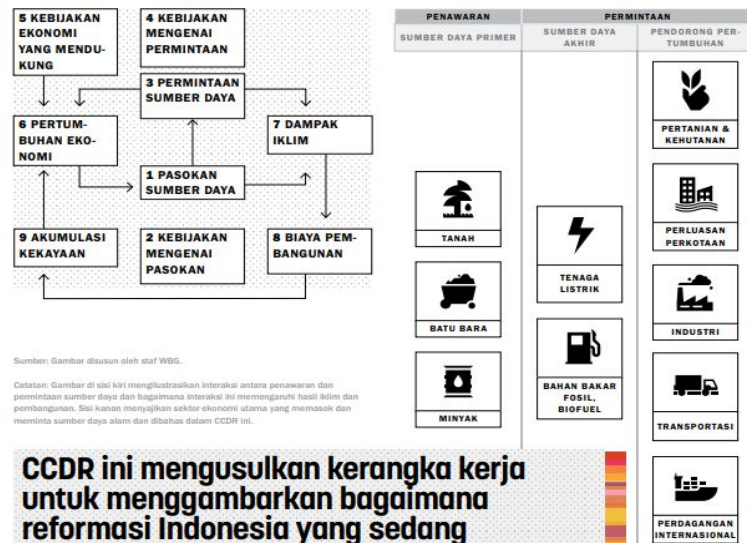
Keterkaitan antara Satu Sektor dan Sektor Lain dalam Penanganan Perubahan Iklim Menjadi Penanda Bahwa Isu ini bukan Hanya Isu Lingkungan Hidup

Laporan Bank Dunia terkait Iklim dan Pembangunan di Indonesia menunjukkan bahwa perlu ada keseimbangan dari sisi permintaan dan penawaran dari pertumbuhan

Kedua sisi tersebut saling bersinggungan dari beragam sektor dan membutuhkan kesinambungan dan koordinasi yang intensif agar *climate-resilient society* bisa semakin terwujud

GAMBAR 3

Mengurangi Pasokan dan Permintaan Sumber Daya Intensif Karbon Melalui Reformasi Sektor dan Reformasi Kebijakan Pemberdayaan dan Kelembagaan



Sumber: Gambar disusun oleh staf WBG.

Catatan: Gambar di sisi kiri mengilustrasikan interaksi antara penawaran dan permintaan sumber daya dan bagaimana interaksi ini memengaruhi hasil iklim dan pembangunan. Sisi kanan menyajikan sektor ekonomi utama yang memasok dan meminta sumber daya alam dan dibahas dalam CCDR ini.

“ CCDR ini mengusulkan kerangka kerja untuk menggambarkan bagaimana reformasi Indonesia yang sedang berlangsung dan di masa depan dapat mendukung transisi yang adil dan terjangkau melalui dinamika iklim dan pembangunan yang positif”

Begitu pula dengan isu transisi digital seperti kecerdasan buatan. Akan ada banyak pergeseran yang harus diantisipasi di segala lini



Potensi Ekonomi Kecerdasan Buatan di Indonesia (2030)



PDB Indonesia berpotensi **meningkat hingga 12 persen atau 366 miliar dollar AS**



Sejumlah **23 juta pekerjaan** dapat digantikan oleh **otomatisasi**. Namun, terdapat **27 juta hingga 46 juta pekerjaan baru**.



Peningkatan tenaga kerja ada pada sektor kesehatan, konstruksi, manufaktur, dan ritel.



Banyaknya peluang pekerjaan di Indonesia tersebut **membutuhkan banyak tenaga ahli** dari perguruan tinggi dan gelar lanjutan.

