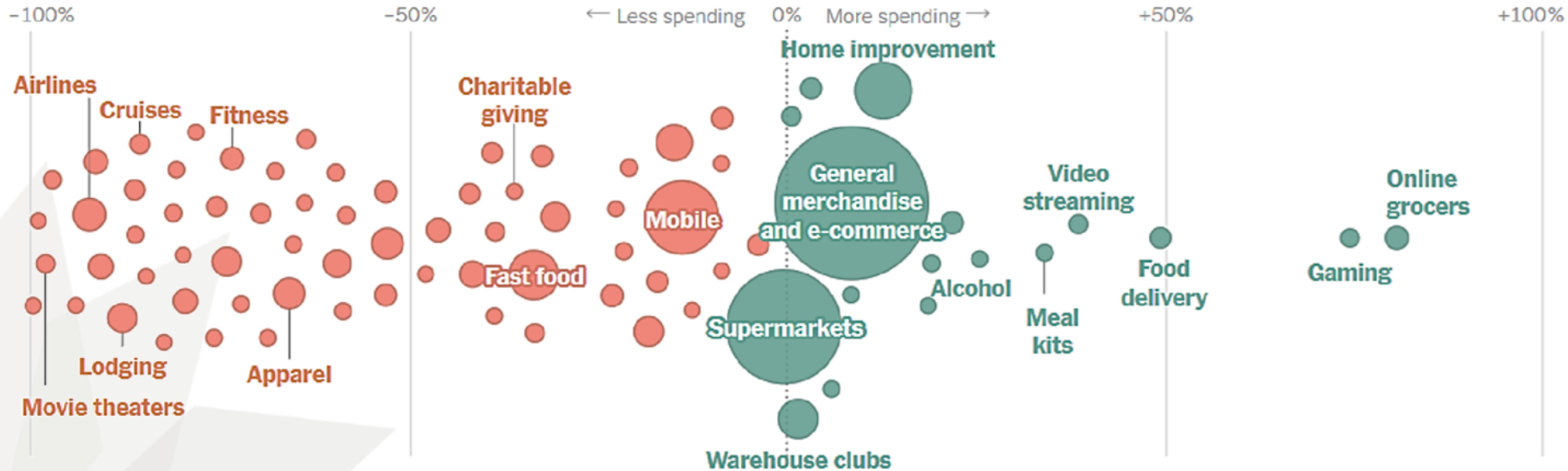# COVID-19 Has Transformed the Way People Consuming Products & Services

Fighting to Survive | Everyone Else | Vast Opportunities

Change in spending from 2019 for the week ending April 1. Bubbles are sized by industry sales.

Source: New York Times, 11 April 2020

The Critical AI Application

-- Identified at Least 1 Critical AI Application --

Category	Percentage
Improved agility	45%
Improved customer experience	45%
Cost savings due to automation	41%
Improved revenue	37%
We want the first mover advantage	33%
Improve employee engagement	26%
Our clients demand it	20%
We want to disrupt the market	15%
We are behind our peers	12%
Any other benefit	0.4%
Not sure	0.3%

1 Improved agility

AI is making analytics more **efficient and productive at workplaces**. This change is making leaders revisit business functions and processes

2 Improved customer experience

AI delivers highly **personalized message to every customer** by analyzing a customer's topics of interest and reading patterns to recommend the most relevant content.

3 Cost savings due to automation

Automating workflows ensures that **processes run automatically**, consistently, and with less oversight. AI can replace human inputs while helping to manage the inputs

The Value of AI Applies to All Public Sector Verticals which Become More Productive

Administration and Finance

Business Services

Defense and Intelligence

Education and Research

Health and Social Services

International Affairs

Justice and Public Safety
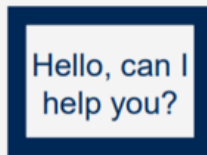
Natural Resources

Transportation and Public Works

35% Robotic Process Automation

31% Chatbot

27% Computer-Asisted Diagnostic

25% Virtual Assistant

25% Fraud Analysis

Source: Gartner. 2018.

