Peta Jalan Indonesia Emas

2045

Indonesia Emas 2045 Roadmap

Building Indonesia's tomorrow now

KADIN INDONESIA

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Foreword

Indonesia Emas 2045 is a collective goal for Indonesian citizens. We aim to live in a country that is prosperous and foster a sustainable and inclusive growth. We have a lot of assets that can propel us to thrive as a high-income country. However, we also have to ensure we conquer the key challenges that have continuously get in the way of growth. Therefore, aside from spelling out an inspirational aspiration, we believe that Indonesia needs a long-term strategic roadmap anchored on a number of breakthrough projects that will catalyze growth at scale.

KADIN members have collaborated to develop this white paper, 'Building Indonesia's tomorrow now', to support the government of Indonesia in paving the journey towards Indonesia Emas 2045. We have involved more than 200 stakeholders in developing this white paper, ranging from sector associations, academicians, labor unions, religious leaders to industry players.

We discuss the goals, jointly discover the key challenges, and identify the breakthrough programs that could unleash the potential of each of the element of Indonesia 2045. Through more than 50 collective discussions, our hope is that this white paper can contribute to Indonesia's overall plan.

Indonesia aims to be a global top 10 economy by 2045 and escape the middle-income trap by 2038. Indonesia Emas 2045 envisions a nation built upon 4 key pillars of resiliency, prosperity, inclusivity, and sustainability that will shape our journey towards a brighter future. At the core of this vision lies our philosophy of "gotong royong," emphasizing the spirit of collaboration and working together for the greater benefit of the entire community. We continue to embrace the principles of "Bhinneka Tunggal Ika" and cherishing unity in diversity. Though the journey may be challenging, this principle will be a guiding compass, as only together can we move this nation forward.

M. Arsjad Rasjid P. M.
Chairman, Indonesian Chamber of Commerce
and Industry (KADIN Indonesia)

Foreword

On June 1, 1945, the day when the Pancasila was formulated, Bung Karno mentioned that independence is a golden bridge. Across the golden bridge, two roads stretch out, i.e., a world in prosperity and a world in calamity. Now, in 2023, at 78 years of independence, we are questioning whether this nation is moving towards the north star that Bung Karno longed for, or are we straying far from the imagination of the nation's founding fathers.

In 2045, when this nation reaches a century or its 100th year, there is a lot of hope springing from the heart of all the nation's generation. Many research institutions predict that Indonesia will become a beacon of the world. Many predict that Indonesia will become a country that is "*selalu dipuja-puja bangsa*" (always praised by its people).

However, all these predictions will be meaningless if we are lenient; drowning in all the praises, without pushing our best effort to move forward.

At this point, we need a roadmap that functions as a compass to find the intended direction. This book is the effort of the Indonesian Chamber of Commerce and Industry (KADIN) to contribute by providing a roadmap towards an advanced and prosperous nation by 2045.

Indeed, this white paper is not the first. However, what makes this book special is that the stakeholders under the umbrella of KADIN are those who work in the field every day and have direct assessment of economic activities.

This white paper has gone through a long process. Starting from research and interviews to the stage of synthesizing ideas and making recommendations. This book presents many hopes which are then summarized into a road map for Indonesia to achieve progress.

We hope that the ideas in this white paper will continue to change and undergo a process of dissemination so that they are known to all children of the nation. We hope that in 2045, Indonesia will become a leading, resilient, and advanced country. We want to see an Indonesia that continues to be eternal and stand the test of time.

Just like the poem Chairil Anwar wrote at the beginning of independence: "*Aku ingin hidup seribu tahun lagi*"- "I want to live another thousand years."

Eka Sastra
Ketua Tim Indonesia Emas 2045
KADIN Indonesia

Executive summary

Indonesia has demonstrated remarkable growth since its independence in 1945 and is expected to further continue its development.

By 2045, 100 years after its independence, Indonesia is projected to be the world's 4th largest economy (by GDP PPP) and the 8th largest economy (by real GDP). Under these projections, Indonesia will become a high-income economy[1] and escape the middle-income trap by 2038, similar to Bappenas 2025-2045 RPJPN projections.

Indonesia 2045 aspires to be a resilient, prosperous, inclusive, and sustainable powerhouse, and become the inspirational lighthouse from ASEAN. At the heart of this vision lies the enduring philosophy of "Gotong Royong" and "Bhinneka Tunggal Ika", emphasizing the spirit of working together for the greater benefit and celebrating unity in diversity.

These 4 pillars have been cascaded into 14 sectoral roadmaps, as strategic growth themes and key enablers:

- **Boost resiliency:** Building unrivalled health resiliency and establishing a self-sustaining food security ecosystem, targeting:
  - — Top 20 Global Food Security Ranking, out of 113 countries
  - — >6 index score in Global Biopharma Resilience
- **Foster prosperity:** Grow high value sectors through unlocking lighthouses in strategic manufacturing sectors, leapfrogging growth in financial services, building world-class ecotourism destinations, unleashing global creative players, and accelerating MSME growth to mid-size, globally competitive companies, targeting:
  - — High-income economy by 2038
- **Strengthen inclusivity:** Becoming the role model of end-to-end transformation of healthcare ecosystem, and empowering the vulnerable population, targeting:
  - — Equal opportunities: >60% women's labour participation, <0.3 Gini coefficient, Top 20 globally in PISA score, >70 score in skillset of graduates
  - — Higher life expectancy: >80 years for both male and female, Child mortality <5 per 1000 births, <10% stunting prevalence
  - — Improved infrastructure quality: >90 score in infrastructure quality
- **Advance sustainability:** Becoming the world reference in innovative and affordable decarbonization, and setting up the world's largest hub for green business build to reach Net Zero by 2060, targeting:
  - — ~50% Renewable power generation mix
  - — Top carbon credits issuer
  - — ~50% of 4W, 3W, 2W and buses electrified
  - — ~25% of smallholders practice regenerative farming practices
- **Key enablers:** Ensuring future-ready human capital, an integrated, accessible, and affordable infrastructure, transversal technologies for all and global quality leadership with local wisdom

Each sectoral roadmap lays out 3 key aspects: context and challenges to understand where Indonesia is now, bold moves to explore key activities to be done in the next 22 years, and key metrics to identify specific targets. The bold moves are strategic initiatives that will unlock the growth of the sector or unleash the enabler for broader sectors.

Through a GDP impact assessment, without executing the bold moves, Indonesia potentially will only reach ~65% of the 2045 GDP target.[2] With the bold moves, on

[1] GDP per capita will surpass the high-income threshold of ~$14,600, reaching $15,700 by 2038. For details, refer to Chapter 1: Introduction – Indonesia's growth potential

[2] For details, refer to Chapter 1: Introduction – Potential GDP impact

the other hand, Indonesia is projected to reach ~90-110% of the 2045 GDP target. Indonesia can confidently chart its course, towards a resilient, prosperous, inclusive, and sustainable growth.

KADIN aspired for this white paper to contribute to the Indonesia 2045 Master plan, reflecting the best possible inputs from the business community with 'Merah Putih' spirit. It is a result of collective discussions across various stakeholders, anchored on solving for the aspirations and the bold moves that will truly unlock the growth for Indonesia.

1 INTRODUCTION

Introduction

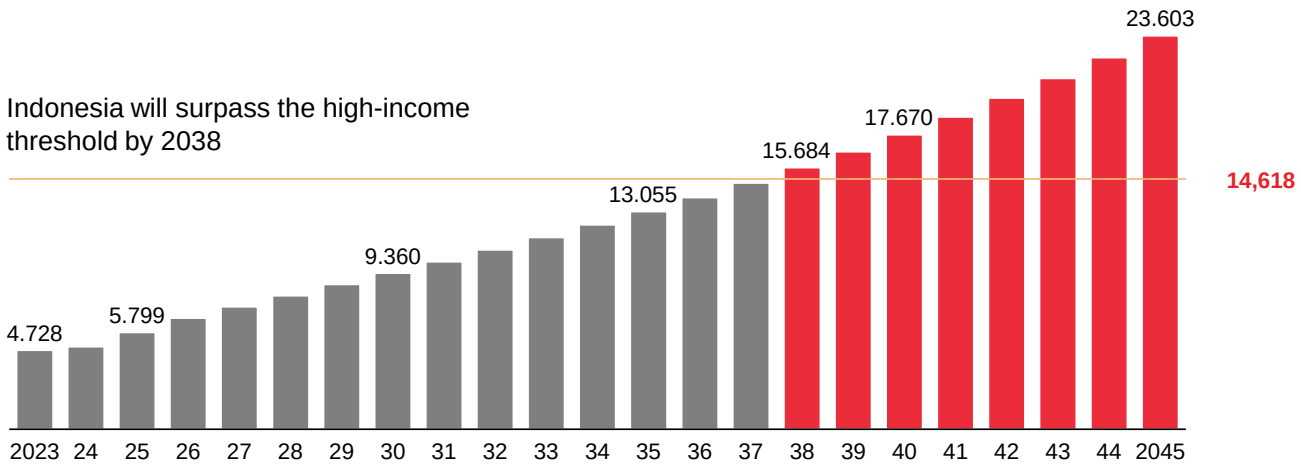
Indonesia's growth potential

Indonesia has demonstrated remarkable growth since its independence in 1945 and is expected to further continue its development. By 2045, 100 years after its independence, Indonesia is projected to be the world's 4th largest economy (by GDP PPP) and the 8th largest economy (by real GDP).[3] This projected growth translates to 2.5-fold surge in real GDP from current $1.1 trillion in 2022 (17th largest economy), reaching $2.8 trillion in the next 22 years. This trajectory signifies a momentous leap beyond Indonesia's current standing, to be referred as Indonesia Emas 2045.

Under these projections, Indonesia will become a high-income economy and escape the middle-income trap by 2038, similar to Bappenas 2025-2045 RPJPN projections. GDP per capita will surpass the high-income threshold of ~$14,600, reaching $15,700 by 2038 (Exhibit 1).

Exhibit 1:
Indonesian GDP per Capita Projections

Indonesian GDP per capita projections,
2023-2045, USD



Bappenas 2025-45 RPJPN forecast Indonesia to escape Middle-income trap by 2038-2041

Indonesia's assets and challenges

To reach its potential and realize its vision by 2045, a well-defined and purposeful roadmap is critical. A roadmap that involves specific goals / aspirations derived from current assets and challenges, which ultimately drives the initiatives required and key metrics for tracking. Looking at Indonesia's overall strengths and invaluable assets, Indonesia possesses the ingredients to unlock its full potential and overcome its challenges (Exhibit 2).

[3] Oxford Economics, McKinsey Global Institute.

Exhibit 2:
Indonesia's Key Assets and Challenges

Leverage Indonesia's assets …	…and tackle key challenges
1. Large, young workforce **~187 million** working age people	**1. Low productivity, while reaching its peak of demographic dividend** **$13 average output / hour worked** vs. $26 in Malaysia and $74 in Singapore; Population growth at 1.2% vs 1.5% a decade earlier
2. Digitally savvy population **4th highest number** of internet users globally	**2. Skilled talent disproportionately distributed -** Skilled talent is **mostly concentrated in Java**
3. Strong domestic demand **4th largest population** globally at **~275 million**	**3. 'Digital divide'** 67% overall internet penetration but 10+ provinces still has <60% penetration
4. Presence of large established players with regional markets **Large multinationals and domestic players serving export markets**	**4. Underdeveloped logistics and transport infrastructure** Indonesia ranks 72nd in WEF infrastructure index vs. Thailand & Malaysia who rank 71 and 35, respectively
5. Valuable natural resources and rich biodiversity World's largest **nickel** (21M tons) deposits, **95.6mn hectares of forests, 95 GW of hydro energy** potential	**5. Exports driven by basic goods and resources** **Export share is 25% of GDP** (74% for MY, 66% for TH); **87% of exports are basic goods and resources** (48% for MY, 65% for TH)
6. Creativity and diversity **~20mn+ creative industry workers, ~1300 ethnic groups** across the archipelago	**6. Disparity in income level** **High income mostly concentrated in urban cities** – e.g., Jakarta, Bandung
7. Entrepreneurial spirit **97% of Indonesians are employed by MSMEs**	**7. Lower scale of MSME in the region** **Indonesia's MSMEs are 1/6th the size of Thailand's; 0.1% of businesses are mid-sized** vs. global benchmark of 2%

Indonesia's core assets include a large and dynamic young workforce, digitally savvy population, and a robust domestic demand. Moreover, there is presence of established players in regional markets, and valuable natural resources supported by rich biodiversity. Among its population, there is also a vibrant creative spirit and an entrepreneurial culture that further strengthen Indonesia's position as a catalyst for progress.

The government's move to develop a new capital city (IKN / Ibu Kota Negara / Nusantara), in alignment with Indonesia's 2045 vision, is also a testament to the commitment in fostering sustainable economic growth and establishing a symbol of national pride.[4]

IKN aims to accelerate economic growth and will embrace its role as a symbol of Indonesia's national identity, designing all public spaces to be based on universal access, local wisdom, and inclusive design. The vision for IKN extends beyond just being an exemplary city; it aspires to be one of the top 10 cities worldwide according to the Global Livability Index by 2045. IKN is currently under development to establish its reputation as a "Global city for all" and being the world's most competitive city by 2045 (Exhibit 3).

[4] Ibu Kota Negara website, "www.ikn.go.id"

Exhibit 3:
Overview of IKN Aspirations and Timeline

The world's sustainable city

- Over 75%of IKN's government zone will remain green
- Construction based on strict environmentally friendly methods
- Renewable energy to provide all of IKN's energy needs

A symbol of national identity

- All public places are designed based on key principles: universal access, local wisdom and inclusive design
- Targeted to be the 10 best cities according to the Global Livability Index by 2045
- Social / public service area within 10-minutes reach

Economic driver for the future

- 0%poverty rate within IKN by 2035
- Lowest regional Gini ratio in Indonesia by 2045
- GDP per capita rate akin to high-income countries

2022-24
Building main infrastructure components for the city's initial 500,000 residents

2025-35
Building innovation and economic centers, and completing the transfer of the government center

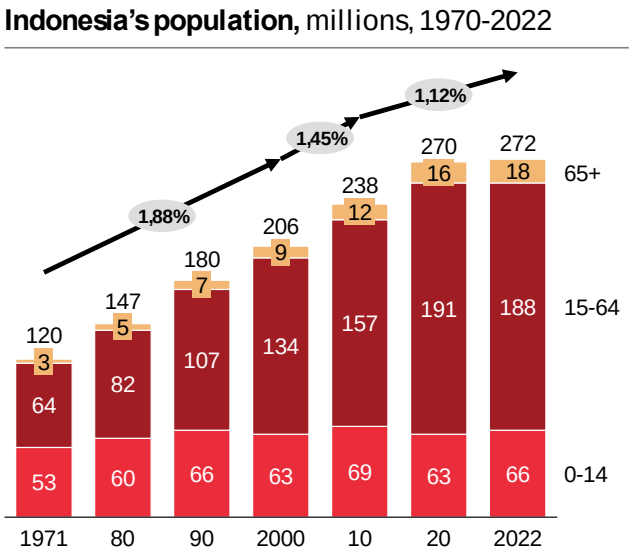
2035-45
Building the infrastructure for the Three Cities ecosystem, and becoming the #1 destination for FDI in priority sectors

>2045
Established its reputation as a 'Global City for All' and being the world's most competitive city

By harnessing these invaluable assets and tackling key challenges, Indonesia can lay the foundation for progress. One of its key challenges is low productivity, especially while reaching the peak of its demographic dividend.

The nation's population growth rate has gradually decelerated over the past decade, standing at 1.12% per annum, down from 1.45% per annum a decade earlier[5] (Exhibit 4). With a declining birth rate, the working age population is unlikely to get bigger in the next decade.

Exhibit 4:
Indonesia's Population Projections



Other challenges to address are poor distribution of skilled talent, digital penetration, and income levels. Underdeveloped logistics and transport infrastructure, as well as relatively lower exports that are driven by basic goods and resources, also remain a challenge to address. Moreover, despite the high number of Micro, Small and Medium Enterprises (MSMEs), their scale

[5] Badan Pusat Statistik (BPS)

remains smaller in the region, limiting their potential to become internationally competitive.

Indonesia should leverage its assets to not only address its key challenges, but also harness them to propel its 4 strategic growth themes:

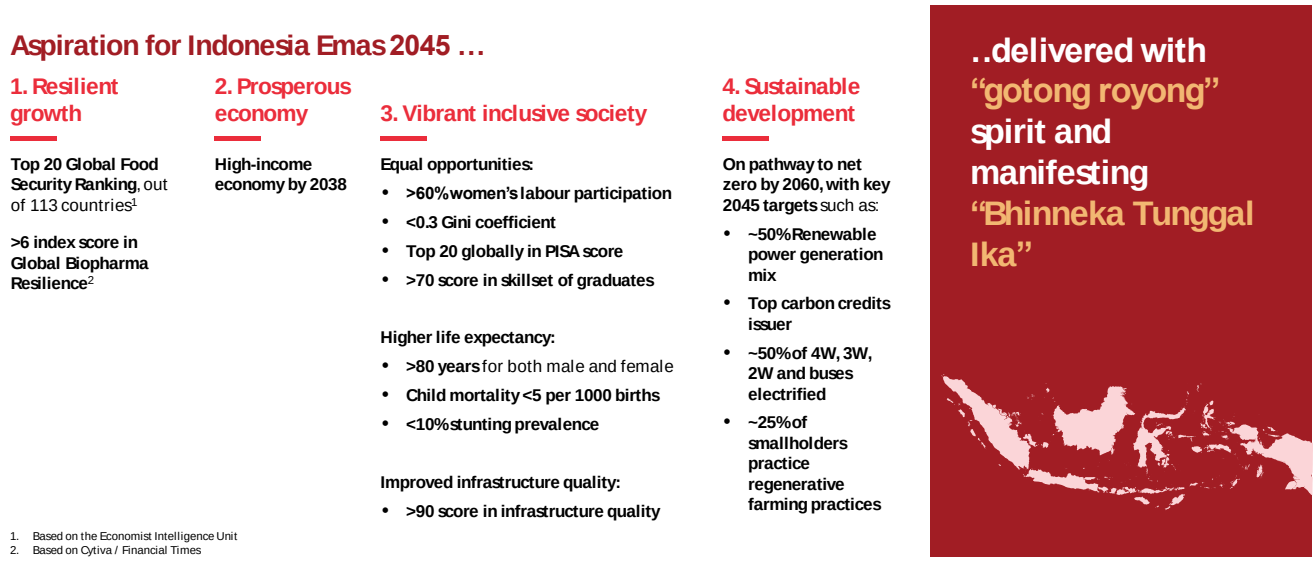
- Boost resiliency
- Foster prosperity
- Strengthen inclusivity
- Advance sustainability

Indonesia's 2045 vision

Indonesia 2045 aspires to be a resilient, prosperous, inclusive and sustainable powerhouse, and become the inspirational lighthouse from ASEAN. This journey should be guided by specific goals across four core pillars: resilient growth, prosperous economy, vibrant inclusive society, and sustainable development. Indonesia's cultural heritage should serve as a guiding compass, ensuring that the welfare and pride of its people remain at the forefront.

At the heart of this vision lies the enduring philosophy of "Gotong Royong," emphasizing the spirit of working together for the greater benefit of the entire community and a manifestation of the cherished principle of "Bhinneka Tunggal Ika," celebrating unity in diversity (Exhibit 5).

Exhibit 5:
Aspirations for Indonesia Emas 2045



1. Based on the Economist Intelligence Unit
2. Based on Cytiva / Financial Times

Theme One – Resilient growth

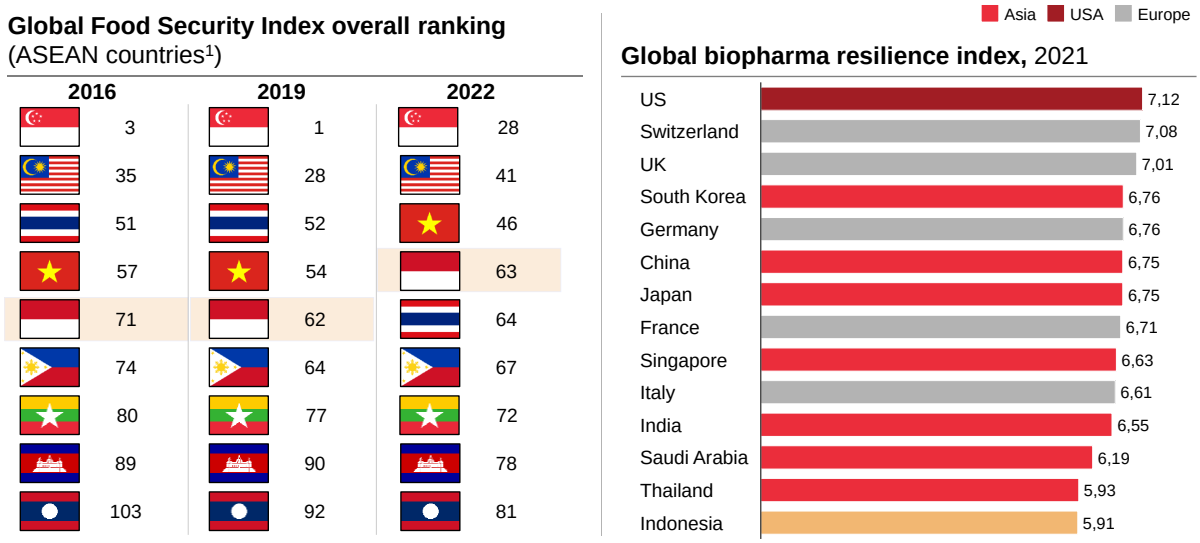
As Indonesia looks to become resilient towards shocks and possess the ability to recover quickly from difficulties, Indonesia needs to address two critical aspects, namely food security and pharmaceutical resiliency.

The current rankings in these 2 aspects reflect a room for improvement, underscoring the need for concerted efforts and strategic planning to elevate Indonesia's position.

In 2022, Indonesia ranks 63rd in global food security index, falling from 62nd in 2019.[6] Meanwhile, Indonesia scores at 5.9 on global biopharma resilience index, compared to the US at 7.12[7] (Exhibit 6).

Indonesia should aim to improve its standing in food security and pharma resiliency indices, not only for the well-being of its citizens, but also for the country's overall socio-economic development. Indonesia can ensure its position as a resilient and self-reliant nation in the face of future challenges.