Sumber: *Sizing the Prize* (PwC), *Automation and the Future of Work in Indonesia* (McKinsey), dan *Racing Towards The Future* (EDBI); Diolah Litbang Kompas/WRD



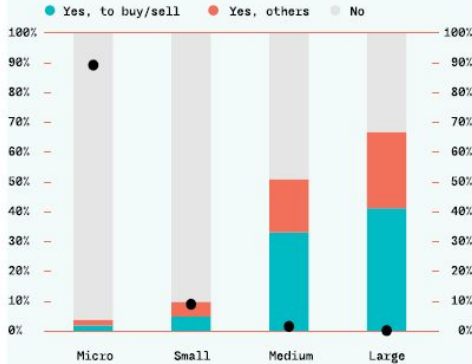
Dan Ketimpangan Digital yang Perlu untuk Diatasi Agar Semua Lini dapat Manfaat dari Digitalisasi

FIGURE 0.13

Internet use by non-agricultural enterprises is still very low, with much higher incidence among medium and large enterprises

LEFT AXIS SHARE OF NON-AGRICULTURAL ENTERPRISES THAT USE THE INTERNET, BY SIZE

RIGHT AXIS THE SHARE OF ENTERPRISES OUT OF TOTAL NUMBER OF ENTERPRISES (DOT)

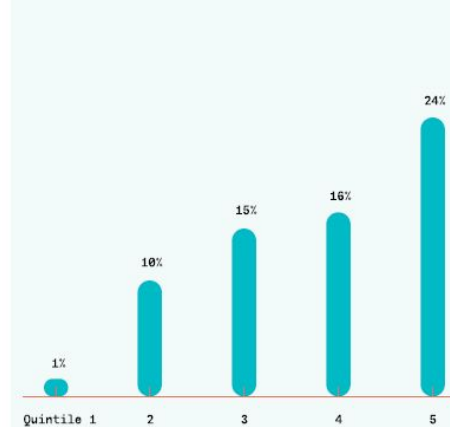


Source: Economic Census 2016, WB staff calculations.

FIGURE 0.14

Internet adoption is far higher among richer household enterprises

SHARE OF HOUSEHOLDS WITH ENTERPRISES WHO USE THE INTERNET FOR THEIR BUSINESS OPERATIONS, BY INCOME STATUS



Source: DEHS 2020, WB staff calculations.

TABLE 0.1

Greater internet access is benefiting higher-skilled workers more than the lower skilled ones

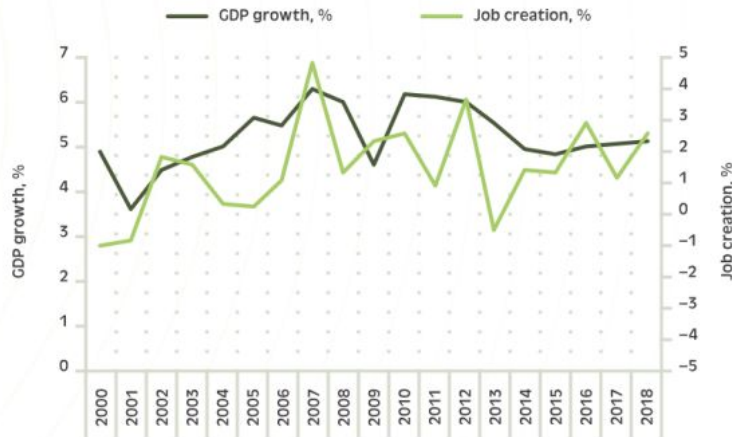
	RETURN TO EDUCATION W.R.T. <6 YEARS OF SCHOOLING	ADDITIONAL AVERAGE RETURN OF 1 PERCENTAGE POINT INCREASE IN INTERNET PENETRATION
PRIMARY SCHOOL	18.50%	0.00%
LOWER SECONDARY SCHOOL	32.80%	0.10%
HIGHER SECONDARY SCHOOL	49.70%	0.30%
COLLEGE/UNIVERSITY DEGREE OR HIGHER	79.40%	0.60%
NON-PRODUCTION WORKERS (RELATIVE TO PRODUCTION WORKERS) IN MANUFACTURING	12.70%	0.20%

Source: Jacoby et al. forthcoming.