3

Main AI Use Cases Across Sectors

non-exhaustive

Sectors	Process Optimization	Fraud Detection	Sentiment Analysis	Market Segmentation	Face Recognition	Chatbot	etc.
Telecommunication	✓		✓	✓	✓	✓	
Media			✓	✓	✓	✓	
Manufacturing	✓						
Mining, Oil & Energy	✓						
Healthcare	✓				✓	✓	
Pharmaceutical	✓						
Banking & Financial	✓	✓	✓	✓	✓	✓	
Government	✓	✓	✓	✓	✓	✓	

AI Initiatives in Indonesia

Opportunity & Value Creation AI in Indonesia

Manufacturing

1. Boosting Indonesian **industrial productivity** by developing better products and processes

2. Adopting **improved management practices**

3. Integrating local firms into **global supply chains and export markets**

Financial Services

1. Financial inclusion and access to finance for **MSME**

2. **Equity crowdfunding and peer-to-peer lending** providing additional channels of capital flow to young businesses

3. New tools **reducing the cost** of financial products and services

4. Improved **customer experience and transparency**

E-Commerce

1. Expanding the number of **consumers in rural areas/** away from traditional retail centers

2. Reducing **physical infrastructure** and capital investment

3. Direct contact with customers enabling more **exact product and service customization** for local needs, both urban and rural
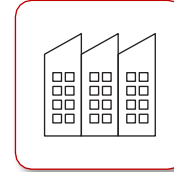
Urban Planning

1. Investment into **digital infrastructure** able to connect geographically dispersed Indonesia and **rebalance regional disparities**

2. **Digital strategies** differentiated for local conditions, providing, for example, digital payment systems for public transport in urban areas and, in rural areas, access to public svcs

3. More **effective disaster and emergency response**, for example, establishing a centralized national disaster response system
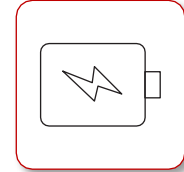
Energy

1. Decarbonizing electricity supply to **lower energy costs** and mitigate oil dependency

2. Falling **demand for electricity** from traditional power plants even with the adoption of such green technologies as electric motorcycles

3. **Reducing noise and improving air quality** in big cities

1	**Keep us safe**	1. Autonomous vehicle 2. Cybersecurity
2	**Make us productive**	1. Manufacture automation 2. Credit scoring
3	**Extend our capabilities & knowledge**	1. Healthcare research 2. Space exploration

How Do We Seek to Develop Competitive Advantage In AI?

Optimizing synergy between academic, business, community, government, and media to strengthen Indonesian AI Ecosystem

1 People

Mind Set — Skill Set
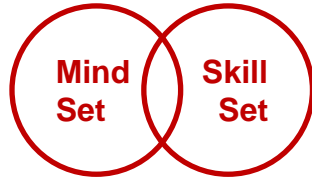
Immersive	Inclusive	Human Context	Machine Context
Real Experience	Hands-on	Empowerment	

2 Process

Regulating AI in society

Business as Usual:
Many parts of AI are presently covered by other legislation, e.g. existing privacy, competition, and IP law

Game Changer:
A New field of law is emerging: AI law and privacy law are becoming the defining legal fields of our time

3 Technology

Machine Learning	Automated Reasoning
Computer Vision	
Knowledge Representation	Natural Language Processing
Cognitive Science	
Robotics	Bots

4 Participation

AI Ecosystem development thru *Penta Helix Collaboration*

Academic + Research institute

Business

Community

Government

Media

Telkom is Supporting Government Digital Agenda by Developing National Digital Platform

One of Horizontal Platform is AI Platform

1. By order of technology stack
2. Priority platforms selected based on market attractiveness (i.e. ICT spending and growth), and potential Telkom advantage (i.e. # of leading SOEs and SOE revenue, # of Telkom subsidiary presence)
3. Other potential vertical segments open to be exercised (e.g metals, utility, tourism & travel)

Source: IHS Markit, Gartner, Ministry of SOE, Telkom, A.T. Kearney, Lampiran PerPres No 18/ 2020 Tentang RPJMN 2020-2024

TelkomGroup AI Development Approach

Data Science Platform

Existing Big Data platforms is an excellent foundation for building new AI-based systems.