Exhibit 6:
Overview of Indonesia's Standing in Food Security and Pharma Resilience Indices



1. Excluding Brunei and Timor Leste (not in the ranking list)

6 Global Food Security Index EIU

7 Biopharma 2021: The resilience rethink report.

Theme Two – Prosperous economy

To realize the ambition of becoming the world's top ten economies by 2045, Indonesia must focus on enhancing key sectors of its economy (Exhibit 7).

First, bolstering the manufacturing sector will unlock Indonesia's potential, as it contributes to ~19% of GDP (the highest sector contribution) and drive ~70% of exports. Second, accelerating growth of financial services is essential to drive economic growth, with Indonesia driving ~40% of digital economic transactions in ASEAN. Third, tourism and creative economies also play a significant role, as it is contributing to ~10% of GDP and providing employment to more than 45 million people (~16% of the Indonesian population).

Lastly, nurturing and empowering MSMEs as the backbone of the Indonesian economy, who are driving ~99% of the economy and ~97% of total employment. By strategically addressing these critical areas, Indonesia can embark on a prosperous growth.

Exhibit 7:
Indonesian Key Sectors

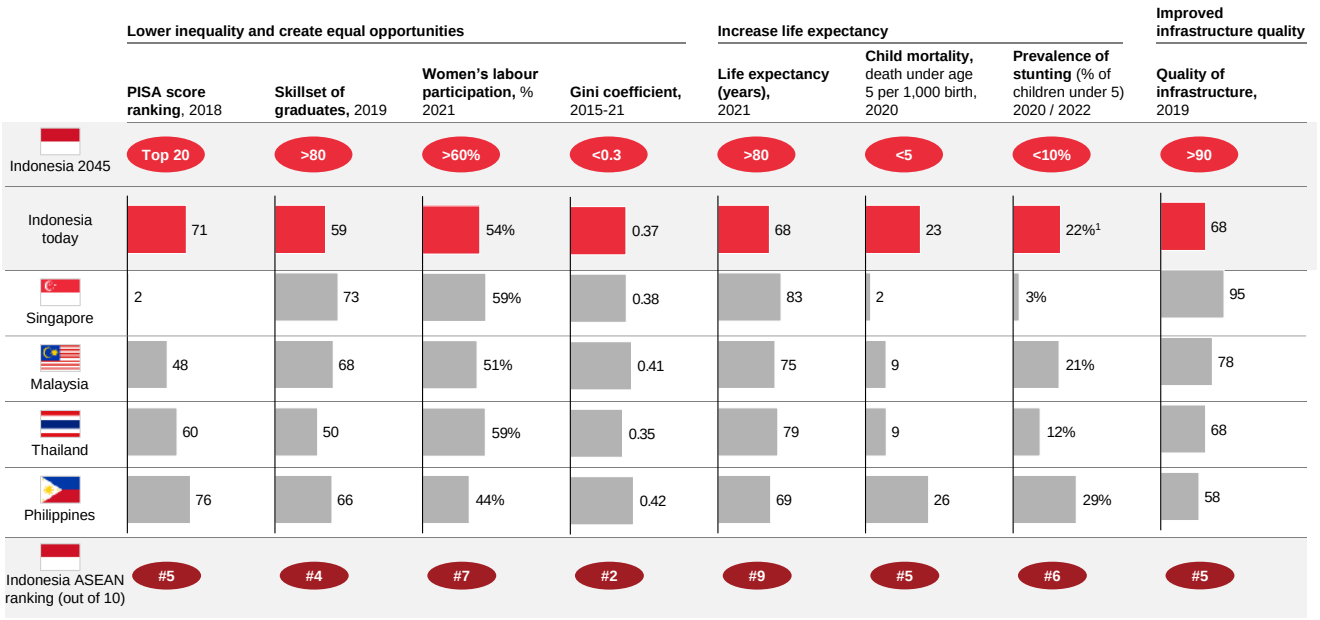
Sectors	Description
Strategic manufacturing sectors	• Contribute to **~19% of GDP** (highest sector contribution) • Projected to **grow by 5% per year** • **70%+ share of total exports**
Financial services	• Contribute to **~4% of GDP** • **7%+ sector growth CAGR in the last 5 years** • Contributes **~40% of digital economic transactions in ASEAN** • 100+ fintech and 150+ insurance companies
Tourism and creative economies	• Contribute to **~10% of GDP** • Provide **employment to >45mn people** (~16% of the population) • Projected to **grow at >10% per year**
MSMEs	• **Drive 99% of the economy** • Drive **97% of total employment** • Contribute to **~60% of GDP**

Theme Three – Vibrant inclusive society

While commendable progress has been made, Indonesia still has ways to go to become a vibrant and fully inclusive nation. Indonesia should enforce its commitment to create equal opportunities, increase life expectancy, and improve infrastructure quality by focusing on its vulnerable populations and healthcare sector.

Ensuring that the marginalized and disadvantaged groups are uplifted and provided with equal opportunities is essential for genuine inclusivity. Additionally, strengthening the healthcare sector and expanding access to quality healthcare services across the nation are vital steps towards enhancing the overall well-being and productivity of the population (Exhibit 8)

Exhibit 8:
Indonesia's Standing on Inclusivity Metrics



1. Based on SSGI (Survei Status Gizi Indonesia) 2022

Theme Four – Sustainable development

Indonesia has embarked on an ambitious journey towards decarbonization, exemplifying its commitment to preserving the well-being of future generations. Supported by bold initiatives and far-reaching commitments, the nation seeks to translate its sustainability goals into tangible actions and commitments by the year 2030 and beyond.

Embracing the urgency of addressing this issue, the nation has set forth bold decarbonization commitments, including achieving net-zero emissions by 2060 or earlier and reducing 32% of greenhouse gas emissions by 2030 as enhanced Nationally Determined Contribution (NDC) commitment[8] (Exhibit 9).

Exhibit 9:
Indonesia's Sustainability Targets

Committed to Net Zero by 2060 or sooner

Pledged to reduce 32% of GHG, and 43% conditionally with international assistance, by 2030 as Enhanced NDC commitment

Joined **Global Methane Pledge to reduce 30% methane emissions** by 2030 (compared to 2020 level)

Committed to have **'forestry and other land use' sector** reach carbon net sink by 2030

Issued **presidential regulation on carbon pricing**; exploring potential collaboration with London Stock Exchange on carbon market setup

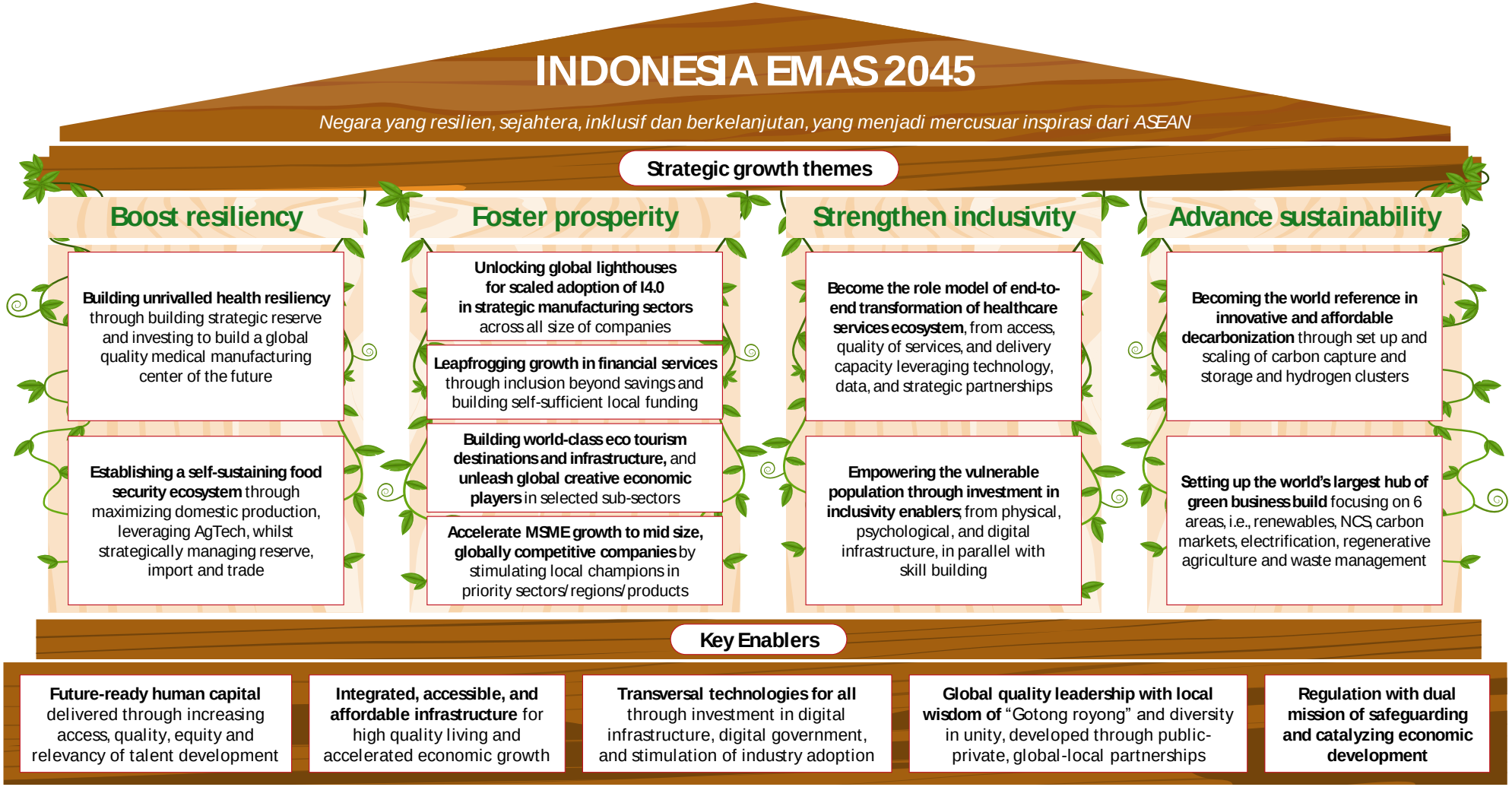
Launched National Plastic Action Partnership (NPAP) to support the national goal of reducing 70% marine plastic pollution by 2025

In pursuit of Indonesia Emas 2045, these 4 pillars have been cascaded into 14 sectoral roadmaps, as strategic growth themes and key enablers (Exhibit 10). Each of the sectoral roadmap lays out 3 key aspects:

- Context and challenges – this section highlights the progress that Indonesia has made, the position that the country / sector is in now, and the challenges that need to be addressed
- Bold moves – this section explores key, big, bold themes that need to be executed in the next 22 years, to be able to address current challenges and develop "above and beyond". This includes the key activities in 5-year phases, how MSMEs can contribute to this roadmap, as well as identification of relevant stakeholders
- Key metrics / enablers – this section identifies specific targets that need to be tracked every 5 years, and the relevant enablers to support execution of the bold moves

[8] Indonesia COP commitment, Indonesia NDC target, press search.

Exhibit 10:
Indonesia Emas 2045 Framework



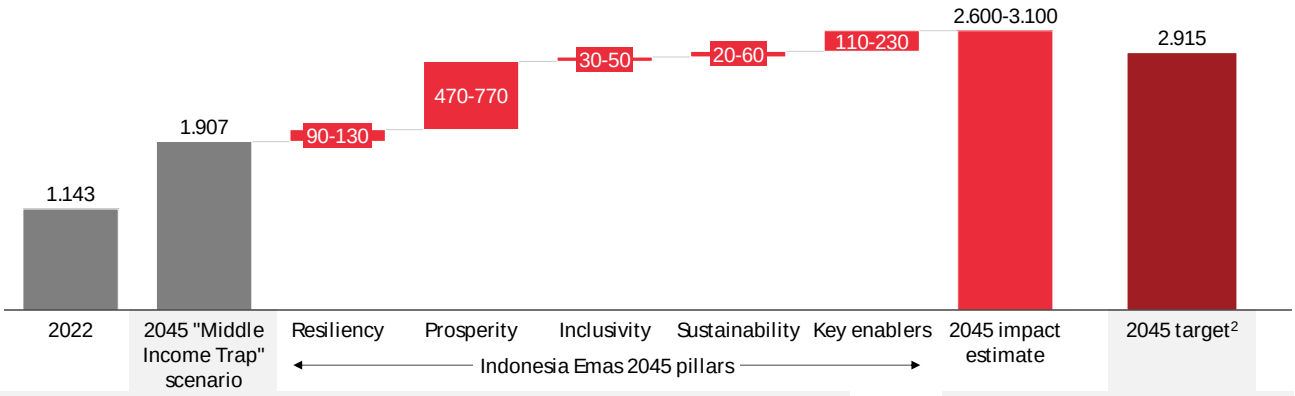
With full commitment to achieve these aspirations, Indonesia stands ready to unleash its potential, becoming a guiding light of progress that nurtures a society that is resilient, prosperous, inclusive and sustainable.

Potential GDP impact

To ensure the proposed 'Bold Moves' will support in achieving the 2045 goals, their potential GDP impact estimate has been calculated (Exhibit 11). This is calculated based on the following steps:

- Estimate revenue baseline in 2022 for each sector, through dividing the Value-added output figure by its sector multiplier
- Develop assumptions for selected bold moves that are revenue levers, based on benchmarking, published reports and other projections.
  - For bold moves considered as 'enablers', their potential GDP impact is not calculated separately
  - Three scenarios were developed for the projections: conservative, base, and aspirational
- Multiply the total revenue impact using the sector multiplier, to get real GDP estimate by 2045

Exhibit 11:
Potential GDP impact of the Bold Moves



Without the bold moves, Indonesia potentially will only reach ~65% of the 2045 GDP target

This assumes a 2.25% economic growth, where Indonesia is in the "Middle Income Trap" i.e. rapidly growing economies stagnate and fail to graduate into high-income countries. This will trigger a growth slowdown of 2 percentage points decrease in GDP growth or more[1] (4.25% growth from 2012-2022)

With the bold moves, Indonesia is projected to reach ~90-110% of the 2045 GDP target

1. Based on IMF Working Paper on "Growth Slowdowns and the Middle-Income Trap", 2013
2. Based on Oxford Economics projections

Without executing the bold moves, Indonesia potentially will only reach ~65% of the 2045 GDP target. This assumes a 2.25% economic growth, where Indonesia is in the "Middle Income Trap", where rapidly growing economies stagnate and fail to graduate into high-income countries. This scenario assumes a growth slowdown, where economic growth is 2p.p. less than previous growth[9] (4.25% growth from 2012-2022). With the bold moves, on the other hand, Indonesia is projected to reach ~90-110% of the 2045 GDP target.

Indonesia can confidently chart its course, towards a resilient, prosperous, inclusive and sustainable growth.

[9] IMF Working Paper "Growth Slowdowns and the Middle-Income Trap", 2013

Inclusive Process of Roadmap Development

In developing this roadmap, more than 200 stakeholders were engaged, ranging from sector associations, academicians, labor unions, religious leaders, and industry players (Exhibit 12).

For each sector, an FGD session was conducted with relevant associations / stakeholder groups, along with the team from KADIN. Topics of discussion include the challenges currently faced, potential improvements to be implemented and key metrics to be able to track progress. Moreover, survey links are distributed post-FGD, to ensure inputs are recorded.

Specifically for understanding talent capabilities and values, a separate 'Skills and leadership characteristics' survey was launched. The survey was created to identify the skills and leadership characteristics that Indonesian organizations deem as prominent today, and those that have the potential to be important in the coming decades, to inform the overall 2045 vision.

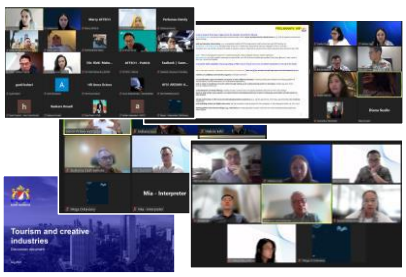
The survey was distributed to KADIN *daerah*, and other organization leaders, reaching more than 120 respondents. This survey result was further validated through industry interviews and reports.

In total, there have been more than 50 collective discussions in the span of 6 months. This roadmap is a product of many constructive discussions, and the inputs received have shaped the writing of this report.

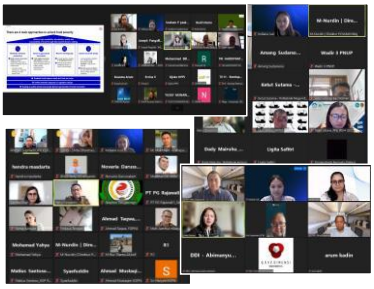
The support of many Indonesian stakeholders that have generously participated in these discussions, allow a truly inclusive roadmap for Indonesia.

Exhibit 12:
Process of Indonesia Emas 2045 White Paper Development

14 kick-off sessions, with Cluster Leads to discuss sectoral roadmaps



20+ FGD sessions, with participants from **60+ associations, academicians, labour unions, religious leaders and industry players**



Launched **'Skills and leadership characteristics' survey**, with **120+ respondents** from KADIN daerah and other organisations

1 INTRODUCTION

Building unrivalled health resiliency

Context and challenges

Indonesia has seen 'resilience' efforts by the government for pharma localization, such as establishing localization policies and boosting the demand for local APIs. To prioritize domestic production, government spending will prioritize drugs with +40% local content, and there has been match-making support for partnerships with foreign API manufacturers.

However, global learnings suggest that among 20 countries surveyed, Indonesia scores the lowest in Biopharma resilience index[10]. There are further areas of improvement for Indonesia. Two areas in which Indonesia can improve pharmaceutical resiliency are in supply chain and manufacturing agility (Exhibit 13).

Exhibit 13:
Indonesia's score in Biopharma Resilience Index

Shortages of medical products occur frequently, resulting in people being unable to access essential products even without external shocks. Medical product shortages have occurred before the COVID-19 pandemic. For example, in 2019, thousands of HIV patients did not receive medication, as not enough was procured from the previous year.

The COVID-19 pandemic further highlighted the gravity of the supply chain issues. There was a surge in demand for certain drugs, e.g., paracetamol during the height of the pandemic that resulted in shortages and price increases throughout the nation. According to news reports, the price of paracetamol, an essential medicine, rose a remarkable 72% in January 2022.[11] Global supply chain breakdown also resulted in mass shortages of non-COVID-19 related medical products such as the Bacillus Calmette–Guérin (BCG) vaccine, used to prevent childhood tuberculous, in Cianjur Regency in August 2021.[12]

These cases highlight that one of the main challenges for maintaining pharmaceutical resiliency in Indonesia is a high reliance on imports that can be illustrated by three key statistics[13]:

- 96% of medical devices are imported
- 95% of Active Pharmaceutical Ingredients (APIs) are imported
- 50% of routine vaccine antigens require importing

The nation's high reliance on imports is a result of limited native capability and capacity to drive pharmaceutical manufacturing. Indonesia's pharmaceutical and medical device production value chain faces a range of challenges from low Research and Development (R&D) activities to in-industry limitations (Exhibit 14).

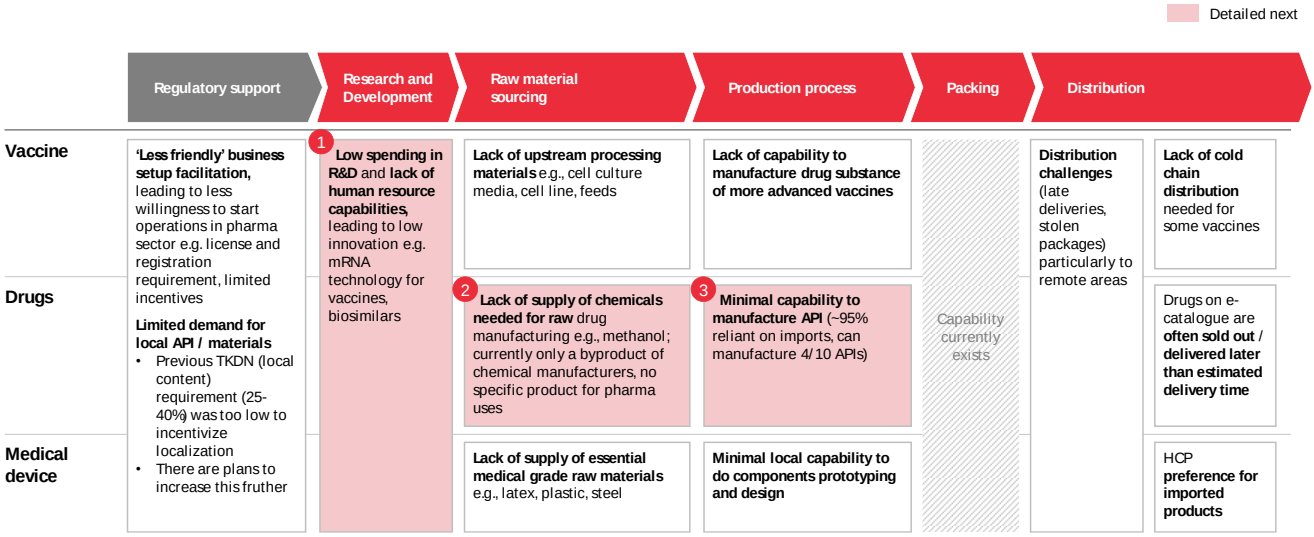
[10] Biopharma Resilience Index, Cytiva, 2021

[11] "COVID Ngamuk, Hara Parasetamol di China Naik 10 Kali Lipat Jadi Rp 600 Ribuan," KumparanNEWS, 21 December 2022.

[12] "Stok Vaksin BCG Kosong, Imunisasi Anak 1-6 Bulan di Cianjur Terhambat," DetikNews, 31 August 2021.

[13] Fitch Solutions, UN Comtrade, Ministry of Health

Exhibit 14:
Challenges across the Pharmaceutical and Medical Devices Value Chain



Research and Development

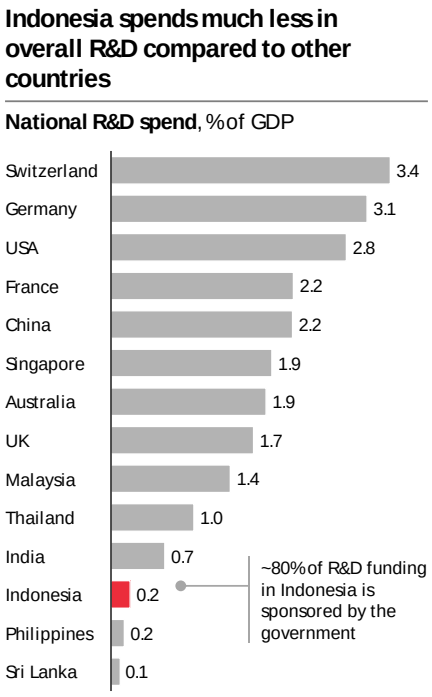
Indonesian pharmaceutical companies have minimal R&D programs, including Human Resource (HR) capabilities, as there is high focus on cost rather than value.