Note: Reported marginal returns to internet are coefficients on the interactions between education levels of individual workers and average internet connectivity within a district in fixed-effect panel data models that also control for all relevant individual characteristics, level of urbanization and economic development of the districts, as well as year effects to capture secular trends in returns to skills. A separate specification is used for the non-production worker result. The analysis uses data from Sakeznas (Indonesia Labor Force Survey) (1990-2019), Susenas (Indonesia Socioeconomic Survey) (1990-2019) and the Medium and Large Manufacturing Survey (1995-2015). The unit of the analysis is individual worker (production/non-production worker by sector-district in the case of the Manufacturing Survey)

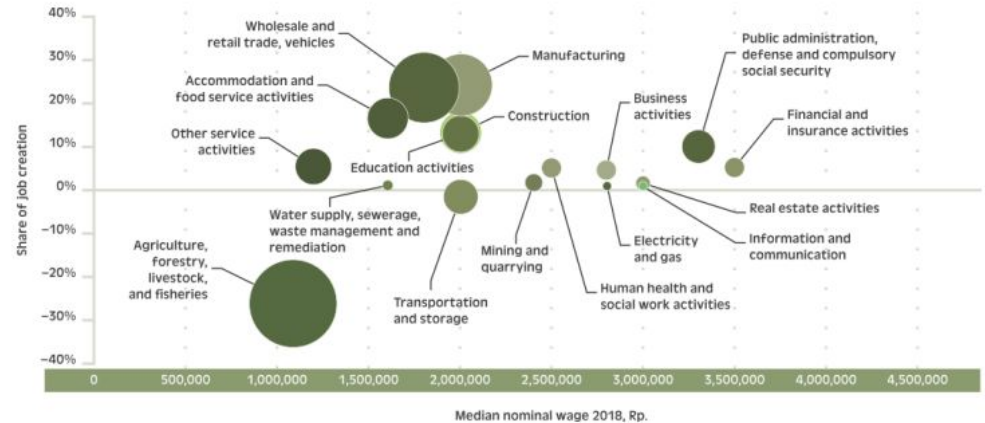
Hal-Hal Tersebut Berpengaruh ke Isu Lapangan Pekerjaan dan Bagaimana Indonesia Bertransformasi di Masa Akan Datang

Respectable growth and job creation rates, 2000-2018
Percent, per annum



Source: Sakernas 2000-2018 (August Round), National Accounts and WDI

Despite the robust job creation, half of jobs created since 2008 have accrued to low-end, low-wage services
Median real wage 2018, share of job creation 2008-2018, share of employment 2018 (bubble size)

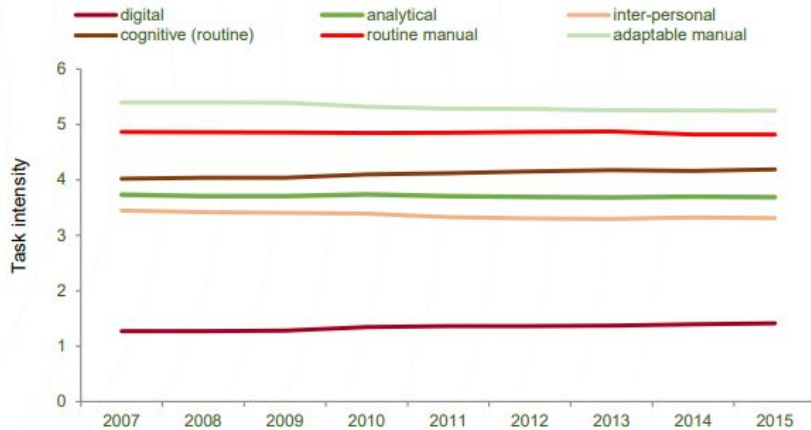


Source: Sakernas 2008-2018, WB staff calculation

Termasuk Keterampilan dan Tipe Pekerjaan Apa yang Akan Muncul untuk Membawa Kesejahteraan