Rich Use Cases

Look for AI opportunities from huge customer data base and explore new opportunities.

Network-Generated Data

Provide rich and huge data for building AI systems to provide great customer experience.

Building Capabilities

Building people capabilities to anticipate the disruption from AI-based system, product or technology

Cloud-Based Services

Leverage Telkom cloud-based service that provide system scalability and rich set of APIs for use cases

Strategic Partnership

Identify startups/partners that provide pre-trained domain-specific models to drive innovative solutions with AI.

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the world in your hand

AI Development Approach

How Does AI Drive Our Business?

Improve Speed & Efficiency

1. Reduce operating costs & increase operating efficiency

2. Increase speed of process (automate process)

3. Improve decision making process

Better Data Processing & Analytics

1. AI for predictive analytics (network fault prediction & churn prediction)

2. Analysis of unstructured data from infrastructure logs.

3. Faster process of variety of data (image, video, etc)

Enhance Customer Experience

1. Customer care and service desk automation

2. Enhance customer service effectiveness.

3. Cost saving & increase customer satisfaction

Use Case: AI for Document Analytics Policy Review for SETNEG

Bigdata solution by OCR, Text analytics – NLP, and Machine Learning (recommendation)

KEMENTERIAN SEKRETARIAT NEGARA RI

A. Dashboard RPUU
(Search & Reminder)

Benefit:

1. RPUU completion alert reminder via voice, WA, email, and Telegram
2. Easier PUU searching related to PUU

B. Dashboard PUU
(Search & Reminder)

Benefit:

1. Easier PUU searching by words and phrase input
2. Alignment contentual and contextual recommendation

C. RPUU Automation
(for RPUU & Public Opinion)

Benefit:

1. Analytics process automation as easy as upload document
2. Sentiment analytics from social media dan digital media

D. Machine Learning & Recommendation

Benefit:

1. Alignment recommendation based-on Machine learning and RPUU & PUU
2. NLP approachment & text analytics trigger insights

*Under development

12

|	BEFORE	AFTER
A. People	**1. Silo Operation** 　a) Single Job Responsibility 　b) Specialist-skill 　c) WFO Resources **2. Paradigm Shift:** 　a) Work only at office 　b) Legacy system, inefficient resources	**1. Agile Operation:** 　a) Matrix Job Responsibility 　b) Multi-skill 　c) Hybrid Resources **2. New Digital Corp Culture** 　a) Change Agent reinforcement 　b) Digital Culture activation
B. Process	1. Bureaucracy & complex process, system do not accommodate end-to-end process yet 2. Limited digital process 3. Rigid, Silos 4. Manual process/task, massive, clerical, repetitive	1. **Process Simplification** (easy tracking, manageable, effective) 2. **Digitization**/ automation using extend RPA program (faster, efficient resources, proactive/predictive). 3. **Flexibility**, Agile 4. Digital Transformation for process automation
C. Tools	1. Partial manual tools **(Manual 64%, auto: 36%).** 2. Multi-domain application/tools 3. Inventory system do not accommodate end-to-end process. 4. Manual task, massive, clerical. Repetitive, partial tools (not integrated).	1. **TIOC Digitization** Extend Use Case Program *RPA (Robotic Process Automation)* 2. **Machine learning implementation.** Enhancement Program RPA using Machine Learning.

RPA: Robotic Process Automation

Driverless Bus at Asian Games 2018


Driverless Vehicle

LiDAR + AI + 5G
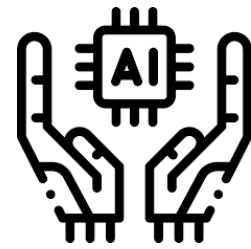
Sensor-based technologies are playing a key role in making **Artificial Intelligence (AI)** possible in various fields.

LiDAR (Light Detection and Ranging) is one of the most promising sensor-based technology, used in autonomous vehicles or self-driving cars and became essential for such autonomous machines to get aware of its surroundings and drive properly without any collision risks.