Historically, Indonesia has much lower spending on R&D compared to other countries. The percentage of GDP spent on research and development is 0.2% (around 80% of R&D funding in Indonesia is sponsored by the government), as compared with the top-tier country, Switzerland, at 3.4% or the highest neighbouring countries, China and Singapore, at 2.2% and 1.9% respectively[14] (Exhibit 15).

The challenges to developing a solid domestic base in Research and Development can be linked to social determinants such as education. There is not enough native R&D talent. Based on international Program for International Student Assessment (*PISA*) evaluation, Indonesia ranks in the ninth lowest rank of mathematics and science competencies, below four other ASEAN neighbours (Singapore, Malaysia, Brunei Darussalam and Thailand)[15], which results in below average number of researchers (0.40 per 1000 people in Indonesia, vs 5.0 in the United States, and 5.45 in Japan).

This led to low innovation in Indonesia e.g., lack of R&D into new technology for vaccines or biosimilars.

Exhibit 15:
Benchmark of National R&D spend



[14] World Bank

[15] "Why did Indonesia fare badly in PISA 2018?" The ASEAN Post Team, 11 December 2019.

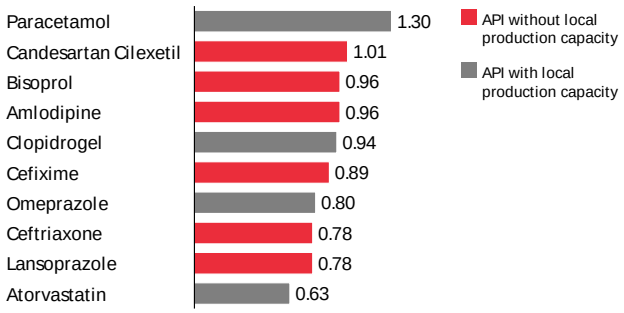
In-Industry limitations:

- Raw material sourcing is challenging, with
  a. lack of upstream processing materials e.g., cell culture media, cell lines, feeds
  b. lack of supply of chemicals needed for raw drug manufacturing. For example, methanol is currently only a by-product of chemical manufacturers and not manufactured for specific use in the pharmaceutical industry
  c. lack of supply of essential medical grade raw materials e.g., latex, plastic, steel
- Production processes are impeded by
  a. lack of capability to manufacture drug substances for more advanced vaccines
  b. minimal capability to manufacture APIs, resulting in a 95% reliance on imports, with native manufacturing capability for only four out of the 10 most consumed 10 APIs
  c. minimal local capability to create component prototyping and design testing

The result of this imbalance in that Indonesia is import reliant on three countries for top six consumed APIs, with four out of 10, or 60%, imported from China alone (Exhibit 16). India runs a close second, with Indonesia importing 30% of its APIs from there with the remaining 10% being imported from the EU.[16]

Exhibit 16:
Indonesia's API imports

Top 10 API by value, *Trillion Rp*



Breakdown of import source (by value), *%*

The bottom line is that in order to improve its pharmaceutical resiliency, Indonesia should aim to strategically import vaccines, pharmaceuticals and medical devices, moving from a net importer with frequent shortages of essential products to a country with the ability to manufacture strategically selected advanced medical products with centralized and strategic stockpile essential medical products to ensure availability even during crises (Exhibit 17).

Exhibit 17:
Aspirations for Pharma Resiliency

FROM	TO
Lack of capabilities to manufacture certain advanced healthcare products	**Ability to manufacture strategically selected advanced medical products**
High frequency of medical product shortages due to lack of essential product reserves	**Centralized and strategic approach to essential medical product stockpile** to ensure product availability
20th in Cytiva GBRI[1]	**Top 10** in Cytiva GBRI[1]

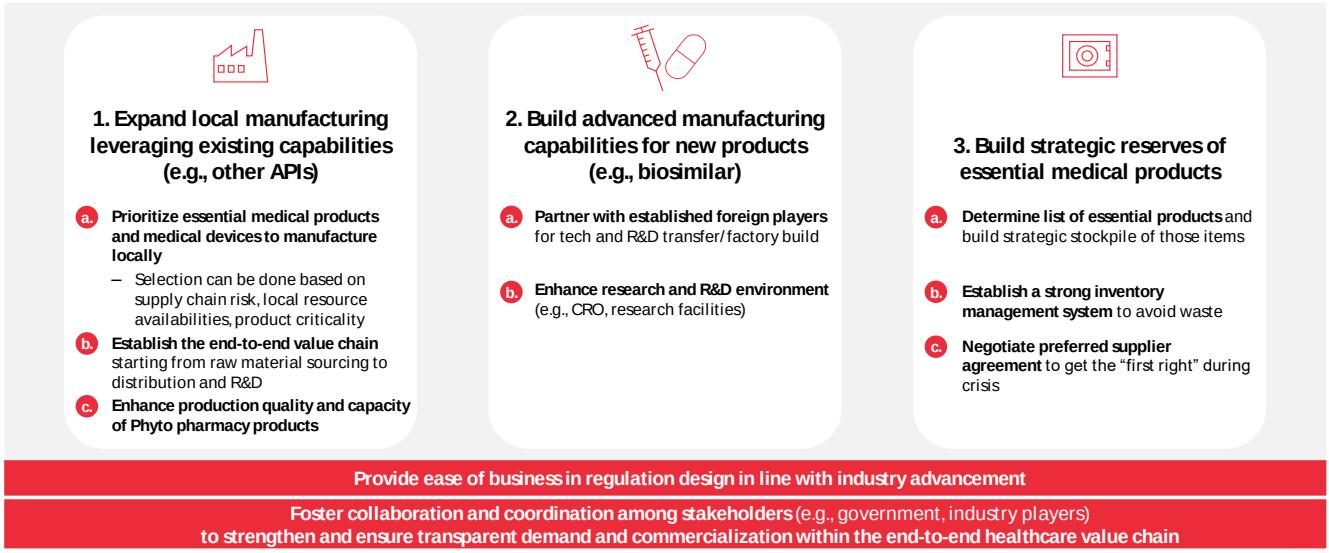
1. Global Biopharma Resilience Index done by Cytiva for 20 countries

16 Ministry of Investment/Indonesia Investment Coordinating Board, "Pharmaceutical raw material factory: Paracetamol, Clopidogrel, and Amoxicillin" 2021

Bold moves

There are three bold moves that Indonesia should focus on to improve healthcare resilience. This includes investing to build the ecosystem for the long-term and building reserves for crisis preparation (Exhibit 18).

Exhibit 18:
Pharma Resiliency Bold Moves



Bold Move One - Expand Local Manufacturing

With a population of over 270 million and a rapidly evolving healthcare landscape, Indonesia presents immense potential for bolstering its domestic manufacturing capabilities. There are 3 key moves to be taken:

- Prioritize essential medical products and medical devices to manufacture locally: Selection can be done based on supply chain risk, local resource availabilities and product criticality
- Establish the end-to-end value chain starting from raw material sourcing to distribution and R&D

Today, the pharmaceutical manufacturing landscape is fragmented. While Indonesia has approximately 200 pharma players, the large manufacturing plants are mostly located in West Java, which can create a distribution bottleneck to the rest of the archipelago. Additionally, large pharmaceutical players exist individually and do not often cooperate on R&D.

There are 5 ways to potentially strengthen the current pharma manufacturing to create a robust manufacturing hub and end-to-end value chain (Exhibit 19)

- Enhance production quality and capacity of Phyto pharmacy products, due to abundant local resources

Indonesia has the potential to become the largest producer of Phyto pharmacy, as Indonesia is one of the richest countries with diverse species of herbal plants. However, as of today, out of 30,000 plant species with potential herbal property, only 800 are used for herbal medicine. There are still very minimum local phyto pharmacy products available in Indonesia.

Case study: India

India pharmaceutical industry is among the largest in the world due to strong government support, such as:

- Phyto pharmaceuticals mission: R&D collaboration to advance the technology implementation in phytopharmaceuticals.
- Production Linked Incentive Scheme 2.0: awarding ~USD 2bn fiscal incentives for investors, including in phytopharmaceuticals.
- Amendment of domestic regulation to include phytopharmaceutical drugs.

From these 3 initiatives, India managed to achieve an annual growth of ~14% in herbal medicine market and USD $600 million of herbal remedy market in the country.

Exhibit 19:
5 Ways to potentially strengthen Pharma Manufacturing

5 ways to potentially strengthen current pharma manufacturing:

	**Advanced infra-structures**	• Build efficiencies through shared infrastructures in waste management and sewage system in order to reduce costs	›	Collaborated on **building a shared waste-water treatment facility** in order to reduce costs[1]
	**Skilled labor force**	• Develop skilled labor force in the fields relevant to biopharma manufacturing (e.g., chemistry, biology, engineering)	›	Invested in **industry-academic partnerships** in creating **targeted training programs and established the NIBRT[2]**
	**Reliable supply chain**	• Build reliable supply chain of raw materials and distribution of end-products (both domestic and export)	›	Implemented **traceability system** for major drugs **using RFID tags and barcodes** to track pharma products more accurately
	**Favorable regulations**	• Establish regulations that incentivize investments (both FDI and domestic) and stimulate demand for locally produced products	›	Incentivized partnership with foreign companies through **open access (e.g., reducing approval time) and lower tax**
	**Accelerate R&D**	• Invest in facilities to provide infrastructure needed to support R&D • Provide financial incentives (e.g., grants, tax breaks) for R&D • Optimize environment for clinical research, while maintaining high-level participant oversight, and data robustness and transparency	›	Incentivizes advanced biomedical research, innovation, and enterprise while **investing in the improvement of existing R&D infrastructure** Established **Clinical Trials and Research Centre (CTRC) as a one-stop center** to coordinate high quality clinical trials

Case Study: South Korea

Two decades ago, the South Korean government invested $360mn in 11 bioclusters and nine commercial development projects in order to boost medical product manufacturing.

This effort led to successful biohubs that integrate R&D, clinical trial centers and massive production capacity manufacturing:

- Songdo Bio Hub - one of the world's largest biohubs by production capacity (880kL), 80+ Life Science companies, 10 universities and research centres
- Seoul Bio Hub - houses nine universities, six medical centres and nine research institutes and multiple life science companies and start-ups

The South Korean biohubs are populated mainly by local companies, some of which are government owned. Such arrangements result in a positive end-to-end value chain and smooth technical transfers as part of Contract Development & Manufacturing Organizations (CDMO) or Contract Manufacturing Organisations (CMO) agreements.

The biohub system has boosted local manufacturing capacity to meet 80% of local demand and the country has become a significant exporter: 4% to the global medical device market and 7% to the Asia Pacific market. On top of that, investment and acceleration in R&D has resulted in successful innovations, with 33 new drugs launched and 300 drug candidates out-licensed, and ability to quickly adopt new technologies in the face of adversity, e.g., Covid-19 vaccines.

Bold Move Two - Build Advanced Manufacturing Capabilities

Beyond expanding the local manufacturing, Indonesia recognizes the importance of harnessing advanced pharmaceutical manufacturing capabilities to reduce reliance on imports, pave the way for economic growth, and establish a self-sufficient nation in the healthcare ecosystem.

To achieve this aspiration, there are 2 key moves Indonesia could take:

- Enhance research and R&D environment, e.g., CRO, research facilities
- Partner with established foreign players for tech and R&D transfer or factory build

Development of advanced manufacturing often require complex and expensive knowledge and technology. Hence, it is important for Indonesia to forge strategic partnerships with established foreign players to facilitate technology and R&D transfer for the development of pharmaceutical products, e.g., biosimilars.

There are 5 partnership models that Indonesia could consider with varying levels of control by local manufacturer, from high control to low control (Exhibit 20):

1. Technology transfer hub – A central hub established by public sector to provide technology to numerous recipients, including national drug regulatory authorities.
2. Facilitated (shared) transfer / platform – A technology transfer system from one or more donors to a single or multiple recipient(s). This partnership is usually facilitated by a public agency, e.g., WHO or PATH, providing a set of tools to each recipient, e.g., funding, technical support.
3. Joint venture and acquisition – A technology donor (typically an industrialized research-based manufacturer) acquires an existing facility in developing countries or joint funds with a local manufacturer to establish a manufacturing facility with retained rights over the use of technology and products.
4. Bilateral know-how transfer – An exchange of knowledge, expertise, and technical skills between a technology donor and technology recipient through a mutually beneficial agreement.
5. De Novo Manufacture – An establishment of manufacturing facility from scratch by existing multinational manufacturer, providing technology transfer but retaining all rights to the product.

An example of a rising advanced pharmaceutical products with potential to be locally produced in Indonesia is Biosimilars.

Biosimilars offer a valuable pathway for providing advanced medicines to large populations in the developing world and beyond. Biosimilar manufacturing is a nascent, fast-growing market with production in Asia expanding. The Indonesia biosimilar market is projected to rise 10-15% between 2018 and 2025[17].

However, the development of biosimilars is complex and very expensive. Currently, there are two Indonesian firms are actively pursuing the biosimilar market with successful partnership with established foreign players.

- Kalbe entered a joint venture with South Korean Genexine, Inc. and Shanghai Henlius Biotech, Inc. to aid tech transfer for biosimilars production. Kalbe already produces biosimilar versions of insulin and the hormone erythropoietin and is now developing and commercializing the biosimilar immunocology product.
- Etana Biotech has an out-license agreement with Innovent Biologics (Hongkong-based established biopharma company) to produce Bevazicumab, a biosimilar-based cancer treatment.

The development of biosimilars and manufacturing capabilities are also supported by favourable regulations to attract Foreign Direct Investment (FDI). Currently Indonesia is relatively supportive in developing biosimilar regulatory pathways compared to peer countries, although significant time and investment will be required for technology transfer and capability building.

Exhibit 20:
Five potential partnership models

	Type	Description	Example
MNC local manufacturing	**De novo manufacture**	**Existing multinational manufacturer establishes from scratch a wholly owned facility in a different country**, providing technology transfer but retaining all the rights to the product	moderna →
Increasing transfer of 'control' to local manufacturer (*Less control* → *High control*)	**Bilateral know-how transfer**	Occurs between a **technology donor and technology recipient**	Pfizer → BIOVAC
	Joint venture and acquisition	**A technology donor** (typically an industrialized research-based manufacturer) **acquires an existing facility** • In developing countries or joint funds with a local manufacturer to establish a manufacturing facility… • ..but retains significant rights over the use of the technology and the product	SANTO HOLDING → ARISTO
	Facilitated (shared) transfer / platform	**Technology transfer from one or more donors to a single/ multiple recipient(s)** • Facilitated by a public agency such as WHO or PATH providing a set of tools to each recipient (e.g., funding, technical support etc.)	PATH → SII
	Technology transfer hub	**A central hub is established by the public sector to provide technology to numerous recipients**, including national drug regulatory authorities	Afrigen *(SA mRNA hub)*

[17] Expert interviews

Bold Move Three - Build Strategic Reserves

Building a strategic stockpile of key pharmaceutical products is crucial to maintaining resiliency.

Case studies: US and Finland

Inventory management and state-facilitated centralized emergency stockpile are crucial to establish a rotation system and prevent medical supply inefficiencies.

United States established the Strategic National Stockpile, which is a supply of antibiotics, vaccines, chemical antidotes, antitoxins, and other critical medical supplies.

Finland established the Finnish National Emergency Stock of medicine, which is supplied by all medicine producers, importers. Regulations ensure equitable access during crisis such as prohibiting the purchase of similar drugs simultaneously, e.g., paracetamol and ibuprofen. It holds ten months of antibiotics, six months of anaesthetics and three months of asthma medicines.

Currently, Indonesia has no state-facilitated centralized emergency stockpile effort. Indonesia can learn from US and Finland to enhance its resiliency by:

- Building a network of warehouses in secret locations across the country to store emergency use critical medical supplies and equipment
- Establishing guidelines to renew list of critical goods stockpiled in reserves periodically
- Setting up clear and effective request procedure for the use of stockpiled reserved in time of emergency

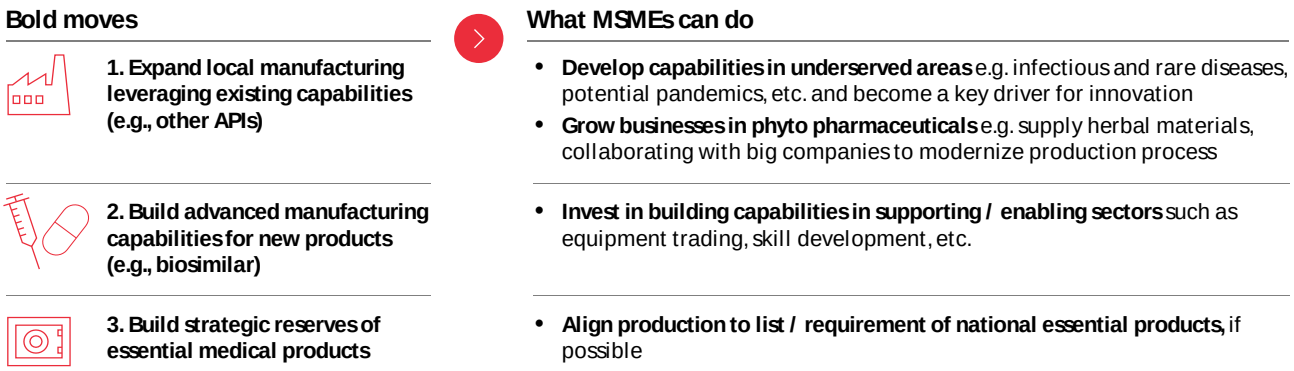
Beyond state-facilitated centralized emergency stockpile, it is also crucial to establish a rotation system to ensure efficient product usage with minimum waste. Rotation system involves a) transfer of older reserve items to hospitals and to suppliers, and b) replenishment of the reserve with new items from suppliers.

Roadmap

MSMEs also have a role to play in implementing the key unlocks. Some ways MSMEs can participate are the following (Exhibit 21)

- Develop capabilities in underserved areas e.g., infectious and rare diseases, potential pandemics, etc. and become a key driver for innovation
- Grow businesses in phyto pharmaceuticals e.g., supply herbal materials, collaborating with big companies to modernize production process
- Invest in building capabilities in supporting / enabling sectors such as equipment trading, skill development, etc.
- Align production to list / requirement of national essential products, if possible

Exhibit 21:
Role of MSMEs in the Pharma Sector



Furthermore, these bold moves can be potentially implemented through initiatives that are phased up till 2045 (Exhibit 22).

Exhibit 22:
Roadmap for Unrivalled Health Resiliency

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholder
1. Expand local manufacturing leveraging existing capabilities	**Prioritize key products to manufacture domestically and expand the capacity of existing manufacturing capabilities** to eliminate import of raw materials (API) that can be locally produced **Expand the capacity of existing manufacturing capabilities** **Assess gaps in medical devices and determine clear prioritization list on key medical devices needed**	**Regularly review and update prioritized key products and medical devices to be manufactured domestically** **Further expand manufacturing capacity of essential API and finished drugs** to achieve economy of scale **Further expand manufacturing quality and capacity of key medical devices**			• Ministry of Health • BPOM • Pharmaceutical industry players
2. Build advanced manufacturing capabilities for new products (e.g., biosimilar)	**Establish partnership with foreign players** for essential medical devices and complex pharmaceutical products e.g., biosimilar **Conduct programs to transfer knowledge between foreign and local talents** to be able to fill capacity and capability gap **Build production facilities and establish tech transfer** for key products	**Ensure sustainable supply of local biopharmaceutical talents** through partnerships between universities and biopharma manufacturers **Enhance research environment and innovation** by attracting CRO and establish research facilities; **Enhance focus on research and discovery of innovative products**			• Ministry of Health • BPOM • Pharmaceutical industry players
3. Build strategic reserves of essential medical products	**Determine the list of essential medical supplies to be stockpiled** incl. medications, medical equipment, and makeshift hospital tents, **and periodically renew the list** **Designate location strategically and build initial network of warehouses** as emergency supply center for highly populated area **Set up a best-in-class warehouse management system** to periodically replace stockpiled inventories and avoid wastage **Establish an effective emergency medicine supply deployment system** in times of emergency	**Expand the network of warehouses to cover all regions in Indonesia**			• Ministry of Health • BPOM • Pharmaceutical industry players

Key metrics and enablers

To ensure the success of the achievement of Indonesia aspirations in pharmaceutical sector, four essential enablers should be in place:

1. Transversal technologies: Tech-enabled medical product inventory management (e.g., remote monitoring, RFID tags) to enable transparent assessment of goods availability
2. Talent capabilities: Skilled talent in the fields relevant to pharma manufacturing (e.g., chemist, engineers)
3. Transportation and logistics: Transportation and cold-chain distribution capabilities throughout Indonesia to ensure access to key medical products for remote areas
4. Regulation: Fostering public private collaboration to regulate, coordinate incentives, monitor and provide other forms of support

Lastly, progress of these bold moves can be tracked through metrics until 2045 (Exhibit 23).

Exhibit 23:
Pharma resiliency key metrics

Key metrics	Source	Current	2030	2035	2040	2045	Note
%of essential drugs consumed produced locally (by value)	MoH	10%	Target to be determined				
%of vaccines consumed produced locally (by value)	MoH	Metric to start being tracked				60%[2]	2045 targets based on India today
%of medical device used produced locally	MoH	4%	13	22	31	40%[2]	2045 targets based on Japan today
Existence of strategic reserves	MoH	Metric to start being tracked				Yes	2045 targets based on US/Finland today
Days inventory of essential medical products in strategic reserves	MoH	Target to be determined					

Establish a self-sustaining food security ecosystem

Context and challenges

In recent years, the world has faced a heightened sense of urgency and concern surrounding global food security, primarily driven by the impacts of COVID-19 and the conflict in Ukraine. These challenges have reverberated across borders, extending their repercussion to Indonesia as well.

Indonesia ranks low on most metrics of food security in the 2022 Global Food Security Index (GFSI). GFSI score consider 4 main components: availability, quality and safety, affordability, and sustainability and adaption (Exhibit 24).