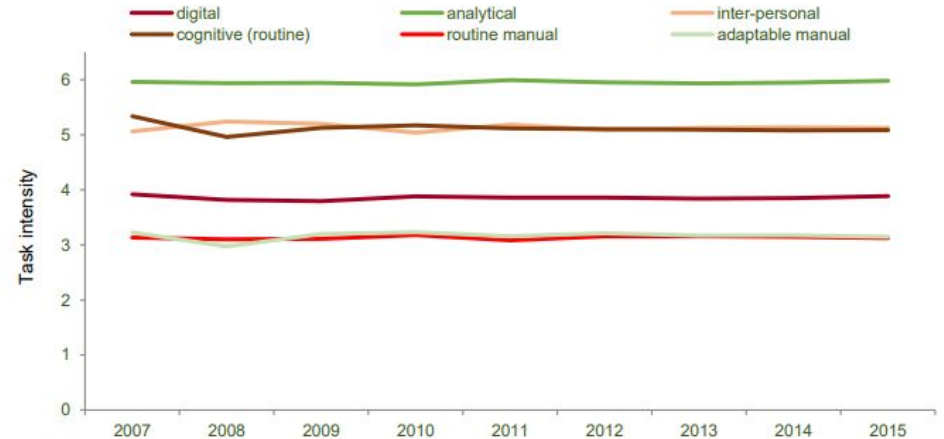
Non-middle-class occupations require manual skills

Task intensity of non-middle-class occupations, 2007-2015



Middle-class occupations require analytical, cognitive, interpersonal and digital skills

Task intensity of middle-class occupations, 2007-2015



Sakernas 2007-2015 and O*Net task content of occupation, WB staff calculation. Notes: The task intensity score is estimated for each occupation and then aggregated across sample of middle-class occupations to generate a score for each task intensity type for each year. The sample of "middle-class jobs" is defined in 2015 and the same set of occupations is used for each sample year.

**Apa yang Perlu Kita
Lakukan?**

Beberapa Penggunaan Teknologi Digital dalam Pendidikan

Table 1. Digital technologies applications in education.

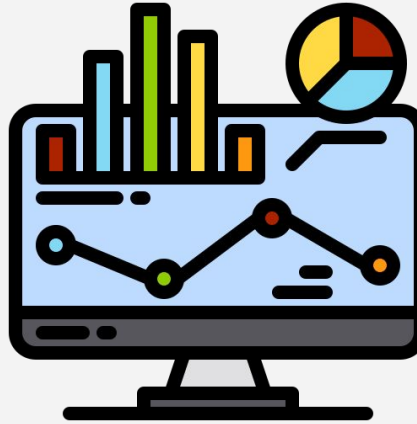
S. No	Applications	Description	References
1.	Improve teaching productivity	Teaching productivity may be improved by using advanced technological aids, which facilitate better planning, easy and practical learning, quick assessment, better resources, new skills, etc.	[58], [59], [60], [61], [62]
2.	Develop Online libraries	Technological advancements have helped create and develop online libraries, which have removed the physical space requirement and facilitated interaction among students, teachers, and researchers from across the globe. Online forums have brought subject specialists to discuss specific topics and evaluate the curriculum, teaching pedagogy, and assessment methods.	[63], [64], [65], [66]

- Promote Distance learning
In reality, technological advancement has boosted distance learning education. It provides easy access to all learning resources and allows the facility to interact with the instructor conveniently. Teachers may quickly build and manage groups using learning tools and technology such as social learning platforms. [67], [68], [69], [70], [71]
- Facilitate Teaching of students with exceptional needs
It is encouraging to see how much assistive technology is available to help students with physical or learning disabilities absorb concepts quickly and actively participate in their classes. Speech recognition, screen-reading tools, Braille displays, and text-to-speech solutions are among the revolutionary technologies for the visually impaired; for the hearing impaired, closed-captioning applications, sound amplifiers, and video conferencing technologies facilitate sign language and lip-reading. [72], [73], [74], [75], [76]

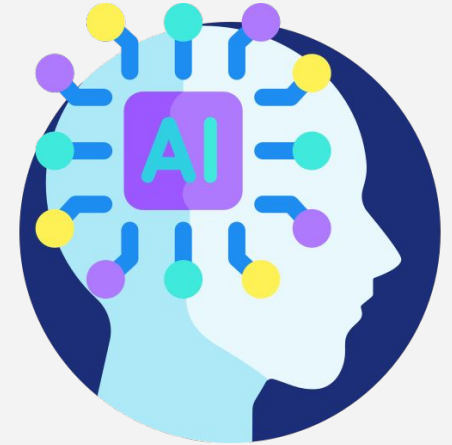
Secara Umum Teknologi Digital Sekarang Berperan dalam Kategori Berikut