1 Diagnostic Covid-19 with AI
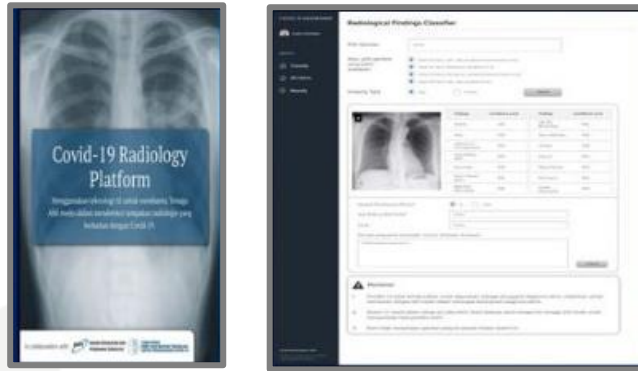
CT Scan and X-Ray with AI can diagnose Covid-19 faster. It help radiology and doctor to detect Covid-19 more accurate. It complement the existing diagnostic using PCR and RDT

Source: BPPT. 2020

2 Detect Covid-19 symptoms only using people's breath

GeNose C19 (Gadjah Mada Electronic Nose) is the first innovation in Indonesia to detect Covid-19 by **breath sample** that is next proceeded to the **cloud computing system** to obtain real-time diagnosis results

This electronic-based tool is easy to mass-produce because it uses parallel and **massive Artificial Intelligence (AI)** data analysis and has high specificity and sensitivity

Source: UGM. 2020

Big Data Telkom Group Implementation

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Big data provides numerous potential advantages for company & institution

For Industry 4.0

Banking:
Customer Acquisition, Credit Risk Engine, Data Audit

Insurance:
Customer Activation & Acquisition

Sierad Produce: Smart Poultry Environment, Fan Speed Automation, Weight Scale, Monitoring

Manufacture:
IoT for Overall Equipment Effectiveness System

Mechanical:
IoT for Monitoring Behavior of Motorcycles

Residential Area: Monitoring Water Level, PJU, Metering Water Residential & Distribution, FMS

Automotive:
Big Data Full Stack

University:
Big Data Full Stack, Social Media Analytics

For BUMN

Pertamina:
SPBU Digitalization
PERTAMINA

Angkasa Pura II:
IoT for Aviobridge Usage Counting System
IoT for Aircraft Block On/Off System
IoT for Passengers Arrival Counting System
IoT for Taxi Queue Management
ANGKASA PURA II

Kimia Farma:
Big Data Kimia Farma
IoT for Power Consumption Monitoring System
IoT for Purified Water & Total Organic Monitoring
IoT for Gas Detection Monitoring System
IoT for Environmental Monitoring System
kimia farma

Pegadaian:
Big Data
Pegadaian

KAI:
Big Data
KERETA API

Jasa Marga:
Video Analytics Rest Area
JASAMARGA

BRI:
Apigee, AtScale, Cloudera Scoping
Customer Profitability & Credit Scoring
BANK BRI

For Government

Kemendagri:
IoT for Power Monitoring System (Disdukcapil)

Kemen PANRB:
Big Data Solution for Aparatur Sipil Negara

BPBD Provinsi Bali:
IoT for Disaster Early Warning System
IoT for Volcano Eruption Monitoring System
IoT for Ambulance Tracking System

BPJS Kesehatan:
Big Data Full Stack

Pemerintah Provinsi DKI Jakarta:
Water Ground Monitoring System

Pemerintah Kota Tangerang Selatan:
Digitalization

For Internal

IndiHome - Churn Prevention	**MelOn** - Growth Hacking
IndiHome - RPA for 147	**MelOn** - Social Media Analytics
IndiHome - Smart Profiling	**LinkAja** Digitization
IndiHome - Smart Collection	Enterprise - BIMA
IndiHome - SIIS	Enterprise Digitization
IndiHome - Smart CAPEX	Enterprise A2P Analytics
IndiHome - Growth Hacking	Blanja Engine Recommendation
HCM Digitization	Agro Digitization
TIOC DSO Assurance Analytics	Smart City DIgitization
PINS - Plate Number Recognition	Tourism Digitization
TLT - Visitor Face Recognition System	

16

Telkom Data Center & Cloud

Telkom DC (NeuCentrIX) has capacity 106.9 sqm, 54,755 KVA, and 1,307 available racks in 18 locations