However, across all metrics, Indonesia's food security presents highest opportunities for enhancement across three pivotal areas: Availability, Quality, and Affordability, as Indonesia was ranked 84th in Availability, 78th in Quality and 44th for Affordability out of 113 countries (Exhibit 25).

Exhibit 24:
Global Food Security Index (GFSI) Ranking and its Components

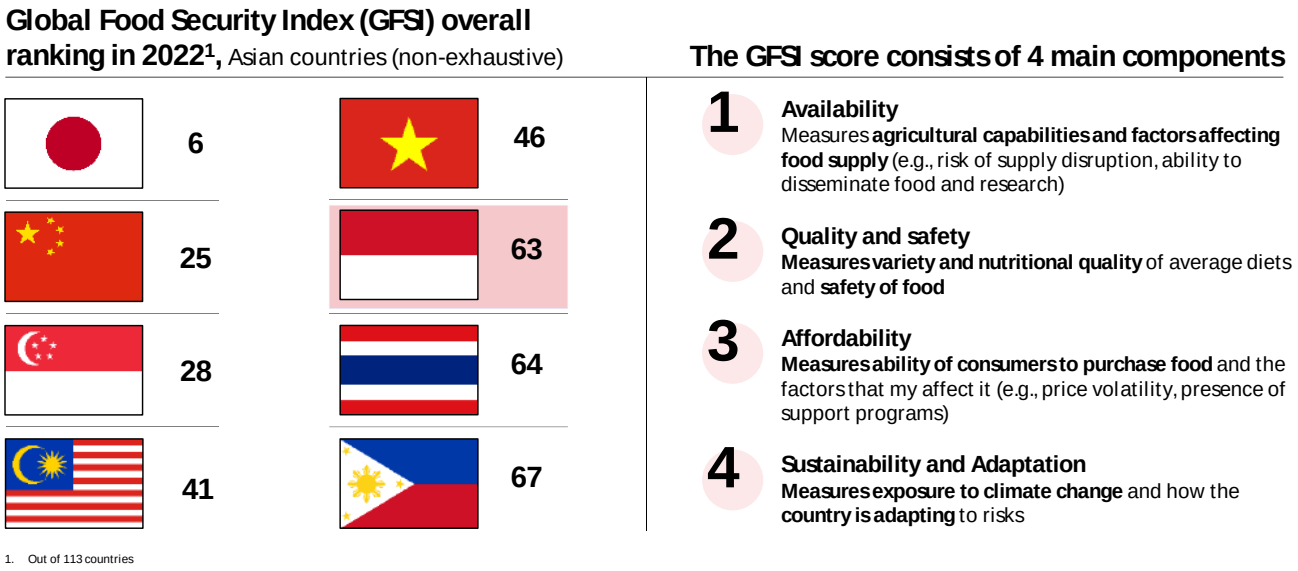
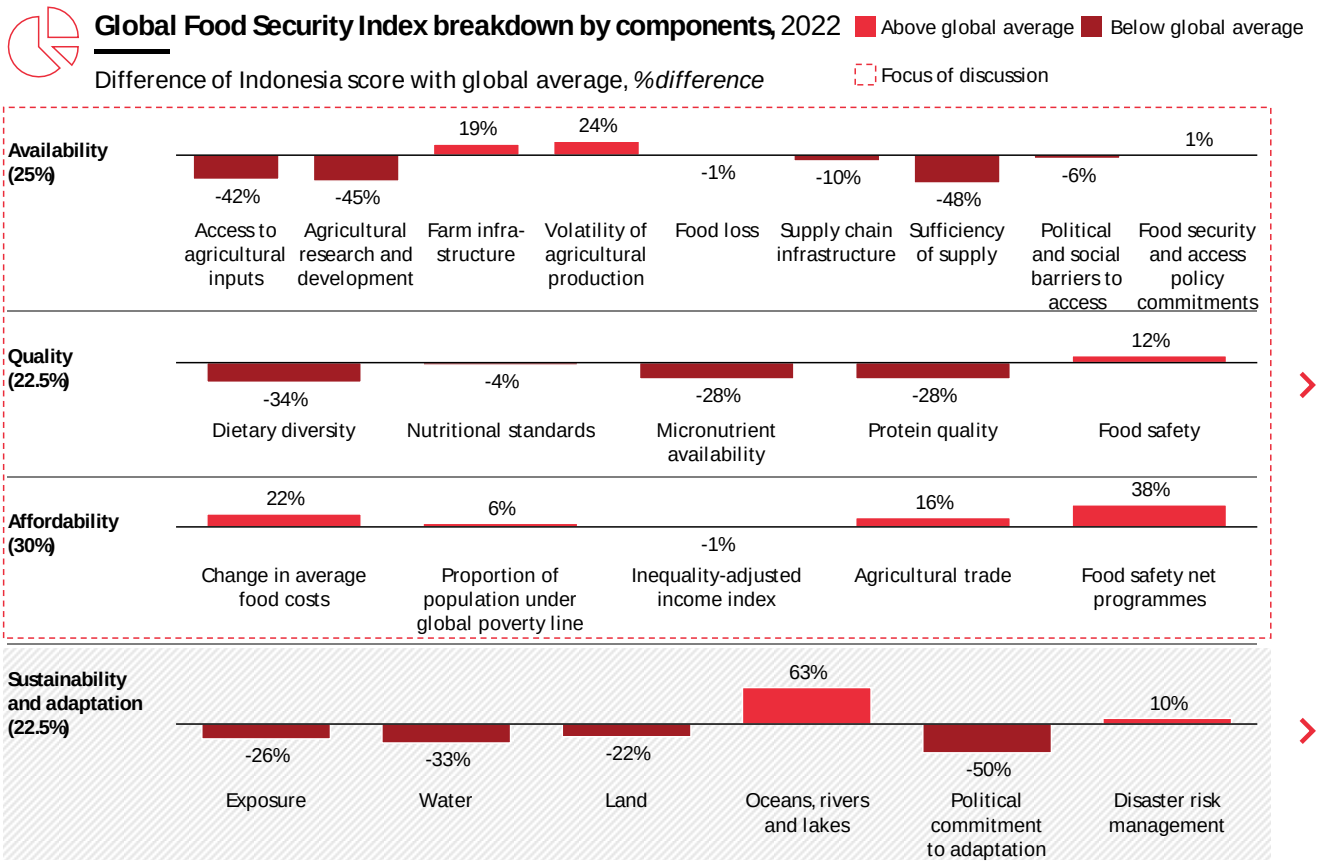


Exhibit 25:
Global Food Security Index (GFSI) Breakdown by Components



Availability

Indonesia scores particularly poorly on availability and quality elements of the index. Indonesia is vulnerable to floods and pest attacks that can result in an unpredictable food supply which in turn often results in food shortages and price spikes. For example, flood and pest attacks in 2021 resulted in rice shortages that pushed prices up 5% nationally and up to 30% in certain regions.

In fact, 83% of districts are classified as high flood-risk and since 2010, tens of thousands of floods have caused an estimated economic loss of Rp 22.8 trillion. Recently, between December 2021 and January 2022, floods damaged over 150k hectares of farmland resulting in 19k hectares of crop failure.[18]

In end of 2022, pests attacked farms in Jawa Tengah region, damaging 30-40% of crops in the region.[19] In total, pest infestations and crop diseases result in failed harvest or lower yields causing an estimated 30% loss of crops annually.

An improved national integrated Food Balance Sheet (FBS) would help to alleviate some of the problems of crop shortage due to floods and pests.

[18] "Ratusan Hektare Sawah di Kramatwatu Terendam, Petani Terancam Gagal Panen," Radar Banten, 1 March 2022.

[19] "Harga Beras di Kabupaten Semarang Naik, Produksi Padi Menurun Akibat Terserang Hama," TribunMuria.com, 15 September 2022.

Indonesia's existing FBSs are generated by multiple government agencies (e.g., Ministry of Trade, PT Rajawali Nusantara Indonesia) and are not integrated. The lack of integration across the different food balance sheets causes differences in data. This lack of accuracy retards the predictive ability to prevent price spikes. As a result, current FBS practice lacks the ability to manage price increases by enacting preventative interventions.

The government could not easily supplement the rice supply because the national reserves were not balanced. The result was that in 2022, rice reserves had to be imported from other countries at a high price.

Beyond rice, for import reliant crops, there is room for improvement in Indonesia's current trading strategy. Indonesia relies on a few countries to import some of its key foodstuffs, such as soybean, sugar, wheat and meat, which results in high price fluctuations for these goods.[20]

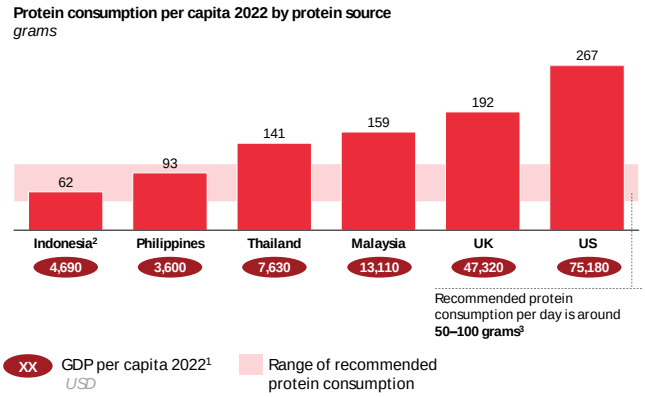
Quality

The availability of food as it relates to nutrition is linked to the quality as well as cost and consumer choice. Compared to her global and regional peers, Indonesia shows room for improvement in the area of Quality as well, which is defined by the nutritional value of available food.

The consumption of protein is unequal across Indonesia. Protein consumption per capita is lower than other ASEAN countries. In 2022, the average Indonesian consumed 62 grams of protein per day (per capita) as compared to 93 daily grams in the Philippines, 141 daily grams in Thailand and 159 daily grams in Malaysia. Internationally, the highest consumption per capita is the USA with 267 daily grams (Exhibit 26).

This means that the daily protein consumption of the average Indonesian barely meets the minimum requirement of protein consumption but not enough for muscle growth.[21]

Exhibit 26:
Benchmark of Protein Consumption per Capita



When compared to ASEAN peers, Indonesia has a lower protein consumption rate even though it has a higher GDP than, for example, the Philippines. There are several reasons for this seeming contradiction.

One is myths or misinformation that is passed down generationally, such as "eating fish causes allergies and mercury poisoning," which results in lower protein consumption.[22]

Another factor is the unequal consumption of protein across provinces. The lowest earners consume <50 grams of protein daily, potentially as a result of higher protein prices.

Provinces with a lower percent of urban population tend to have lower protein consumption. This pattern could be a result of:

- Poor distribution channels to rural areas resulting in limited supply and higher prices of protein
- Higher protein prices resulting in preference of lower-cost carbohydrate options, such as plain rice, that are not as nutritious

[20] "Atasi Lonjakan Harga Daging Sapi, Komisi VI DPR Minta Pemerintah Setop Impor," Kompas.com, 4 March 2022. "Harga Daging Sapi Menggila, Pedagang: Pemerintah Tolong Turun Tangan," Liputan6.com, 25 December 2022.

[21] The US National Institute of Health recommends 0.8 gr of protein per kilogram of bodyweight, while the Mayo Clinic recommends two grams of protein per kilogram of bodyweight for muscle building; the average body weight in Asia is 65kg.

[22] Based on a study by the Research Institute for Environment and Livelihoods at Australia's Charles Darwin University.

- Lack of education about the importance of protein consumption resulting in a preference for starchy foods and snacks

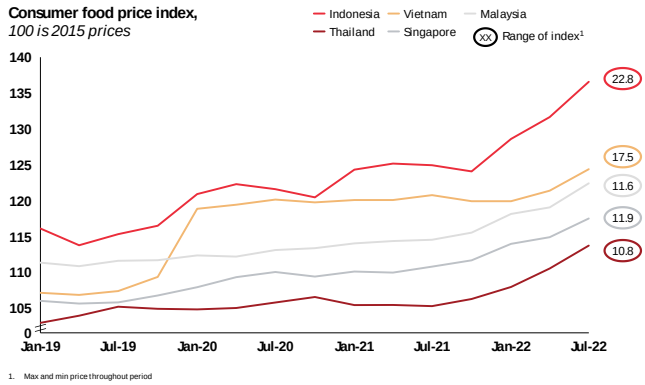
Affordability

Although Indonesia scores generally well in food Availability (84th out of 113), the food price index shows food prices have increased more in recent years than her ASEAN peers. Compared to 2015, food prices increased by 22% in Indonesia while Thailand saw increase of only 15% (Exhibit 27).

This spike in food price, particularly, in early 2022 was driven due to the Ukraine-Russia conflict, as Indonesia is heavily dependent on food import. Simultaneously, price increases were exacerbated by crop damage due to floods and pests. Given that roughly 10% of Indonesia's population lives below the poverty line, these price fluctuations put many citizens at risk of not being able to afford sufficient food to prevent malnutrition.

To look at regional success stories, over the past ten years, Japan has maintained a high food security score due to maintaining a strong agricultural processing resulting in low volatility of food price and a population that has preference for nutritious food. While China was able to increase their score the most due to improving agricultural process to increase farmer productivity and increasing food safety and nutrition programs to encourage a nutritious diet.

Exhibit 27:
Consumer Food Price Index Benchmark



One of the factors that affects food affordability in Indonesia is poor agricultural processing due to a large population of smallholder farmers with low productivity. In Indonesia, 98% of farms are smaller than 0.5 hectares with the average size being 0.6 hectares. Only 0.3% of farms are larger than ten hectares.[23]

This large population of smallholders and small average farm size results in challenges for farmers across the agricultural production value chain (Exhibit 28).

To improve food resiliency, Indonesia should aim to strategically adopt best-in-class technology to increase productivity, adopt data-driven decision making to manage reserves and imports, and to increase access and consumption of nutritious food across the nation.

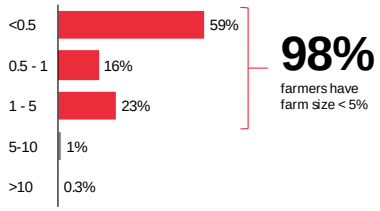
In order to improve food security, Indonesia should aim to adopt best-in-class technology, data-driven decision making and boost healthy consumption of nutritious food (Exhibit 29).

[23] Based on FAO 2010 (latest available data), while Indonesia data is updated based on 2019 BPS data.

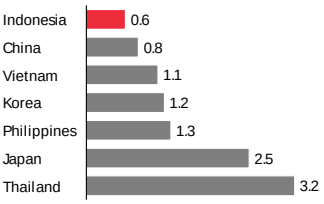
Exhibit 28:
Average Farm Size and Farmers' Challenges across the Value Chain

Large population of smallholders and small average farm size…

Breakdown of households by farm size, *%*



Average farm size, *Ha*[1]

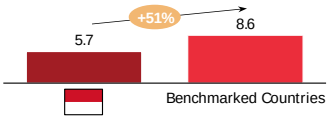


…results in challenges for farmers across the value

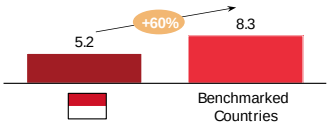
Financing	Inputs	Processing	Selling
Poor access to finance especially for smallholders • >55%of farmers have no credit lines or loan facilities	**High input prices** due to less negotiating power with suppliers	**Low productivity due to low mechanization rates;** mechanization (e.g., use of tractors, AgTech solutions) need scale for the unit economics to make sense	**Layered trading network** as distributors *(tengulak)* are needed to consolidate products from many smallholders As a result, the price of food to the consumer is higher as every layer takes a margin

As a result, Indonesia has a lower crop yield when compared to benchmarked countries[2]

Corn (Maize) yield, *Tons/Ha*



Rice yield, *Tons/Ha*



1. Based on FAO 2010 data (latest available data), while Indonesia data is updated based on 2019 BPS data
2. Benchmarked countries value is taken from highest yield of countries with similar climate to Indonesia

Exhibit 29:
Aspirations for Food Security

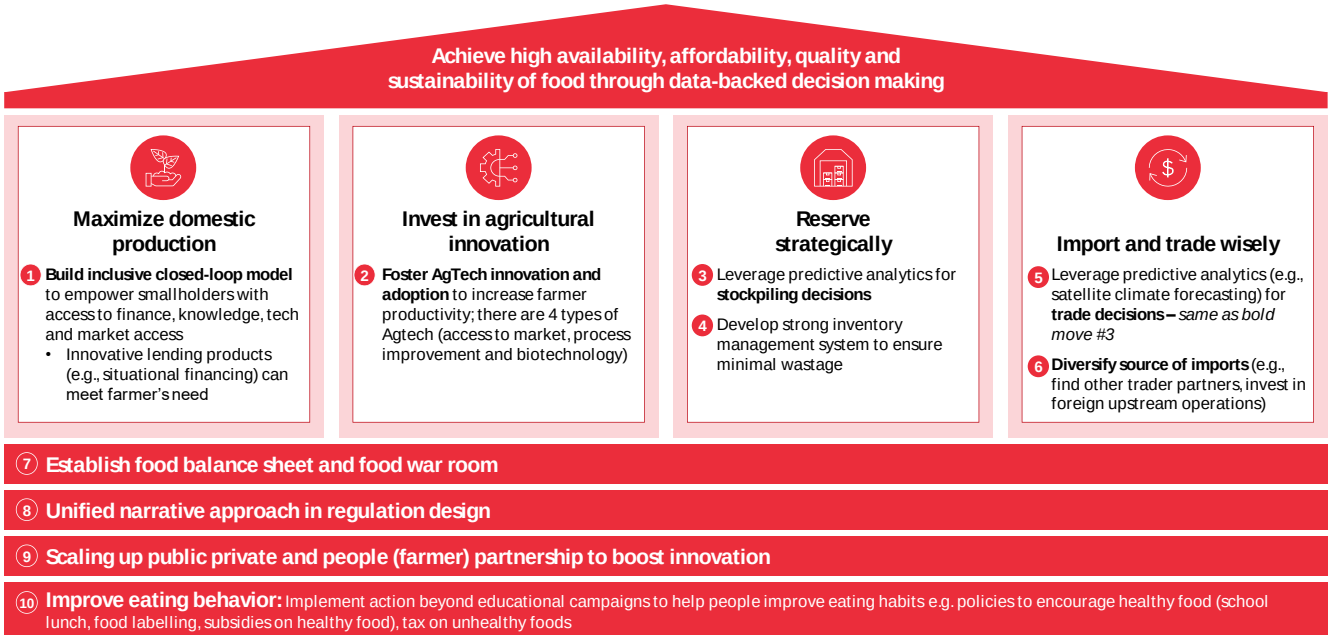
FROM	TO
Small farms with **low economies of scale** and **low technology adoption, resulting in low productivity**	**High adoption of best-in-class technology resulting in high productivity of food production**
High price fluctuations of food due to lack of data-based decision making	**Data-driven decision making on reserves and imports** to ensure price stability
Below standard consumption of nutritious food (e.g., protein) in certain regions	**Healthy consumption of nutritious** food across Indonesia
63rd **in GFSI ranking**[1]	**Top 20** **in GFSI ranking**[1]

1. Based on Global Food Security Index dene by EIU for 113 countries

Bold moves

Indonesia can achieve strong food availability and quality while maintaining affordability through four bold moves (Exhibit 30).

Exhibit 30:
Food Security Bold Moves



Bold Move One- Maximize Domestic Production

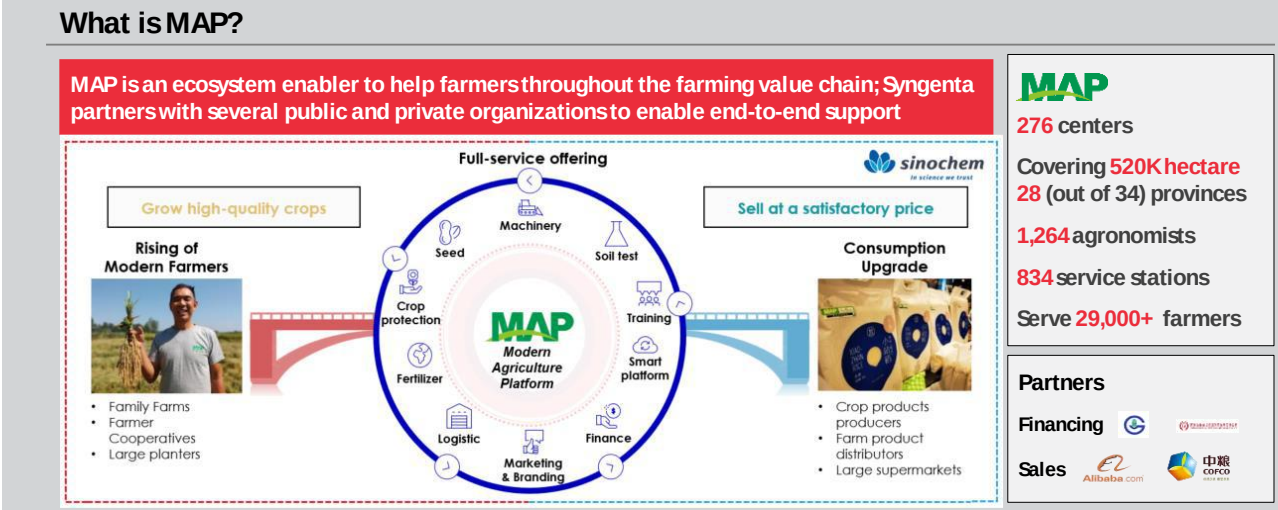
With a growing population and the need to meet the nutritional demands of its people, it is important for Indonesia to maximize its domestic food production and reduce the reliance on import. To do this, Indonesia could adopt an inclusive closed-loop model that empowers smallholders by providing them with essential resources and market opportunities. In addition, this move can be accelerated by establishing an innovative lending product that are tailored to meet the specific needs of farmers.

Case Studies: China, Africa

Much like Indonesia, Chinese agriculture is dominated by smallholders with low mechanization rates. To address this challenge, the Syngenta China Group, a coordinated enterprise of SOEs and private sector companies, devised and deployed a Modern Agriculture Platform (MAP) that successfully scaled up small farmers by building an inclusive closed-loop model.

MAP is an ecosystem enabler to help farmers throughout the farming value chain; Syngenta partners with several public and private organizations to enable end-to-end support (Exhibit 31).