Efisiensi dalam penyampaian informasi tanpa dibatasi jarak (tapi dibatasi konektivitas)



Kemampuan dalam mengumpulkan informasi dan mengolah untuk membuat keputusan



Yang terbaru: kemampuan dalam menghasilkan ringkasan informasi dalam waktu yang singkat

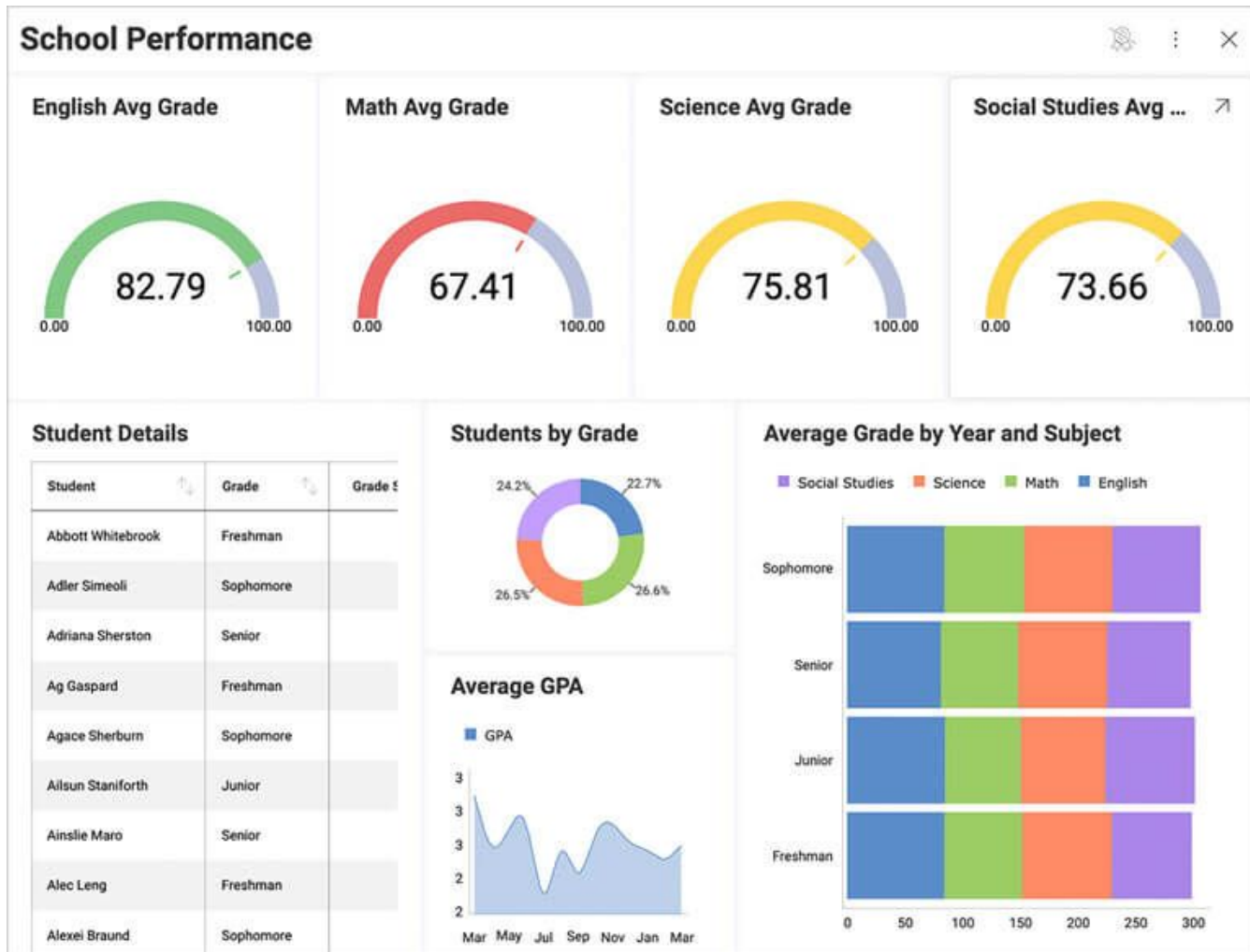


Kadang dalam konteks pendidikan, yang sering muncul terkait digitalisasi adalah soal pembelajaran jarak jauh atau *hybrid learning*

Padahal kekuatan digitalisasi terbesar ada pada pengolahan data!