Map of Indonesia showing Telkom Data Center locations:

- **Medan** — 23 Rack, 1500 KVA
- **Batam** — 34 Rack, 750 KVA
- **Dangas** — 0 Rack, 650 KVA
- **Manado** — 25 Rack, 500 KVA
- **Balikpapan** — 23 Rack, 275 KVA
- **Jakarta Cyber** — 139 Rack, 14670 KVA
- **Jakarta Jatinegara** — 0 Rack, 2000 KVA
- **Serpong** — 223 Rack, 14670 KVA
- **Jakarta Karet** — 40 Rack, 1180 KVA
- **Sentul** — 290 Rack, 8000 KVA
- **Semarang** — 35 Rack, 500 KVA
- **Gubeng** — 96 Rack, 960 KVA
- **Kebalen** — 9 Rack, 1000 KVA
- **Makasar** — 24 Rack, 500 KVA
- **Surabaya** — 313 Rack, 4330 KVA
- **Bandung** — 7 Rack, 1500 KVA
- **Yogya** — 5 Rack, 960 KVA
- **Denpasar** — 21 Rack, 810 KVA

Legend:
- Internet Data Center = DC+IX (Internet eXchange)
- Tier-2, Total : 3.874 sqm
- Tier-3 & Tier-4, Total : 8.981 sqm

Global Data Center Tier-3 & 4:
Singapura (3 Locations) dan Hongkong (1 Location). Total Area = 25K Sqm

Telkom Has Strong Domestic and International Connectivity that Connect Seamlessly to All DC & Cloud

National Fiber Optiv Backbone
164.770 km
1. Domestic 100.070 km
2. International 64.700 km
3. Coverage IKK 458 IKK
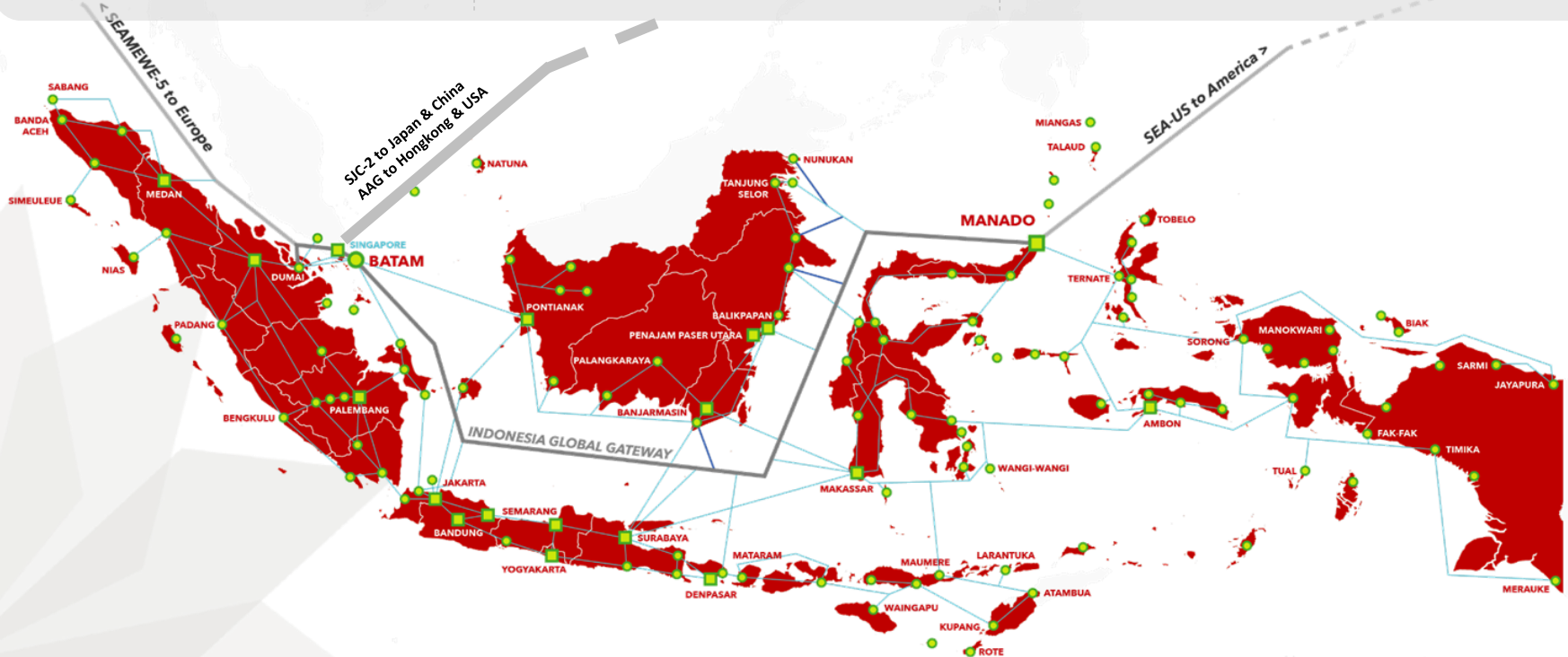**Global Internet Access 10 TBps**