Exhibit 31:
Syngenta China Group's Modern Agriculture Platform (MAP)



Farmers that were part of MAP experienced a 36% decrease in fertilizer usage and a parallel 50% increase in water productivity. The outcome of this boost was a massive improvement for farmers as they experienced a 15% increase in income.

In Nigeria and Kenya, situational financing, a system in which pre-approved loans can be used with specific partner suppliers for a pre-defined purpose, has also helped farmers with their financing needs through asset-based offerings and timing flexibility. In Nigeria, Babban Gona, facilitates the creation of farmer-owned franchises by:

- Offer products and services on credit (e.g., agricultural inputs, training on farming techniques, etc.)
- Allow loans extended to farmers to be only repayable at the end of the growing season / post-harvest
- Provide market access by purchasing produce from farmers after harvest, storing it and selling it when prices are favourable

In Kenya, the One Acre Fund offers smallholder farmers:

- Asset-based financing in the form of agricultural and non-agricultural products, including seeds (e.g., maize, trees and other crops), fertilizer, storage bags, drying sheets, solar lamps, and cookstoves etc.
- Crop insurance to mitigate risks of drought and disease

The positive impact of such programs is felt by all stakeholders. The income of smallholders who work with Babban Gona is up to 2.5 times greater than that of the average Nigerian smallholder. In Kenya, ninety-two percent of farmers in the One Acre Fund program repay their loans in full and earn on average 1.4 times more than farmers not in the program.

Indonesia should encourage public-private partnership to establish a closed-loop model and innovative financing for farmers and food producers to boost their productivity and income.

Bold Move Two - Invest in Agricultural Innovation

Although many AgTech capabilities and players exist in Indonesia, adoption is still nascent (Exhibit 32). Accelerating adoption can supercharge domestic food production.

Exhibit 32:
Types of AgTech capabilities

Category	AgTech ecosystem	Services
Access to market	Providing direct market linkages	**Creating market linkages through digital platforms / mobile apps** growers and customers for purchase and sale of agriculture products
Process improvement	Smart farming using IoT sensors	**Smart sensors that collect data** to help food producers monitor crop health, weather, and soil quality
	Precision farming using predictive analytics	**Use of big data** to calculate the precise levels of inputs to use to increase productivity or yield
	Farm management tools / calculators	**Farm management software/ dashboards** for operations, yield management, etc.
	Mechanization of manual processes	Using technology (e.g., smart irrigation, drone sprayer) to mechanize currently manual processes
Biotechnology	Hybrid and GMO seeds	Using technology (e.g., smart irrigation, drones) to mechanize currently manual processes

With growing food demand and pressing need to improve food security in Indonesia, it is crucial for Indonesia to invest in agriculture innovation, e.g.., AgTech. Fostering AgTech innovation and adoption, can help Indonesia to be a thriving and resilient country in agricultural and food security sector, by empowering smallholders' food producers, increasing their productivity, and addressing sector challenges.

Today, many AgTech capabilities and players exist in Indonesia. However, adoption is still low and nascent. Although, based on data from 2017 to 2020, Indonesian farmers are connected to the world with 85% having good access to the internet; 65% have smartphones and 75% use the internet daily. But, only 20% are willing to use weather forecasts and consider weather data as part of an integrated solution.[24]

[24] McKinsey Indonesia Digital Farmer Survey 2020, Center for Indonesian Policy Studies

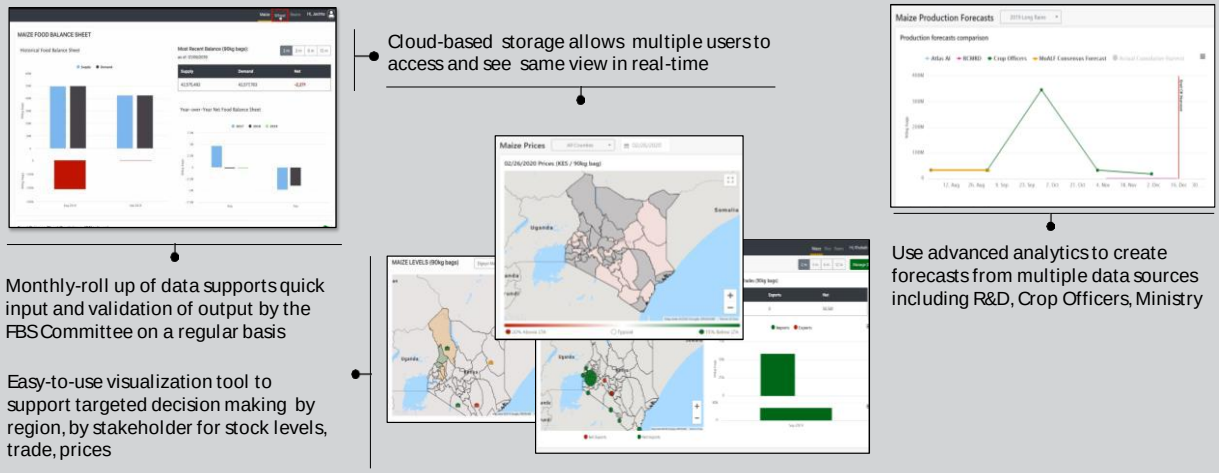
Enabler Seven – Establish Food Balance Sheet and Food War Room

Case Study: Food Balance Sheet, Kenya

In Kenya, an FBS system was trialed that used advanced analytics to create forecasts from multiple data sources including R&D, Crop Officers, and Ministries. A monthly roll-up of data supported quick inputs and validation of outputs by the FBS (Exhibit 33).

Committee meets on a regular basis while cloud-based storage allows multiple users to access and see same view in real-time. Easy-to-use visualization tools support targeted decision making by region, by stakeholder for stock levels, trade, prices.[25]

Exhibit 33:
Food Balance Sheet in Kenya



The FBS committee brings together various groups who can provide input into the balance sheet to ensure that the Ministry has the best possible information. This allows others outside the Ministry to have more confidence in the estimates – knowing many groups have been consulted – and creates "one source of truth".

The integrated FBS system also plays an important role in understanding the private sector's concerns and needs by providing an incentive for the private sector and SOEs to share information, knowing they are part of the solution, while maintaining data confidentiality.

A Food Security War Room can be the key action of FBS as an intervention during emergency. Food Security War Room (FSWR) refers to a command centre that monitors and provides leadership for food security position in times of crisis.

To ensure the success of the FBS, a comprehensive and precise data collection is needed. In Indonesia, Pasar Induk is a potential platform for data collection, by collaborating via the Pasar Komoditi Indonesia (Paskomnas), where Pasar Induk act as a “middle-man” between customers and food producers.

[25] Kenya digital use cases study.

Enabler Eight - Scaling up Public Private and People (farmer) Partnerships to Boost Innovation

Given the scale of investments, People-Pubic-Private (PPP) Partnerships and improved distribution are required to ensure food accessibility for everyone. There are three main types of PPPs that Indonesia can consider to scale-up smallholders (Exhibit 34).

Exhibit 34:
Examples of Public-Private Partnerships

P Public P Private P People

Types of PPP	Examples: Problem	Initiative	Stakeholders	Impact
Value Chain Development	Maize farmers were failing to **increase yield despite dramatic increase in chemical fertilizes** which damage the arable land[1]	**Maize system –** private sector contribute products e.g., seeds, fertilizers and equipment while scientists from CARS of on-site demonstration of item usage; private sector offer offtake agreement	P Ministry of Agriculture, Chinese Agriculture Research System (CARS) P Sinochem, Cofco, Maize P Farmers, farmer cooperatives	**Maize yield increased by ~15%** for smallholders part of PPP, reduction in GHG emissions by ~19%
Developing Agricultural Infrastructures	Farmers sold produce right at harvest time resulting in lower selling price, and had difficulty getting financing	**Warehouse Receipt System –** a program where farmers can deposit their produce in warehouses and get a receipt (which can be used as collateral financing)	P Government of Kenya, Ministry of P EAGC[2], Lesiolo Grain Handlers, Equity Bank P Maize farmers	25,000 tones of grain stored, farmers experienced **reduced post-harvest losses and increase in credit access**
Agricultural biotechnology R&D	**Wheat crop yield was low in rainfed areas**, seed manufacturers were not incentivized to improve seed due to frequent climatic variations	**Drought resistant wheat seed** (Chakwal-50) was developed, manufactured and distributed to farmers in selected rainfed regions	P Government of Punjab P Zamindara Seed Corporation, Barani Agricultural Research Institute P Local farmers	90,000 kg of drought resistant seeds were produced, ~**32% increase in yield** of new seed

1. Yield increased by 15% while fertilizer use increased by 90%
2. Eastern Africa Grain Council - Nonprofit focused on improving grain farmer welfare

Roadmap

MSMEs also have a role to play in implementing the key unlocks.

Some ways MSMEs can participate are the following (Exhibit 35)

Exhibit 35:
Role of MSMEs for Food security

Bold moves	What MSMEs can do
1 **Build inclusive closed-loop model**	**Leverage digital platform for smallholders** to exchange knowledge and experiences to other MSMEs and get direct marketing channels
2 **Foster AgTech innovation and adoption**	Be open and adopt **digital platform to connect with other farmers and customers for sales**
3 **Leverage predictive analytics for stockpiling and trade decisions**	**Participate in digital capability building and adopt predictive analytics tools** to identify trends, forecast demand, customer segmentation, price optimization, and supplier performance
4 **Develop strong inventory management**	-
5 **Diversify source of imports**	**Establish relationship and partnership with other farmers, producers, and suppliers** to reduces reliance on intermediaries and minimize food waste in the supply chain

Furthermore, these bold moves can be potentially implemented through initiatives that are phased up till 2045 (Exhibit 36).

Exhibit 36:
Roadmap for Establishing a Food Security Ecosystem

Bold Moves	2023-2030	2031-2035	2036-2040	2041-2045	Relevant stakeholders[1]
1 **Build inclusive closed-loop model**	**Prioritize 3-5 key crops to prioritize** for closed-loop model **Set up public-private-people partnership** that provide inputs, financing, and access to market and extension services **Identify target locations to pilot** and conduct diagnostics **Pilot inclusive closed-loop model** in 10 cities	**Scale-up closed-loop model** to 100 other priority cities across other priority crops			Ministry of Agriculture Agriculture organizations and associations (e.g. farmers and producers) Agribusinesses Local governments
2 **Foster AgTech innovation and adoption**	**Incentivize use of biotechnology inputs** (e.g., hybrid seeds, GMO, higher efficiency fertilizer, insecticides) through inclusive closed-loop model, sponsoring and educating farmers	**Foster adoption of AgTech for farmers** with enough scale **Set up biotechnology R&D ecosystem** (fund research, scholarship and provide facilities)		**Launch new biotech products**	Ministry of Agriculture AgTech businesses Agricultural organizations, associations, and businesses
3 **Leverage predictive analytics for stockpiling and trade decisions**	**Establish clear stockpile governance** (Food Balance Sheet Committee and Food Security War Room) **and strategy** (which items to stockpile, how many days inventory) **Develop strong physical and digital stockpiling infrastructure** (e.g., warehouse, inventory management)	**Implement data analytics infrastructures** (e.g., climate forecasting, supply chain risk news analysis) to enable predictive capabilities	**Iterate data analytics models** to improve predictive capabilities **Leverage data and predictive infrastructure** to make stockpile, import and trade decisions		Ministry of Agriculture Ministry of Trade Research institutions and universities Agricultural organizations, associations, and businesses
4 **Develop strong inventory management**	**Set up monitoring cadence and dashboards** to closely monitor food security metrics **Build data collection and storage infrastructure** for data to be used in predictive modelling				Ministry of Agriculture Agricultural organizations and associations
5 **Diversify source of imports**	Determine which crops are deprioritized for domestic production and **identify multiple trade partners** for each crop **Establish strategic partnerships** with the identified trade partners Set up committee and fund to **identify upstream investment opportunities and execute investment**	Leverage **strategic partnership with trade partners and foreign investments** to maintain availability of food			Ministry of Agriculture Ministry of Trade Agricultural organizations and associations Agribusinesses

Key metrics and enablers

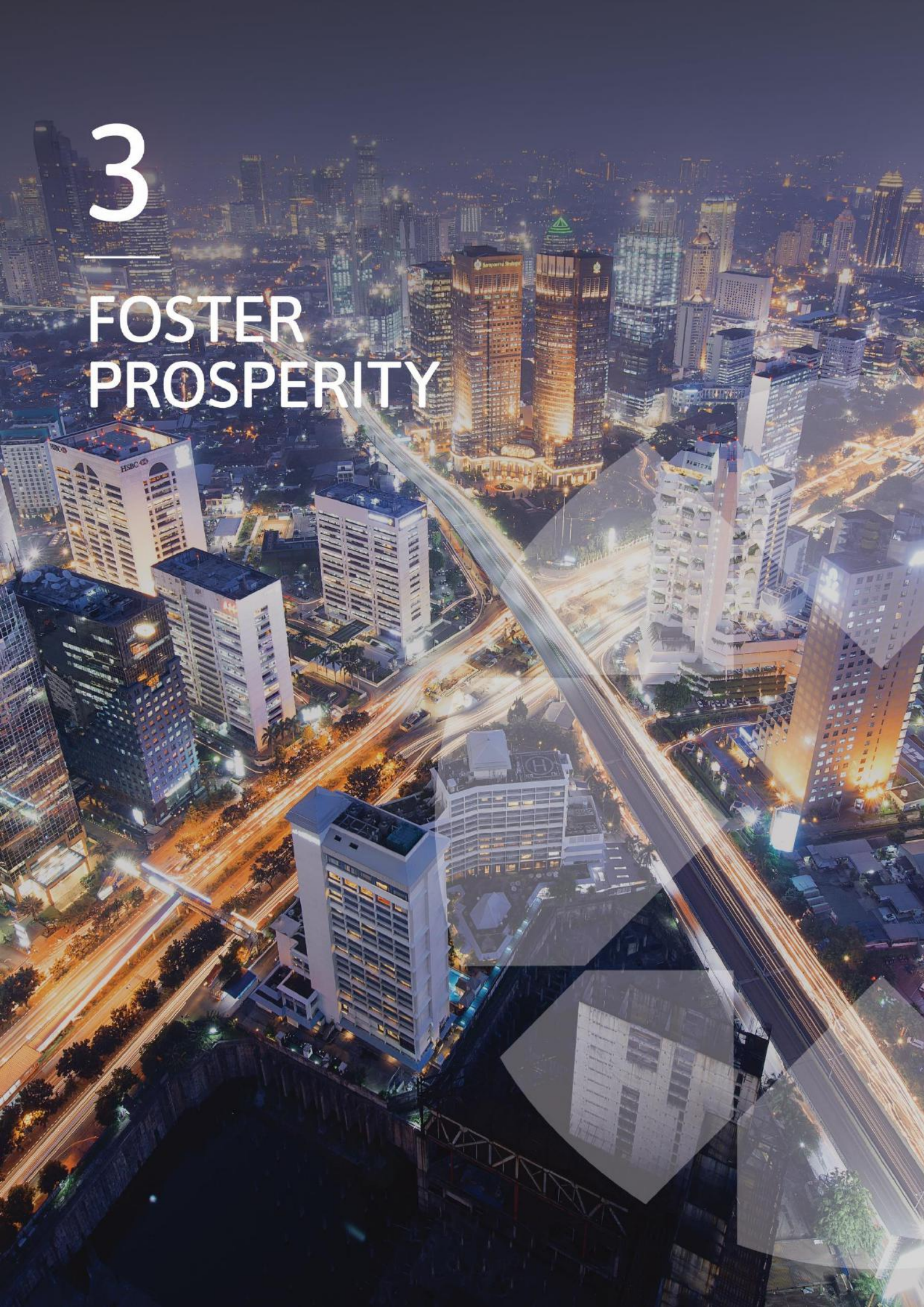
To ensure the success of the achievement of Indonesia aspirations for food security sectors, four essential enablers must be in place:

1. Transportation and logistics: transportation and cold chain distribution throughout Indonesia to ensure equal access and prices for everyone
2. Public private partnership: strong public private and farmer partnership to scale smallholders and maintain strategic reserves; offtake agreements to drive demand for farm owners
3. Regulation: adaptive trade regulation to adjust trade practices depending on supply and demand dynamics, e.g. import quota
4. Consumer education: access to proper nutrition education so consumers understand healthier eating habits

Lastly, progress of these bold moves can be tracked through metrics until 2045 (Exhibit 37).

Exhibit 37:
Food security key metrics

	Key metrics	Source	Current	2030	2035	2040	2045	Note
Overall	**Global Food Security Index Ranking,** *rank*	EIU *(2022)*	63rd	52nd	41st	30th	Top 20	2045 targets based on China/ Japan today
Availability	**Food production per capita,** *kg per person*	BPS *(2022)*	1,700 kg	1,900 kg	2,100 kg	2,300 kg	2,500 kg	2045 targets based on Thailand today
	Ag. value[1] addition per capita, *USD per person*	World Bank *(2019)*	3.6k	7k	10.5k	14k	15k – 20k	2045 targets based on Japan/ Korea today
Quality	**Protein consumption per capita,** *g per person*	OECD *(2022)*	62g	81g	100g	120g	140g	2045 targets based on Thailand today
	Prevalent of under-nourishment, *%*	World Bank *(2020)*	7%	6%	5%	4%	3%	2045 targets based on China/ Japan today
Affordability	**Increase in consumer FPI[2] from 2015,** *%*	FAO *(2022)*	37%	Metric to start being tracked				
	Poverty headcount, *%*	World Bank *(2021)*	3.5%	2.75%	2%	1.25%	0.1%- 1%	2045 targets based on China/ Japan today
Sustainability	**Agri water-use efficiency,** *USD/ m3*	FAO *(2019)*	$0.26	$0.4	$0.6	$0.75	$0.75 - $1.50	2045 targets based on Japan/ Korea today
	GHGs from diet per capita, *kg per person*	BPS *(2022)*	360 kg	285 kg	210 kg	135 kg	60 kg	2045 targets based on Brazil today

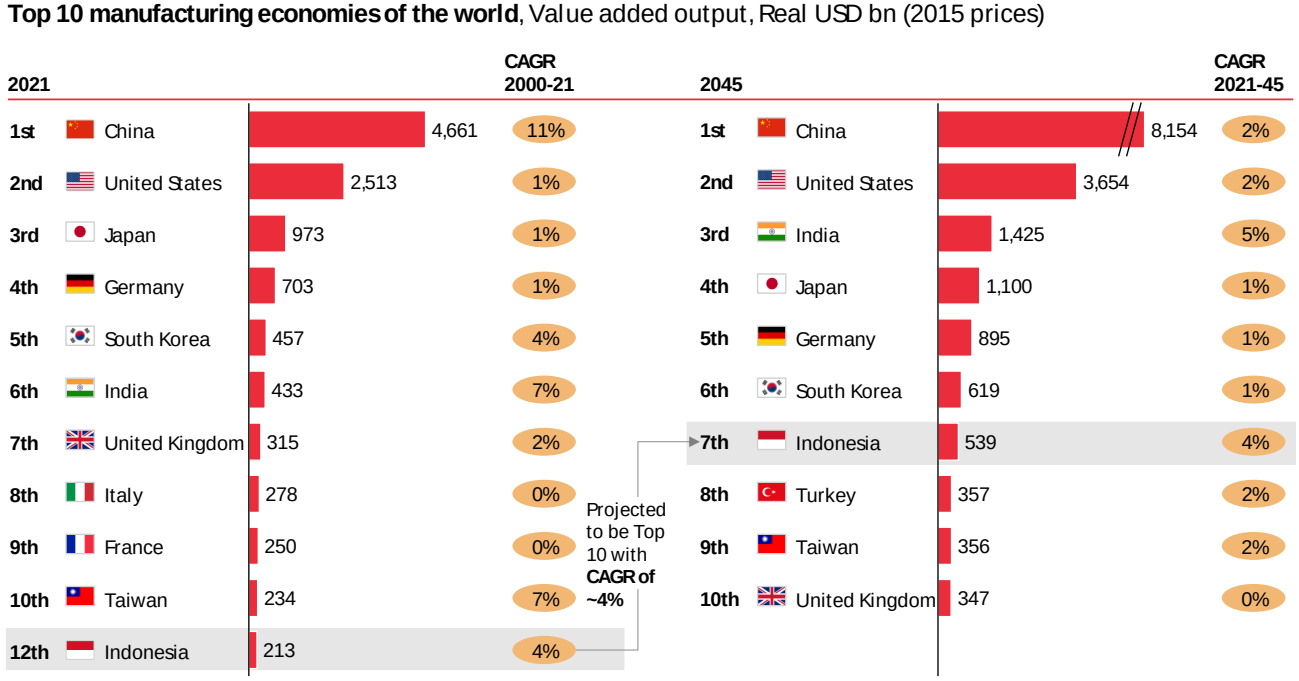

3
FOSTER
PROSPERITY

Unlocking global lighthouses for scaled adoption of I4.0 in strategic manufacturing sectors

Context and challenges

Indonesia has prioritized its manufacturing sector to develop the economy into the top ten largest economies by 2045. Indonesia's manufacturing potential is enormous to foster prosperity. Currently ranked as the twelfth largest manufacturing economy in the world, with a manufacturing sector growth rate of 4%, Indonesia is projected to be the seventh largest manufacturing economy globally by 2045.[26]

Exhibit 38:
Top 10 Manufacturing Economies of the World



To achieve this goal, the Ministry of Industry (MoI) launched a "Making Indonesia 4.0" roadmap prioritizing six key sectors: food and beverages (including tobacco), automotives, chemicals, textiles, electronics, and medical devices.[27]

Successfully executing this presents a significant opportunity for Indonesia, especially because "Atlasia" has become a close alternative to China's global dominance[28] (Exhibit 39).