Teknologi digital mampu mengolah dan membantu pemimpin sekolah, orang tua, dan pengajar untuk membuat keputusan yang lebih baik dengan data yang ada

Dan hal ini membutuhkan budaya berbasis data (*data-driven culture*)



What does it mean to be a "data-driven" organization?



Place data at the front and center of the work done



Utilize data effectively and generate insights



Drive change, innovate new products, acquire more customers

Sam Altman on the Impact of Generative AI on Education

“Education is certainly going to change dramatically. And I think it is forever altered by the course of this technology” Sam Altman

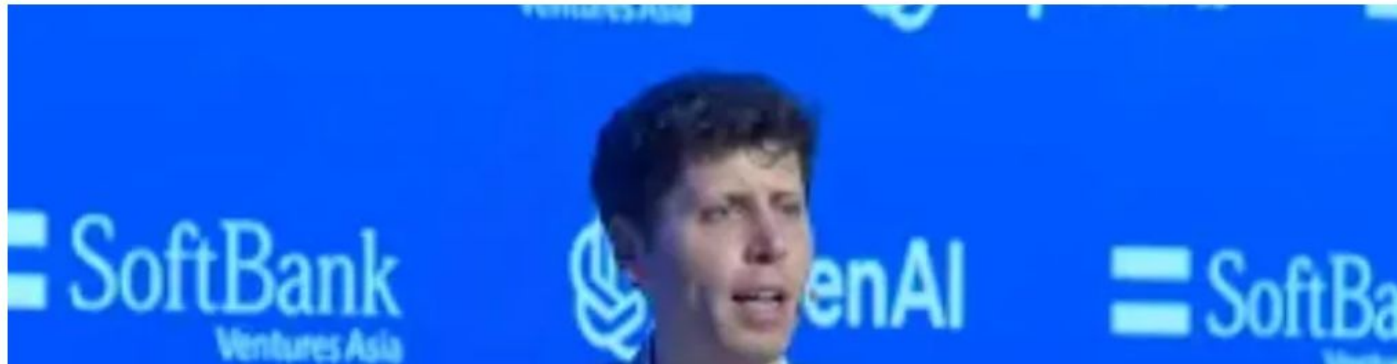


STEFAN BAUSCHARD

JUN 18, 2023



Share



Oleh karena itu, konteks digitalisasi akan sangat-sangat berbeda dan belum ada preseden yang bisa dijadikan acuan

Ada yang bisa memberitahu saya apa ini?



Di hamparan data dunia maya

Berkembang ekonomi digital, lahirnya era baru

Bisnis tak lagi hanya fisik terlihat

Namun berbalut teknologi yang semakin canggih terasa

Ada banyak hal yang membuat kita harus berpikir ulang tentang teknologi digital

Harvard
Business
Review

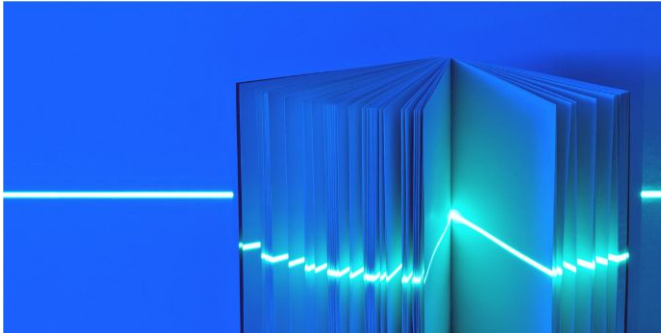
AI And Machine Learning | ChatGPT and How

AI And Machine Learning

ChatGPT and How AI Disrupts Industries

by Ajay Agrawal, Joshua Gans, and Avi Goldfarb

December 12, 2022



ChatGPT passes exams from law and business schools



By Samantha Murphy Kelly, CNN Business

Updated 1:35 PM EST, Thu January 26, 2023



An A.I.-Generated Picture Won an Art Prize. Artists Aren't Happy.