22 Data Center (106.9K Sqm)
1. 5 DC Tier-3 & Tier-4 (int'l)
2. 3 DC Tier-3 & Tier-4 (domestic)
3. 14 DC neuCentrIX Tier-2 (domesttic)

Digital Platform
1. Big Data & Analytics
2. API Factory
3. Internet of Things

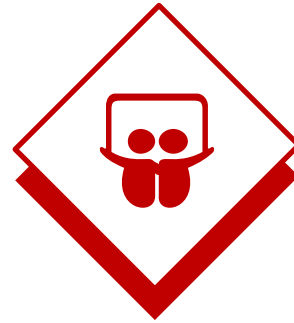1. Cyber Security
2. Artificial Intelligent
3. Payment / Blockchain

Key Takeaways

Value Creation
Provides opportunities and creates value for industry, government, business and society

AI Capability
Prepare capabilities to develop and implement AI in organization

Strategic Collaboration
Open strategic collaboration with any parties in the implementation of AI in organization
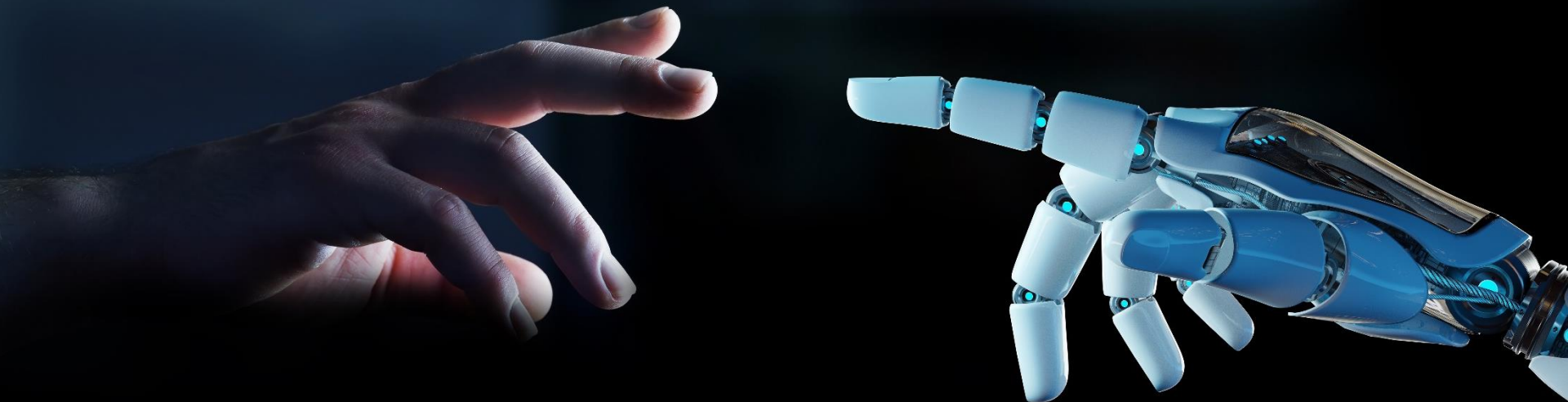
Job Disruption & Creation
Routine jobs are disrupted but many new jobs are created