Challenges in footprint, planning, talent, and resiliency have led several global leaders to take transformative actions. One of these involves seeking alternative supply chains to China. "Atlasia", a term coined to represent 14 Asian countries, is increasingly being considered given

[26] Oxford Economics

[27] Kementerian Perindustrian (Ministry of Industry) 2018, 2022; Oxford Economics

[28] The Economist

relatively higher quality labour force and logistics, attractive labour costs and volume of exports. Amongst these 14 countries, currently, Vietnam is benefiting the most (3.1% increase in share of emerging market exports in labour-intensive manufacturing from 2014 to 2019, vs 0.8% in Bangladesh and 0.05% in Indonesia).[29]

Exhibit 39:
Examples of Trends in Supply Chains

Examples of trends in supply chains

	Before 2020	2020 - 2025	After 2025	Benefiting Countries in SEA
Apparel	With advantage in low labor cost, SEA countries became the OEM of global brands like Nike, Adidas etc. **Production is mainly for export to supply foreign demand**	Together with the penetration of e-commerce increase and preference for local manufacturing especially in Muslim garment, **derived more domestic flow**	Domestic consumption and brand awareness will continue grow in SEA countries, which will drive **from more domestic to more intra-SEA and to global flows**	**Indonesia** **Vietnam**
Home and living (local wooden furniture)	Most SEA countries with abundant forest resource, there are **a lot of individual furniture workshop for scattered overseas orders**	Home and living e-commerce penetration is growing quickly, boutique local furniture brands are emerging, **driving the local domestic flow**	SEA home and living products are branded as nature and handmade with limited production capacity, we expected **the future flow will be fulfill domestic as core then expanded to intra-Asia**	**Indonesia** **Malaysia**

For Indonesia to be relevant and competitive, it needs to demonstrate excellence in 4 key elements:

- Agility and customer centricity
- Supply chain resilience
- Speed and productivity
- Eco-efficiency

This can be achieved through overcoming seven challenges:

- **Low spending on technology**: Indonesia's IT expenditure per capita is lower compared to its ASEAN peers.
- **Flat ratio of labour productivity to costs**: Indonesia's productivity to cost ratio is lagging and declining in recent years, this could result in weaker competitiveness in global market.
- **Lower proportion of trade (i.e., net exports) to GDP**: Indonesia's trade (net exports) contribution to the economy is lower compared to its peers in Southeast Asia region.
- **Stagnant FDI:** Foreign investment inflows to Indonesia has been recovering with inward flows higher than that of India and China.
- **Weaker ease of doing business**: Indonesia has improved in Ease of Doing Business over the years but has yet to match or surpass the top performers.
- **Lower quality of logistics and infrastructure**: Indonesia's infrastructure has historically lagged peers.
- **Lack of highly specialized skills**: Indonesia has one of the lowest productivity rates in the region as majority of workers are low skilled while skilled talent is unevenly distributed.

[29] International Monetary Fund, World Trade Organization, McKinsey Global Institute analysis

Bold moves

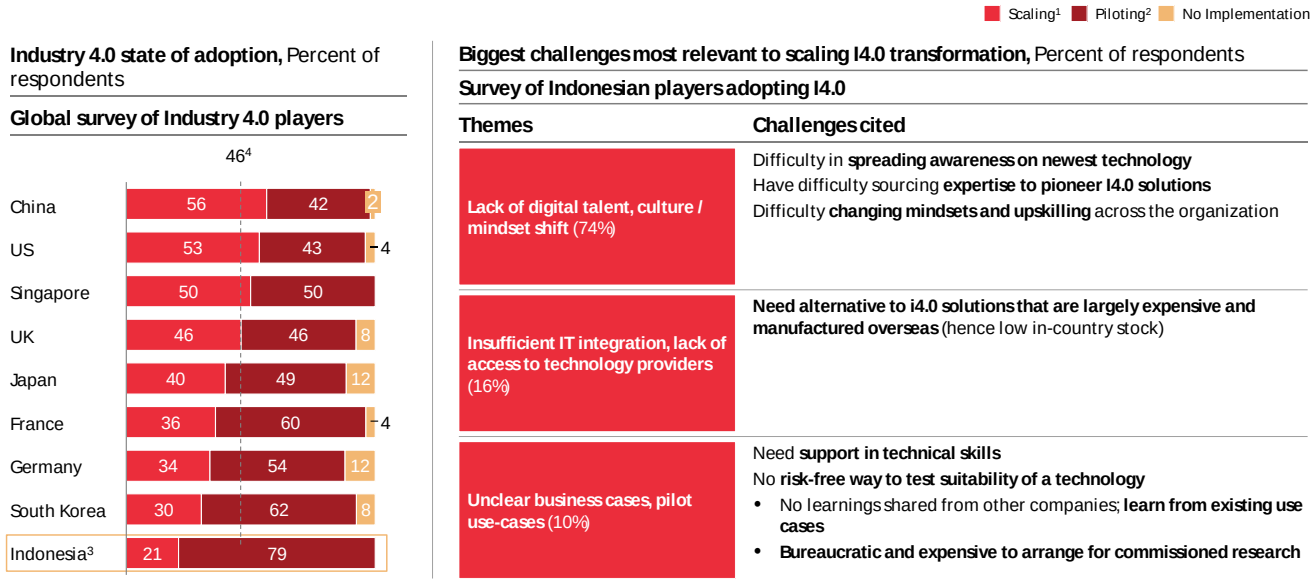
To reach her aspirations in the manufacturing sector, Indonesia can consider two bold moves: Improving productivity of existing sectors through scaling Industry 4.0 and developing the existing manufacturing base. The latter can be achieved by moving to higher value-added activities in key existing sectors and by developing nascent sectors, leveraging competitive advantage in key commodities.

Bold Move One - Improving Productivity through Scaling Industry 4.0

In 2018, Indonesia's Ministry of Industry enacted the "Making Indonesia 4.0" strategy, recognizing the importance of Industry 4.0 in boosting the economy.

However, at present, only 21% of Indonesian companies have adopted Industry 4.0, leaving the country far behind regional players like China, Singapore, and Japan (Exhibit 40).

Exhibit 40:
Adoption of Industry 4.0 in Indonesia and Biggest Challenges



1. Scaling = Some use cases in pilot and others scaling or scaled already
2. Piloting = Some ad-hoc implementation or piloting of use cases but no scaling
3. Perceived main barriers: required investments and lack of standardized IT infrastructure across BUs and Systems
4. Average of all 16 countries surveyed

Based on McKinsey Industry 4.0 Global Survey 2019, the following challenges were the most difficult for companies to overcome in adopting Industry 4.0 standards: lack of talent, insufficient IT integration and unclear business cases.

74% blamed a lack of digital talent, shifting work cultures and employee mindsets. They found it difficult to spread awareness about the newest technology and have difficulty sourcing expertise to pioneer I4.0 solutions as well as changing mindsets and upskilling across the organization.

16% cited insufficient IT integration and lack of access to technology providers. They seek alternatives to I4.0 solutions that are largely expensive and manufactured overseas (hence a low in-country stock).

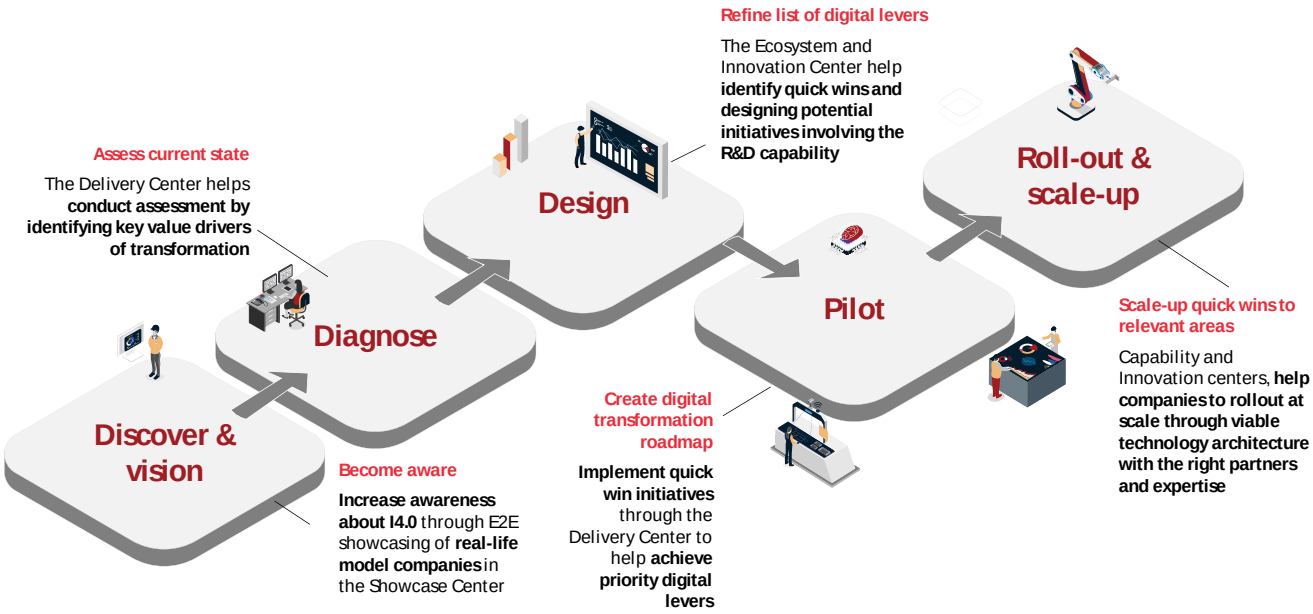
10% named unclear business cases and pilot use-cases. They need support in technical skills, have no risk-free way to test suitability of a technology, lack shared learning-experiences from other companies and learn from existing use cases, and find it unduly bureaucratic and expensive to arrange for commissioned research.

Building Digital Capability Centers (DCCs) and I4.0 Lighthouses can continue to promote adoption and scaling of Industry 4.0 across the country.

Digital Capability Centers (DCCs)

DCCs function by delivering capability building via real-life demonstrations and learning environments, as well as providing a test base for piloting and scaling up new digital solutions (Exhibit 41).

Exhibit 41:
Digital Capability Center Key Activities



DCCs also help with talent challenges through offering customized capability building programs. These include courses in Industry 4.0 CXO Seminars, Industry 4.0 Accelerators for managers and engineers, and digital fundamentals for frontline workers as well as mini-MBA programs, deep-dive training seminars and industry bootcamps. Additionally, DCCs can also help to create an ecosystem of technology providers that are curated based on their impact across value-creation levers in five categories: labor, planning/inventory/ warehousing, asset utilization, quality, and others.

I4.0 Lighthouses

Lighthouses are manufacturers showing leadership in applying I4.0 technologies at scale to drive step-change financial, operational and sustainability improvements by transforming factories, value chains and business models.[30] They can help inspire nationwide adoption and scale of Industry 4.0, particularly since Lighthouses model what is best-in-class and what benefits can be reaped. In fact, a study of the Lighthouses shows that they achieve a step change in productivity by focusing on select KPIs for improvement.

Currently, only two of the Lighthouses in the global network of 132 lighthouses are in Indonesia: Petrosea (mining) and Schneider Electric (electrical components). Prioritizing build of additional Lighthouses will help inspire other companies in Indonesia to overcome existing challenges and prioritize adoption and scale of Industry 4.0, as relevant.

[30] https://initiatives.weforum.org/global-lighthouse-network/lighthouses#

Bold Move Two - Developing a Manufacturing Base

The goal is to develop existing manufacturing bases either by moving to higher value-added activities in existing sectors and/or developing nascent sectors.

A study by the United Nations Industrial Development Organization shows that advanced manufacturing economies recovered from the COVID-19 pandemic faster than countries that are still developing their manufacturing base.

On the whole, advanced manufacturing sectors are associated with smaller projected losses in economic activity during and after a major crisis because manufacturing supports key factors of national resilience and is critical to maintaining security, tackling emergencies and post-crisis recovery and growth.

Two keys element that distinguish advanced manufacturing economies are moving up the value chain to higher value-added activities by leveraging I4.0 and developing sectors with promising growth prospects. In fact, Asian economies, including Indonesia, have room to industrialize further.

Accordingly, Indonesia can strengthen its manufacturing sector by leveraging competitive advantage in existing commodities to develop upstream and downstream capabilities in existing sectors such as food & beverages (F&B) and textiles and by developing nascent sectors like Electric Vehicles (EV), chemicals and electronics (Exhibit 42).

Exhibit 42:
Benchmark of Value-added Output as % of World Total

Source: Oxford Economics March 2023

In fact, each sector's value-added output can be boosted through not only sustainably improving domestic consumption and export volumes but also moving into higher value-added activities that turn these commodities into finished or intermediate products.

Next, we explore how Indonesia can develop upstream and downstream capabilities in existing sectors such as F&B and textiles and develop nascent sectors such as automotives, chemicals and electronics. We take a holistic view of the end-to-end

value chain and understand the current strengths and challenges to propose initiatives to tap into the full potential of the sector. We also map the initiatives to a time horizon and propose targets to track impact.

Through improving its domestic and export base, Indonesia can grow its F&B sector by more than 2.5 times through 2045.[31] The exhibit below captures initiatives that could help grow the sector across the end-to-end value chain (Exhibit 43).

F&B

Exhibit 43:
Food & Beverages Sector Opportunities

Covered in Food Security pillar

Value chain	Raw materials	Processing / Packaging	F&B distribution
Current status	• **Sufficient supply of 9 of 12 prioritized commodities** • **Room for improvement in food security** on availability, quality and affordability	• **Emergence of globally competing players** – Mis, Nabati, Indofood, Mayora, Wings • **Sub-optimal cold chain infrastructure**	• **Traditional trade dominates at ~75-78% of total market size**; modern trade at ~15-18% and e-commerce at ~3-5%
Opportunity (i.e., Initiatives)	• **Reserve strategically** • **Import and trade wisely** • **Maximize domestic production** • **Invest in agricultural innovation**	***Domestic story*** • **Improve processing of raw materials,** converting stable crops, fruits and veg, diary and livestock to **processed products** (e.g., animal & veg oil, confectionary & starch products, processed dairy, veg, fruits and veg, meat, poultry and seafood) • **Remove inefficiencies through employing I4.0** to enable traceability and automation ***Export story*** • **Set up export food ecosystem** (e.g., food processing zones) **centering on higher premium products that have an existing large domestic market** – e.g., – Chilled & frozen protein and seaweed products through doubling down on abundant natural asset – aquaculture – Alternative plant-based protein given large consumer of soy and partnership with e.g., Singaporean firms for R&D – Chocolate given world's 3rd largest producer of cocoa • **Clarify requirements and regulations on Halal products** to reach more markets	***Domestic story*** • **Reduce wastage through improved cold chain** technologies, supply chain, and organized retail • **Provide capability building programs to traditional trade players to digitize,** reaching more customers and benefiting from economies of scale • **Implement initiatives** to connect farmer directly to market **enabling "farm to table"** ***Export story*** • **Invest in infrastructure to reduce warehousing, transport and logistics costs and improve efficiency and resiliency** • Develop **trade agreements** with key export markets
Horizon	• Present - 2045	• Present - 2045	• Present - 2040
Target	• From 63rd in Global Food Security Index to Top 30 by 2045	• From USD 77bn in 2021 to **+USD 190bn (~2.5x) 2045**	

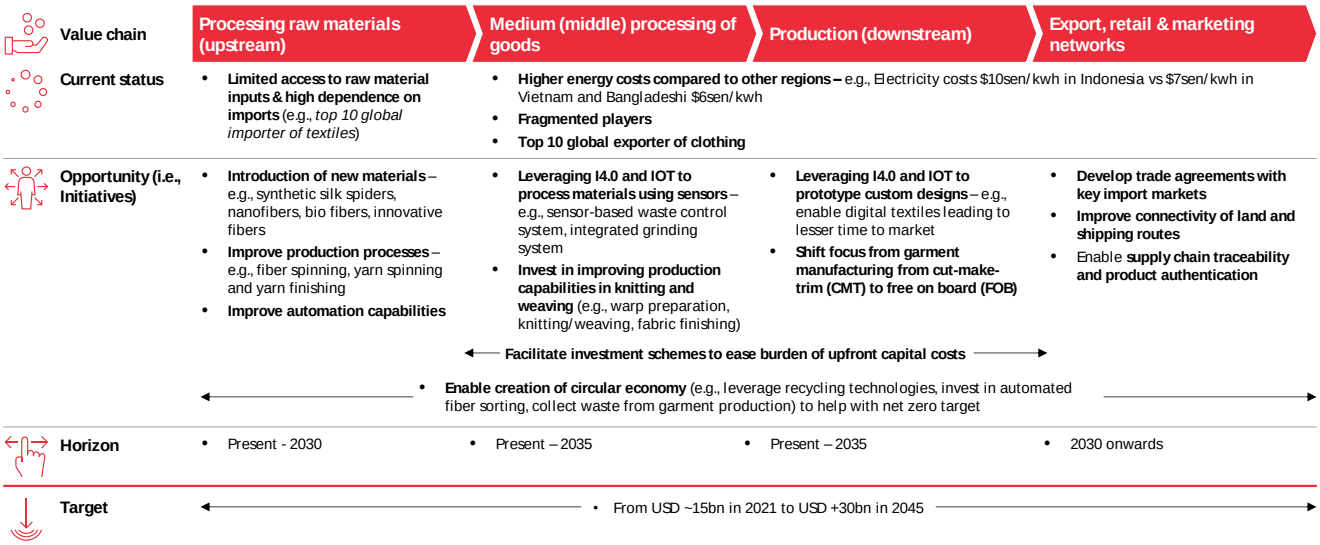
Textiles

By introducing of new materials and improving production processes and automation capabilities by leveraging I4.0 and IOT technology, Indonesia can double its textiles sector through 2045.[32] See the exhibit below for more details (Exhibit 44).

[31] Ministry of Industry; FAO (2021); Euromonitor (2019; latest available)

[32] Ministry of Industry

Exhibit 44:
Textiles Sector Opportunities



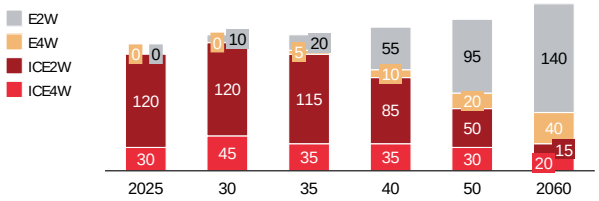
Electric Vehicles (EV)

Indonesia expects growth in the EV sector given its Net Zero ambitions (Exhibit 45). Such growth would be enabled by regulations that incentivize the sector, Total-Cost-of-Ownership (TCO) parity and market access.[33]

[33] McKinsey Energy Insights' Global Energy Perspective (Jan 2019), McKinsey Decarbonization Scenario Explorer (DSE) model – Indonesia, industry expert interviews.

Exhibit 45:
Electric Vehicle Growth in Indonesia

Indonesia EV vehicle parc[1], Million vehicles

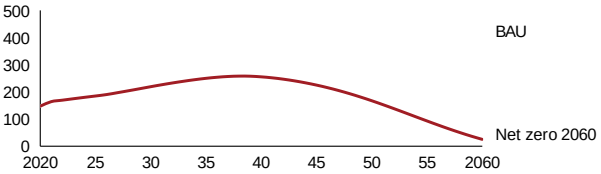


	2025	30	35	40	50	2060
E2W penetration[2]	0.9%	6%	16%	40%	100%	100%
E4W penetration[2]	0.3%	2%	7%	20%	100%	100%

- All new motorcycles sold from 2040 will be electric
- All new cars sold from 2050 will be electric
- Motorcycle take up faster since cheaper to switch, while cars slower to adapt
- Some people will retain old ICE vehicles instead of switching

This is enabled by regulations, TCO[3] parity and market access

Emissions from transportation in Indonesia, $MtCO_2e$



Key enablers for EV growth

Regulatory push

Subsidies and incentives

ICE bans and restrictions

Technology and infrastructure readiness

Availability of models

EV production ramp-up

Power demand and load curve

Charging station deployment (public and home/office charging)

Decline in cost of ownership

Battery material cost (Cobalt, lithium, graphite & nickel)

Battery production

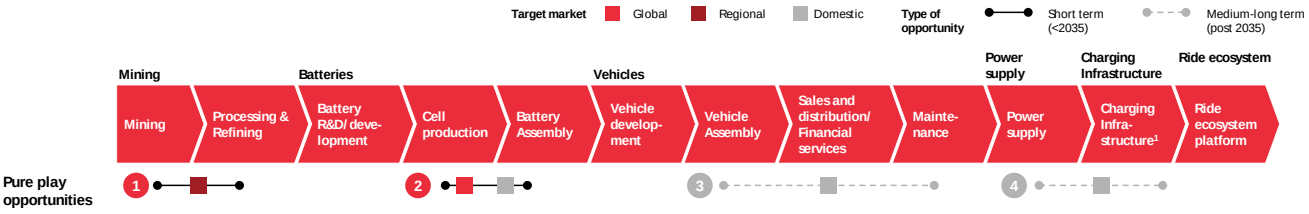
Applications (e.g., V2X, stationary storage)

Used batteries recycling

1. Includes BEV; 2. Penetration = EV/ (Total EV + ICE); in the case of vehicle sales, its penetration = EV sales / total sales, in the case of vehicle parc, penetration = EV parc / total parc; 3.Total cost of ownership

To maximize the opportunities of such growth through to 2045, there are four potential pure plays and three potential ecosystems for players to consider in Indonesia's burgeoning EV manufacturing ecosystem. See the exhibits below for more details (Exhibit 46 and Exhibit 47).