"I won, and I didn't break any rules," the artwork's creator says.

Give this article



1.5K



Dan isu ini akan semakin kompleks

What are Deep Fakes?

- Facial re-enactment
- Face swapping
- Full-body deep fake
- Audio deep fake
- Image-based deep fake

“Deep fakes”—a term that first emerged in 2017 to describe realistic photo, audio, video, and other forgeries generated with artificial intelligence (AI) technologies.

Mashup of Fake (not real) using Deep Learning (Machine Learning) methods based on artificial neural networks with representation learning, supervised or unsupervised.

US Defense Department is looking into building tools to detect deep Fake and media manipulation amid growing threat of “large scale, automated disinformation attacks”

Modern Polarization : Disinformation and hoaxes are high stake warfare for creating social discord, increasing polarization; influencing an election outcome.

Computational Propaganda: Deep Fake (fake videos, audio recordings) are new tool to spread disinformation at scale and with speed.

Source: DARPA Media Forensics <https://www.darpa.mil/program/media-forensics>

Video *deepfake* ini
disebarkan 4
tahun lalu. Jauh
sebelum ada
ChatGPT dan
teknologi
Generative AI
yang terbuka
seperti sekarang

Bisa dibayangkan
apa yang terjadi
sekarang jika
hal-hal seperti ini
tidak dikelola
dengan baik?



It's Getting Harder to Spot a Deep Fake Video



Bloomberg Originals ✓
3.39M subscribers

Join

Subscribe

Impact to Society

Undermine Journalism

Creating Divisions

Manipulation of
Collective Actions

Disrupting Discourse

Eroding Trust

Influencing Judicial
Proceedings

Implications: 3 Key Forces on
Individuals and Organizations

Disinformation

Exhaustion of thinking

**The Liar's Dividend – Escaping
accountability for the Truth**

Source: https://intelligence.house.gov/uploadedfiles/citron_testimony_for_house_committee_on_deep_fakes.pdf

**Apa yang bisa kita lakukan
terkait transformasi
pendidikan dalam konteks
digitalisasi yang berlangsung?**



Memastikan visi pendidikan dan digitalisasi bisa saling mengisi



Memastikan literasi dasar dan literasi digital dapat berjalan dengan beriringan dan tidak dapat dipisahkan



Membuka ruang eksperimen bersama antara pemerintah, sektor swasta dan masyarakat untuk mempercepat pengelolaan teknologi baru

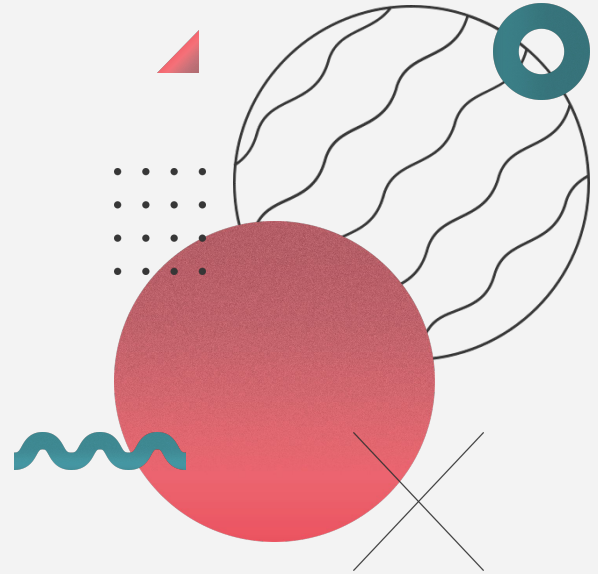


Mendorong ekosistem yang baik untuk menumbuhkan inisiatif-inisiatif yang baik terkait digitalisasi pendidikan

Pada akhirnya transformasi digital yang kita harapkan adalah transformasi digital yang bermakna (*meaningful digital transformation*)

Transformasi digital yang inklusif, tepat sasaran, dan relevan dengan kondisi zaman dan masyarakat

Terima Kasih



[MONTH] | 2023