Exhibit 46:
Electric Vehicles 4 Potential Pure Plays



Pure play opportunities

1 Supply of battery-grade nickel

- Could supply globally 15-20% of class 1 Nickel for EV battery manufacturing leveraging its large reserves (25% of world reserves)
- Requires large investments in HPAL processing plants and working with foreign consortiums

2 Production of battery components/ battery assembly

- Potential opportunity to become a competitive manufacturing hub for NMC battery cells as long as it can serve both its domestic and regional demand; to sustain its competitiveness in the long run, it will also need to attract OEMs as anchor demand and build capabilities
- LFP batteries supply is dominated by Chinese manufacturers; their price advantage is due to scale & technology capabilities

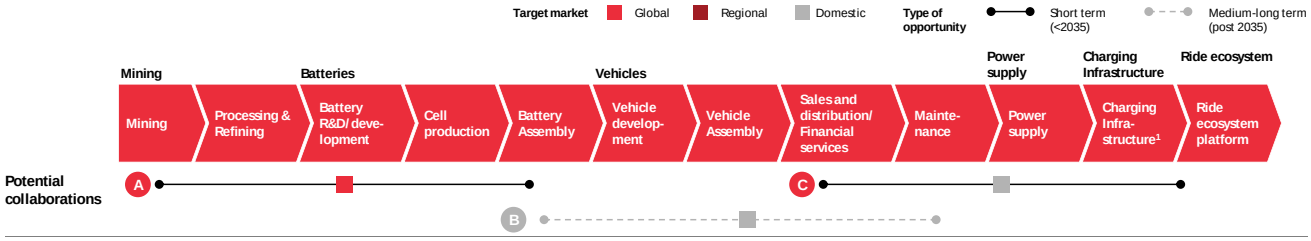
3 Manufacturing of entry-level electric scooters and passenger cars

- Potential opportunity for manufacturing light electric 2W and passenger cars esp. building on its competitive cost of battery supply.
- One of the countries with the highest 2-wheeler penetration in the world, the large domestic demand brings potential for both established OEMs and new entrants.
- Currently, a regional hub of passenger cars manufacturing today, Indonesia could take the pioneer role to produce the leading OEMs' first BEV models for ASEAN

4 Up-grading existing grid and developing safe charging systems

- Invest in infrastructure to support increased demand for power; Consider alternative solutions to mitigate grid impact (e.g., use of TOU tariffs, storage solutions)
- Promote development of safe charging systems working with startups and established industry players

Exhibit 47:
Electric Vehicles 3 Potential Ecosystems



Potential collaborations

A End-to-end raw material to battery production ensuring circularity (i.e., battery recycling)

- Potential opportunity to become a competitive manufacturing hub for NMC battery packs (cells, modules, BMS) for both domestic and ASEAN market leveraging its access to Nickel reserves
- Require large investments in HPAL processing plants and attracting foreign battery cells and module manufacturers
- Ensure optimized technological processes to enable battery recycling (i.e., circularity in production)

B Vehicle OEM/ battery co-design

- Leverage access to nickel reserves for EV vehicle manufacturing hub to create ecosystem to develop integrated battery and vehicle manufacturing.
- Require policies and regulatory support to attract battery and automobile developers to set up their manufacturing plants in Indonesia

C Design-to-value across the EV ecosystem (e.g. CAPEX reduction, range optimization for B2B users, etc.)

- Build solutions to improve user adoption (e.g., swapping stations, ecosystem on maintenance and spare parts, alignment on a single charging standard)

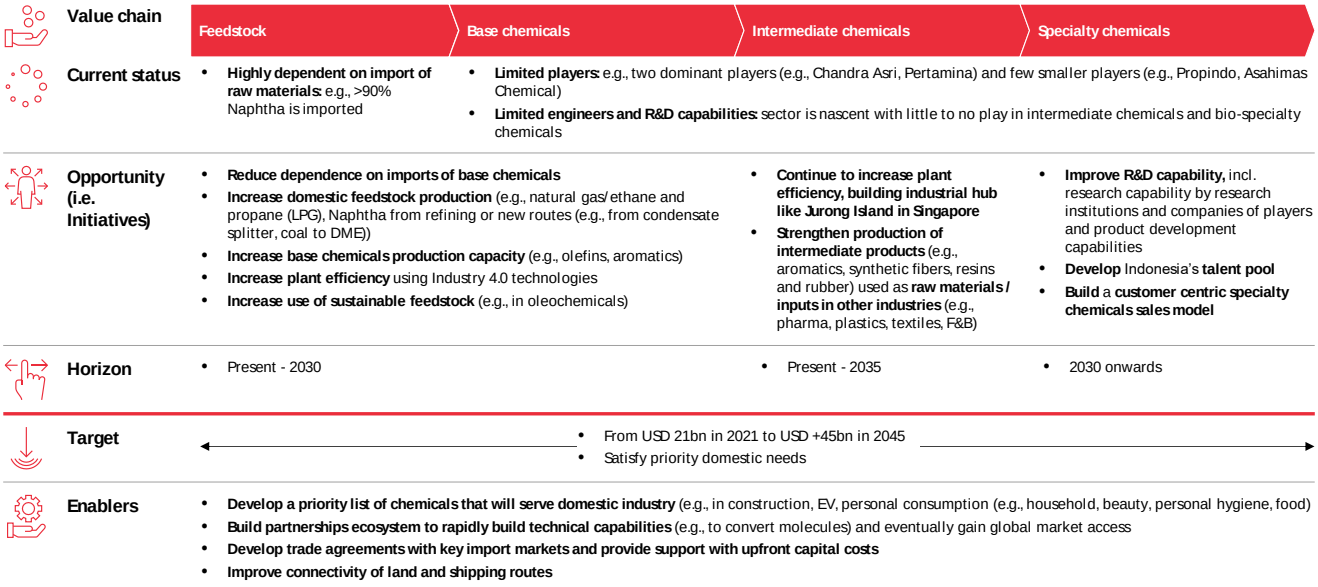
Target

- From ~<1% EV penetration to +75% EV penetration of 2W and 4W

Chemicals

Indonesia can develop capabilities across the chemicals value chain, from feedstock to base, intermediate and specialty chemicals. Through this, it can fulfill priority domestic needs, reducing the trade deficit. See the exhibit below for more details (Exhibit 48).

Exhibit 48:
Chemicals Sector Opportunities



Case study: Jurong Island Chemical Hub

Indonesia can aspire to build a chemicals hub like Jurong Island (JI), the formidable hub at the heart of Singapore's energy and chemicals industry.

The success of JI is undeniable. It has risen to be the world's top ten manufacturing chemical hubs by export volume and one of the world's top five refinery export hubs. Additionally, it has attracted over S$50 (US$38) billion worth of investments from over 100 leading global companies resulting in the employment of more than 18,000 energy and chemicals professionals.

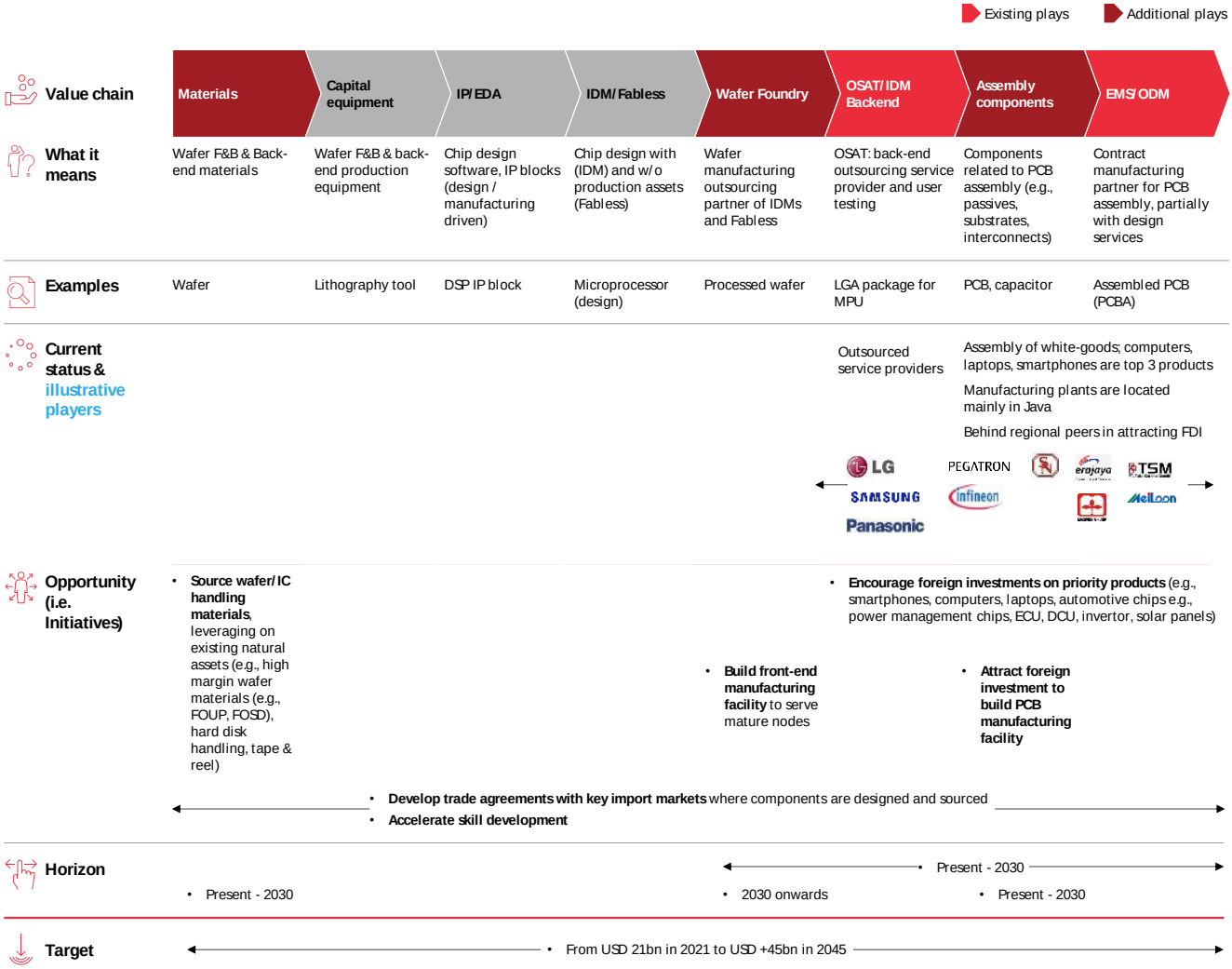
The key learning points from the success of Jurong Island can be summarized as:

- **Coordination across stakeholders** – government, bank, investors, local and foreign players
- **Strong, competitive value proposition** followed by **effective marketing**
- **Resilient enablers** – efficient and dependable energy, logistics, feedstock, ecosystem and water supply chains
- **Partnerships** with and investments from leading international players

Electronics

Indonesia can deepen her presence in the global electronics value chain from sourcing raw materials up through assembly and contract manufacturing (Exhibit 49).

Exhibit 49:
Electronics Sector Opportunities



Case study: China's lagging semiconductor industry

Despite a significant push and considerable investment from the government, China's semiconductor industry has not yet reached a high level of success. In 2020, only 16 percent of the semiconductors used in China were produced in-country, which is far from the government's target of 70% self-sufficiency by 2025.

China's semiconductor industry has long been dependent on Western technology and they intend to end this reliance by moving "up the value chain" from assembling final products from imported components to creating advanced technology.

The key learning points from China's semiconductor industry can be summarized as:

- **Lack of Intellectual Property** and know-how as foreign players dominate across segments.
- **Low influence** on design and IC selection.
- **Restricted access** to leading-edge manufacturing technology as the US prohibits export of advanced chips and chipmaking tools for advanced chips under 16nm or 14nm to China
- **Clusters of excellence did not develop** as investments were spread out across 19 provinces

Roadmap

MSMEs also have a role to play in supporting the unlocking of value in manufacturing sectors (Exhibit 50).

Exhibit 50:
Role of MSMEs in Manufacturing Sectors

	What MSMEs can do
Increase productivity of existing sectors through scaling Industry 4.0	• Partner with big companies to learn and adopt I4.0 technology and capabilities • Develop niche in select I4.0 technologies and scale them across Indonesia
Develop existing manufacturing base either by moving to higher value-added activities in existing sectors and/ or developing nascent sectors, leveraging competitive advantage in existing commodities	• Engage in production, assembly and/ or distribution of key higher premium products (e.g., farm to table, chilled & frozen protein and cocoa in F&B, new materials in textiles) • Participate in assembly of spare parts and design of bikes; and/ or setting up charging infrastructure • For larger-sized SMEs, contribute in part of the value chain (e.g., building pipelines,, wafer foundry, and/ or manufacturing plant for intermediate products (e.g., oleochemicals))

Furthermore, these bold moves can be potentially implemented through initiatives that are phased up till 2045 (Exhibit 51).

Exhibit 51:
Roadmap for Manufacturing Sectors

		2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders[1]
Increase productivity of existing sectors through I4.0	F&B	**Pilot and scale digital capability centers**				• Kemenperin (Ministry of Industry)
		Build and scale I4.0 transformation programs				
		Build an ecosystem of technology providers				
Develop existing manufacturing base either by moving to higher value-added activities in existing sectors and/ or developing nascent sectors, leveraging competitive advantage in existing commodities	F&B	**Improve processing of raw materials,** converting stable crops, fruits and veg, diary and livestock to **processed products** (e.g., animal & veg oil, confectionary & starch products, processed dairy, veg, fruits and veg, meat, poultry and seafood)				• Kemenperin (Ministry of Industry) • Kementan (Ministry of Agriculture) • Kemenlutkan (Ministry of Marine Affairs and Fisheries) • Kemendag (Ministry of Trade) • Kemenhub (Ministry of Transportation) • Kemenag (Ministry of Religious Affairs)
		Remove inefficiencies through employing I4.0 to enable traceability and automation				
		Reduce wastage through improved cold chain technologies, supply chain, and organized retail				
		Provide capability building programs to traditional trade players to digitize, reaching more customers and benefiting from economies of scale				
		Implement initiatives to connect farmer directly to market **enabling "farm to table"**				
		Set up export food ecosystem (e.g., food processing zones) **centering on higher premium products that have an existing large domestic market**				
		Invest in infrastructure to reduce warehousing, transport & logistics costs, and improve efficiency & resiliency				
		Develop **trade agreements** with key export markets				
		Clarify requirements and regulations on Halal products				

Develop existing manufacturing base either by moving to higher value-added activities in existing sectors and/or developing nascent sectors, leveraging competitive advantage in existing commodities

Textiles

2023-2030	2031-2035	2036-2040	2041-2045
Limited access to raw material inputs & high dependence on imports			
Introduction of new materials – e.g., synthetic silk spiders, nanofibers, bio fibers, innovative fibers			
Improve production processes – e.g., fiber spinning, yarn spinning and yarn finishing			
Improve automation capabilities			
Develop trade agreements with key import markets			
Leveraging I4.0 and IOT to process materials using sensors – e.g., sensor-based waste control system, integrated grinding system			
Invest in improving production capabilities in knitting and weaving (e.g., warp preparation, knitting/weaving, fabric finishing)			
Leveraging I4.0 and IOT to prototype custom designs – e.g., enable digital textiles leading to lesser time to market			
Shift focus from garment manufacturing from cut-make-trim (CMT) to free on board (FOB)			
	Improve connectivity of land and shipping routes		
	Enable **supply chain traceability and product authentication**		

Key stakeholders[1]

- Kemenperin (Ministry of Industry)

Develop existing manufacturing base either by moving to higher value-added activities in existing sectors and/or developing nascent sectors, leveraging competitive advantage in existing commodities

Automotives

2023-2030	2031-2035	2036-2040	2041-2045
Improve supply battery-grade nickel		**Manufacture entry-level electric scooters and passenger cars**	
Improve end-to-end raw material to battery production ensuring circularity		**Create vehicle OEM/ battery co-design**	
Develop production of battery components and/or assembly battery			
Upgrade existing grid and develop safe charging systems			
Foster design-to-value across the EV ecosystem (e.g., CAPEX reduction, range optimization for B2B users, etc.)			

Chemicals

2023-2030	2031-2035	2036-2040	2041-2045
Reduce dependence on imports of base chemicals			
Increase domestic feedstock production (e.g., natural gas/ethane and propane (LPG), Naphtha from refining or new routes (e.g., from condensate splitter, coal to DME))			
Increase base chemicals production capacity (e.g., olefins, aromatics)			
Increase plant efficiency using Industry 4.0 technologies			
Increase use of sustainable feedstock (e.g., in oleochemicals)			

Key stakeholders[1]

- Kemenperin (Ministry of Industry)
- Kemendag (Ministry of Trade)
- Kemenhub (Ministry of Transportation)
- KemenESDM (Ministry of Energy and Mineral Resources)
- KemenBUMN (Ministry of SOE)
- Kemenkeu (Ministry of Finance)
- Kemendikbud (Ministry of Education and Culture)

Develop existing manufacturing base either by moving to higher value-added activities in existing sectors and/or developing nascent sectors, leveraging competitive advantage in existing commodities

Chemicals

2023-2030	2031-2035	2036-2040	2041-2045
Develop a priority list of chemicals that will serve domestic industry (e.g., in construction, EV, personal consumption (e.g., household, beauty, personal hygiene, food)		**Improve R&D capability,** incl. research capability by research institutions and companies of players and product development capabilities	
Continue to increase plant efficiency, building industrial hub like Jurong Island in Singapore		**Build** a **customer centric specialty chemicals sales model**	
Strengthen production of intermediate products (e.g., aromatics, synthetic fibers, resins and rubber) used as **raw materials / inputs in other industries** (e.g., pharma, plastics, textiles, F&B)			
Build partnerships ecosystem to rapidly build technical capabilities (e.g., to convert molecules) and eventually gain global market access			
Develop trade agreements with key import markets and provide support with upfront capital costs			
Improve connectivity of land and shipping routes			

Electronics

2023-2030	2031-2035	2036-2040	2041-2045
Source wafer/IC handling materials, leveraging on existing natural assets (e.g., high margin wafer materials (e.g., FOUP, FOSD), hard disk handling, tape & reel)	**Build front-end manufacturing facility** to serve mature nodes		
Encourage foreign investments on priority products (e.g., smartphones, computers, laptops, automotive chips e.g., power management chips, ECU, DCU, invertor, solar panels)			
Attract foreign investment to build PCB manufacturing facility			

Key stakeholders[1]

- Kemenperin (Ministry of Industry)
- Kemendag (Ministry of Trade)
- Kemenhub (Ministry of Transportation)
- KemenESDM (Ministry of Energy and Mineral Resources)
- KemenBUMN (Ministry of SOE)
- Kemenkeu (Ministry of Finance)
- Kemendikbud (Ministry of Education and Culture)

1. Apart from private sector and international organizations

Key metrics and enablers

For Indonesia to successfully reach her manufacturing aspirations, a coordinated effort across all stakeholders is required.

Enabling the two bold moves requires Indonesia to demonstrate a competitive edge in six key factors: labor market, industrial base, infrastructure, technology, legal & regulatory environment, and socio-political risk factors (Exhibit 52)

Exhibit 52:
Key Enablers of Manufacturing Sectors

xx Private/SOE sector led xx Government led xx Both

Talent	• **(Re)skilling programs to cultivate workforce of the future** (e.g., educational offerings, OEM partnerships for vocational training, short-term "exchange" training programs) • **Foreign talent** through "talent visa" categories, "fellowship corridors" with foreign STEM universities, and subsidies for hiring top foreign talent
Industrial base / economic situation	• **Domestic investment and innovation in developing local industrial capabilities**
Infrastructure	• **Resources to ease the burden on upfront capital costs** e.g., EV charging infrastructure • **Investments in infrastructure** e.g., roads, railways, ports
Technology	• **Software tailored to meet local demand** • **Capabilities developed to become suppliers of future manufacturing ecosystem** • **Foreign partnerships for tech transfers that improve operational efficiency** – accelerating industry competitiveness and improving project returns • **Policies to drive adoption of I4.0** e.g., regulations, monitoring, enforcement measures, incentives
Legal & regulatory environment	• **Clearly communicated value proposition to attract FDI** (e.g., incentives, CAPEX, infrastructure improvements) • **Trade agreements with key markets**
Socio-political risk factors	• **Develop long-term transition plan** in anticipation of socioeconomic shifts – jobs, wealth distribution, stranded assets and human health (e.g., reskilling, locating new battery facilities in coal-mining regions)

Progress of these two bold moves can be tracked through a few metrics until 2045 with targets every five years (Exhibit 53)

Exhibit 53:
Key Metrics of Manufacturing Sectors

		FROM	TO				
Bold moves	**Key metrics**	**2021**	**2025**	**2030**	**2035**	**2040**	**2045**
Increase productivity of existing sectors through I4.0	%of companies adopting I4.0[1]	21%	30%	50%	70%	90%	100%
	Manufacturing value added output, USD bn	~213	+250	+300	+350	+450	+525
Develop existing manufacturing base either by moving to higher value-added activities in existing sectors and/or developing nascent sectors, leveraging competitive advantage in existing commodities	Food & beverage value-added output, USD bn	~78	+90	+110	+135	+160	+190
	Textiles, USD bn	~15	+18	+23	+27	+31	+35
	Chemicals, USD bn	~21	+24	+30	+35	+40	+50
	Automotives, USD bn	~17	+20	+25	+32	+36	+44
	Electronics, USD bn	~16	+20	+26	+34	+42	+50

1. 2019

Source: Oxford Economic, McKinsey Industry 4.0 Global Survey 2019

Leapfrogging growth in financial services

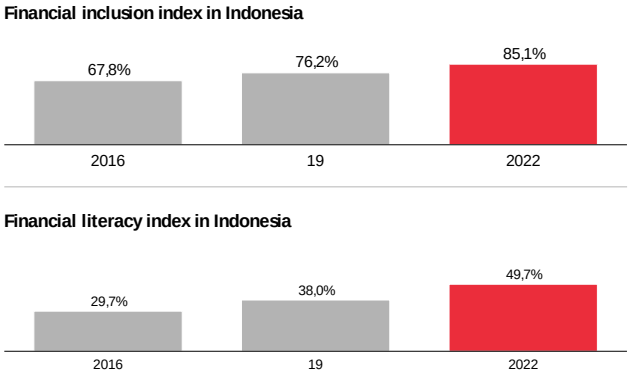
Context and challenges

Indonesia has made spectacular progress in broadening financial inclusion. The past five years have witnessed significant growth: 85% of Indonesians now own a savings account (Exhibit 54) and digital payment penetration (fintech and e-wallet) grew ten times, reaching 47%,[34] putting Indonesia on par with other developed Asian countries.

However, financial literacy and penetration of other financial products remains challenging. Surveys show that financial literacy remains at 50%, which presents a risk of customers not fully understanding the products. Lagging financial literacy can damage the fintech industry's reputation and trap customers in debt because, paradoxically, while financial products become more accessible, customers do not fully understand them, which presents a risk to both the financial services sector and beyond.

One study shows that 59% of fintech users are individuals from low-to-middle income segments (earning Rp. 5-10 million per month), while complaints to LAPS (Lembaga Alternatif Penyelesaian Sengketa Sektor Jasa Keuangan) related to fintech lending increased by 60% year on year in October 2022.

Exhibit 54:
Financial Inclusion and Financial Literacy in Indonesia

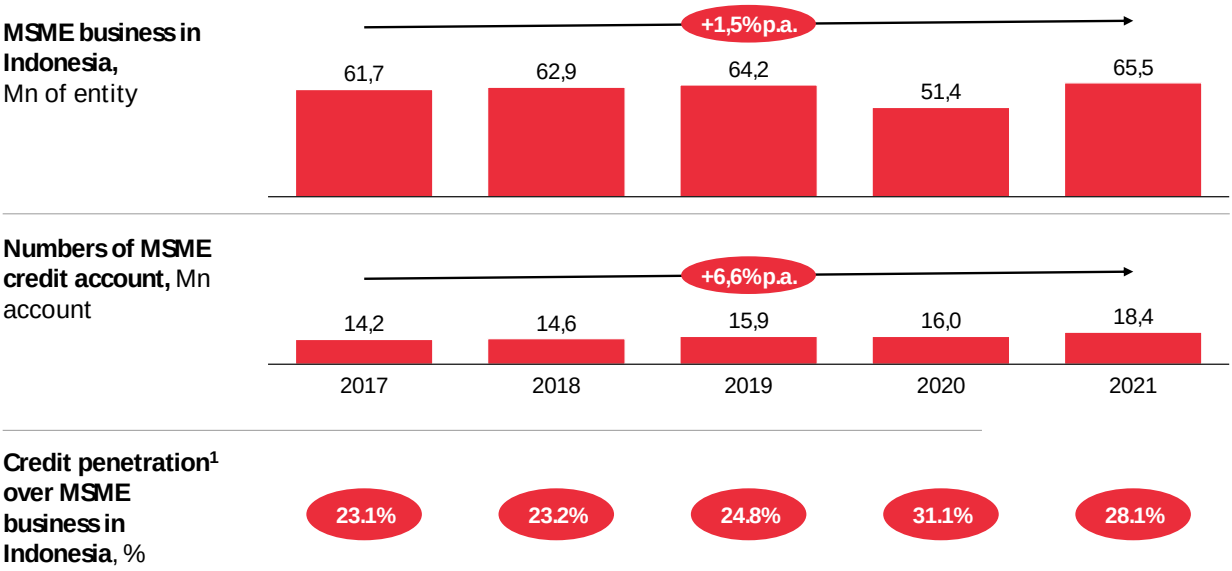


However, penetration of other financial products remains low, which provides further opportunities for growth. For example, retail credit penetration remains low at 18% of GDP versus emerging markets average at 47%. Further, only ~28% of MSMEs receive formal financing from financial institutions, which presents yet another growth opportunity (Exhibit 55) [35]

[34] McKinsey Global Payments Map, World Bank database, Indonesia's Tax Directorate General statistics (DJP), McKinsey Asia PFS survey 2021, press search

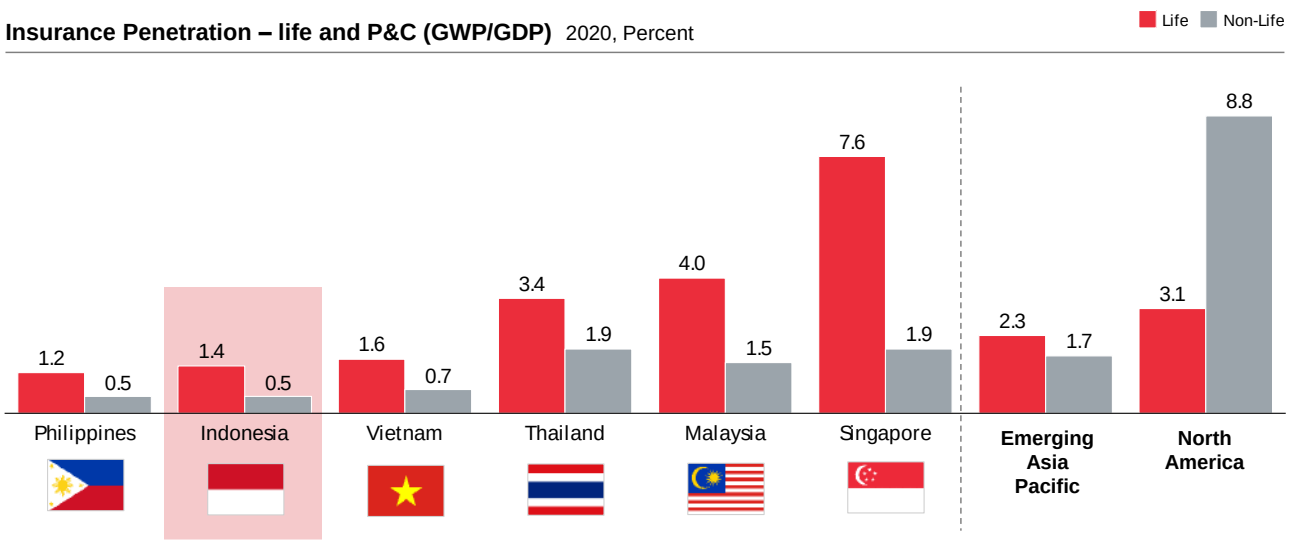
[35] BI, OJK, Bank of International Settlement (BIS), Bernstein analysis and estimates, CLSA, Ministry of Cooperatives and MSME – DATA UMKM; *Statistik Sistem Keuangan Indonesia* 2020 (SSKI)

Exhibit 55:
Overview of MSMEs Credit in Indonesia



Insurance offers another area of growth opportunity, with both Life and Property and Casualty (P&C) insurances under-penetrated in Indonesia (Exhibit 56).

Exhibit 56:
Benchmark of Insurance Penetration

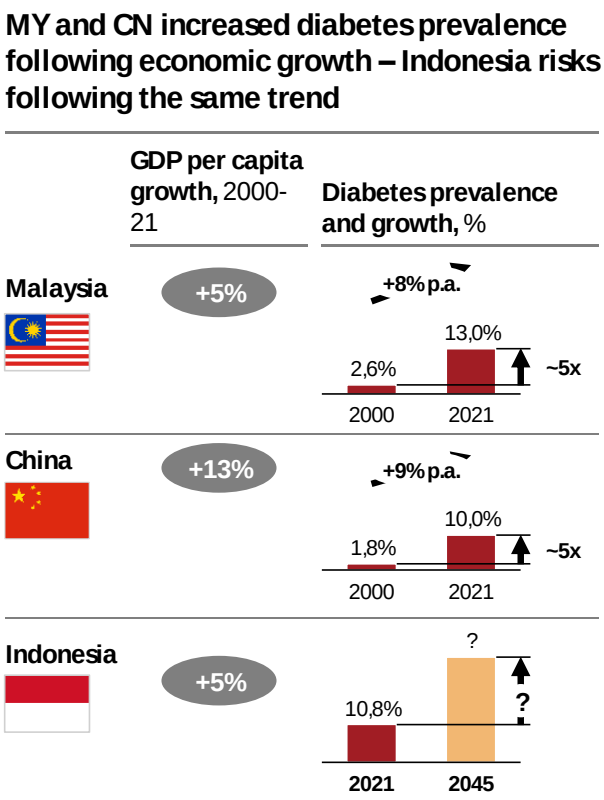


Expanding insurance is imperative as Indonesia is growing and getting more prosperous, with the average household personal disposable income level set to nearly double by 2045 from 2022 levels. As prosperity and life expectancy increase, society remains vulnerable to health-related risks. For example, both Malaysia and China saw an increase in the prevalence of diabetes following economic growth, and Indonesia risks following the same trend (Exhibit 57).[36]

[36] Global Insights (2023), McKinsey Global Institute

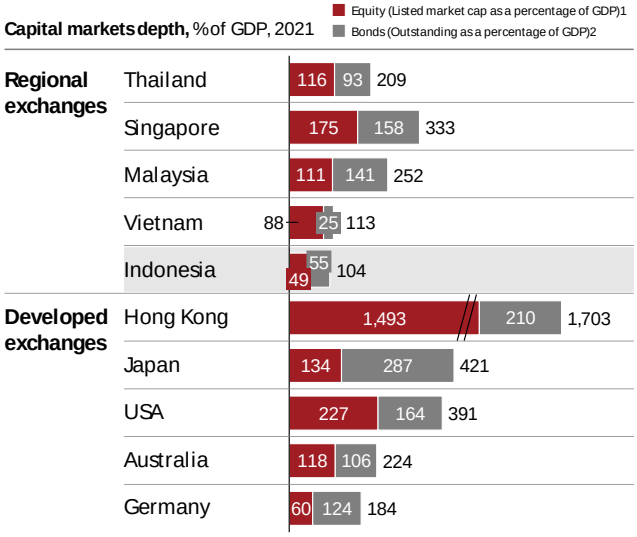
Despite the existence of BPJS Kesehatan[37] and other private health insurance providers, out-of-pocket expenditure is still very common. With only 17% of health expenditures driven by private insurance, there is a growing opportunity to increase health insurance expenditure out of total health spending to protect more people from health risks.

Exhibit 57:
GDP Growth and Diabetes Prevalence Benchmark



In capital market depth, Indonesia falls behind its peers, with less than 1% of the population investing in stock versus 8% in Malaysia and 16% in Singapore.[38] Indonesia's capital market penetration is lower than regional peers at 49% of GDP for equity, and 55% for bonds (Exhibit 58). This makes it more challenging for Indonesian businesses to raise equity financing domestically, which in turn limits overall economic growth potential.

Exhibit 58:
Benchmark of Capital Markets Depth



1. SET (Thailand), SGX (Singapore), Bursa Malaysia (Malaysia), Ho Chi Minh SE, and Hanoi SE (Vietnam), IDX (Indonesia), HKEx (HK), JPX (Japan), NYSE and Nasdaq (USA), ASX (Australia), Deutsche Börse (Germany)
2. Including both corporate and government bonds

The impacts of Indonesia's shallow capital market have ramifications far beyond personal wealth growth.

- **Missed opportunity to fund infrastructure needs:** Extra funds in secondary market could make a big contribution to infrastructure development.
- **Lack of options to diversify funding and match funding with their needs:** Reduced flexibility of corporate borrowers to align funding structure with their assets.
- **Lack of avenues to deploy domestic savings:** Investors put a large part of their savings in physical assets such as real estate, gold and bank deposits. The inability to match long-term savings with future pension and health requirements, combined with aging populations, risks creating a generation of poor retirees.

The bottom line is that the current state of the market makes it difficult to raise funds for new ventures, growth, or innovation, except for existing large companies or conglomerates, which ultimately limits economic growth for the entire nation.

A key takeaway that is that deepening financial inclusion beyond personal savings and building self-sufficient local

[37] BPJS Kesehatan is a social security agency designed to provide universal health care to Indonesia's citizens.

[38] Deepening capital markets in emerging economies, McKinsey report, 2017

funding can serve to empower MSMEs and the underserved population (Exhibit 59).

Exhibit 59:
Aspirations for Financial Services

FROM		TO	
Growing financial inclusion, with lower financial literacy		Strong financial inclusion and financial literacy	
Lack of self-sufficient local funding		Strong local capital, with a diversified asset class field	
Large untapped potential for digital payments		Lower cost to serve by increased adoption of digital payments	
Limited credit penetration		Reduced cost of credit	
50%	Financial literacy index	70%	Financial literacy index
78%	Active digital banking users	90%	Active digital banking users
28%	Penetration of lending for MSME	60%	Penetration of lending for MSME
12%	Stock market value traded per GDP	90%	Stock market value traded per GDP
3%	Mutual fund assets per GDP	30%	Mutual fund assets per GDP

Bold moves

Deepening financial inclusion to empower MSMEs and the underserved population will require solutions from a diverse set of players including conventional banking, syariah banking, insurance companies, fintech and beyond. There are 6 potential bold moves to achieve 3 key objectives: lower cost to serve, strengthen local capital and increasing access to credit (Exhibit 60).

Exhibit 60:
Financial Services Bold Moves

Detailed next

To lower cost to serve

1. **Explore establishing CBDC for wholesale and retail transactions**
   - **China has started digital currency pilot in 2020,** targeting small value payments at the Point of Sales e.g. restaurants, retailers and online e.g. e-commerce, ride-hailing
2. **Further develop digital payment solutions** to enable lower cost to serve and accelerate G2B/G2C transactions
   - **India's Aadhar program** deliver social assistance "digitally"; population without a bank account / formal documentation can get an alternative digital proof of identity e.g. allowing 2 people to vouch for an individual

To strengthen local capital

3. **Diversify the asset class field and grow pension funds and mutual funds**
   - **India's government has released multiple initiatives and incentives** to push and accelerate the mutual fund industry growth
   - **Australia superannuation program** to encourage individuals to save for their retirement by mandating contributions from employers to employees into superannuation funds
4. **Explore mandatory national-level insurance for protection of assets** e.g., house, cars, **elective insurance (**e.g., life, health), and **unit-linked products**
   - In South Korea, every car that has an engine displacement size of at least 50cc is required to have auto-liability insurance – to cover death, injury, disability, and property damage liability

To increase access to credit

5. **Drive formalization of MSMEs** by incentivizing MSME registration to increase access to financing
   - **SIMPLES program in Brazil** reduce tax rate for micro firms (<5 employees). Post-formalization, firms showed improvement of ~50%higher revenue and profit
6. **Invest in a data exchange platform, based on single national ID** that facilitates seamless interoperability between public and private entities, enhancing credit underwriting process, fostering an environment of transparency in credit data, and enabling informed credit decision
   - **Estonia has a data exchange platform called X-Road**, which allows public and private sector information systems to link up. It implemented a "one-ask-only" principle i.e. government cannot ask citizens for the same information twice

Bold Move One - Explore Establishing a Central Bank Digital Currency (CBDC)

Developing CBDC would help Indonesia in achieving greater financial inclusion in the long-term, supporting those without a bank account and enabling easier G2C transfers. 3 key reasons exist of why Indonesia should develop CBDC:

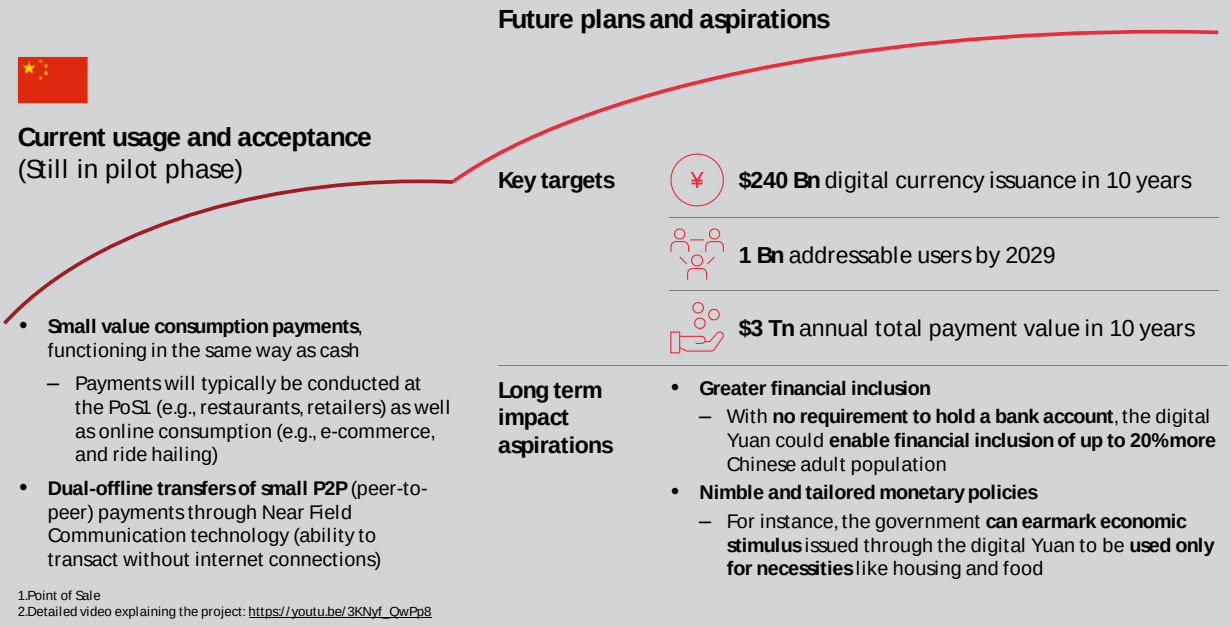
- Greater financial inclusion: safe and liquid government-backed means of payment for those who do not have a bank account.
- Reduced cost of cash management, including cross-border payments.
- Payment systems stability, even in times of crisis such as pandemics.

Case Study: China's Digital Yuan

The People's Bank of China (PBoC) started a study group in 2014 to investigate a Digital Currency Electronic Payment (DCEP) and started a pilot program in 2020. The pilot has been a success, with 261 million personal wallets created and more than 88 billion RMB in transactions between August 2020 and December 2021.

The majority of DCEP application use cases were to satisfy daily retail payment needs such as shopping and bill payments, with niche applications such as university cards to pay for in campus dining and copying services and travel applications such as purchase of tickets to attractions (Exhibit 61).

Exhibit 61:
Digital Yuan Current Usage and Future Plans



1.Point of Sale
2.Detailed video explaining the project: https://youtu.be/3KNyf_QwPp8

Bold Move Three - Diversify Asset Class Field and Grow Pension Funds and Mutual Funds

Enhancing pension funds would strengthen Indonesia's local capital by:

- Increasing the pool of domestic funds, which a substantial portion can be invested into domestic assets

- Establishing a strong base of domestic funds that takes a long term view in investing, to create a sustainable, 'patient' capital in the market
- Enhancing economic stability by providing additional support on top of government-funded pensions

Indonesia could strengthen and complement existing programs with regulations and incentives for program contributors.

Case study: Australia's Superannuation Program

The Superannuation program plays a pivotal role in boosting Australia's pension fund program and strengthening its overall local capita. This initiative mandated employers to make contributions for all employees, which will go into the pension fund and will be accessible after they retire.

With active push from the government, such as tax benefits, this program has been widely accepted and adopted by the population and shown positive impact for Australia:

- 5th largest pension program in the world
- 1.4x higher in value compared to Australia's total GDP
- 20 million+ subscribers (more than 80% of Australia's population)
- $2.4 trillion worth of cumulative value by 2022, contributing to more than 50% of total investment assets
- 6% growth per annum of Australia's investment assets

Bold Move Five - Increase Access to Financing for MSMEs

To increase formalization rates, Indonesia can streamline registration formalities. An estimated 52% of MSMEs in Indonesia have not formalized, due to difficult administrative formalities in registering and high taxation.

Solutions can be found. For example, the Brazilian government launched the SIMPLES program, which reduced tax rates and tax regulations for Brazilian micro firms with no more than five paid employees. This also demonstrates how formalization improves profit margins: post-formalization, firms showed improvement of 50% higher revenue and profit.

Exhibit 62:
Indonesia's Score on Doing Business

Indonesia score on doing business Score out of 100, 2020 report		Best regional[1] score Out of 100	Indonesia Rank Out of 190 countries	
Getting electricity	87	99.3	140	
Starting a business	81	98.2	110	
Paying taxes	76	91.6	33	
Getting credit	70	80	106	
Protecting minority investors	70	88	48	Typical areas of concern for MSME
Resolving insolvency	68	76.8	37	
Trading across borders	68	89.6	81	
Dealing with construction permits	67	89	116	
Registering property	60	83.1	139	
Enforcing contracts	49	84.5	38	

1. Singapore, Malaysia, Indonesia, Thailand, Philippines and Vietnam

We have pinpointed three key issues to holding back MSME formalization in Indonesia: Lack of legal enforcement, tedious registration process, and few obvious benefits gained from formalizing (Exhibit 62). All of these issues have practicable solutions.

Looking to the future, MSMEs will soon have the option to easily switch banks in order to find the specific value proposition that meets their needs. Local banking institutions have already begun rolling out a variety of options (Exhibit 63).

Exhibit 63:
Leading Value Propositions for MSME players

Simple and digitally-enabled business banking

Providing customers with the ease to perform most basic banking activities digitally, delivered through simple and intuitive design for everyday use

C6BANK monzo

Easy lending solution

Offering a quick decisioning for loans to help businesses solve their working capital needs

new10 judobank

Seamless transaction platform

Full integration for all business transactions (across supplier, internal, and buyers) with an easy-to-use platform

stripe Square

All-in-one financial shop

Setup of an integrated financial store that offers both basic banking (lending, savings, and payments) as well as complex financial solutions (e.g., insurance, investment)

ANT FINANCIAL yono

Beyond banking ecosystem

Complementing banking solutions with specific use cases to support business operations (e.g., accounting)

open Coconut.

Bold Move Six - Invest in a Data Exchange Platform Based on Single National ID

Indonesia can roll out digital data for public sector use-cases like India, by leveraging a truly national digital ID as a valid access key.

Indonesia has made progress for financial inclusion, but there is room for improvement. Currently, Indonesia utilizes e-KTP[39] as proof of identity, however it is prone to duplication and falsification and the system needs to be strengthened.

Case study: Aadhaar, India

Aadhaar is a 12-digit unique identity number issued by the Unique Identification Authority of India to Indian residents based on demographic and biometric information (Exhibit 64):.

Exhibit 64:
India's Aadhaar program

	Description	Key points
Aadhaar is a 12-digit unique identity issued by UIDAI[1] to Indian residents based on demographic and biometric information	**Part of the JAM Initiative: Jan Dhan to give everyone bank accounts, Aadhaar to give everyone ID, and to give everyone cell phone service**	**Aadhaar is accepted as proof of identity and address confirmation for various public services** (e.g., passport offices, PAN cards, and commercial services – mobile communications, bank account opening)
Indonesia leverages e-KTP as proof of identity – however it is prone to duplication and falsification	Aadhaar is tied to both personal and biometric information	**It has a print version (for offline) and a mobile version (for offline and online verification) and accessible through biometrics and QR scan**
	Coverage of 95%of population	
	Key usage is for KYC process	
	Issued at special centers (>12,000), it has also recently become possible to receive Aadhaar in the bank	

1. Unique Identificaton Authority of India

Exhibit 65:
Key Steps for Financial Inclusion

	Step 1: Single national ID	Step 2: Savings account	Step 3: Digital payments	Step 4: Lending
Key steps				
Potential initiatives	**Create a single national ID system** to offer all individuals a valid proof of identity	**Encourage more individuals to open a savings account** and achieve financial resilience • Launch campaign on financial literacy e.g., importance of savings account	**Encourage individuals to utilize digital payments;** data collected can later be used for credit underwriting purposes • Set up a national target to measure adoption of digital payment	**Establish access to lending** e.g., micro loans for underserved individuals • Create a platform to facilitate data exchange, to aggregate and make the data available for financial institutions to use • Encourage banks to champion digital lending products launch, specifically addressing barriers of underserved individuals (e.g., micro / ultra-micro loans)
Progress in Indonesia	Indonesia can **build on its NIK / e-KTP data** to be integrated for public and private interoperability	Indonesia to further **build on existing infrastructure e.g. QRIS, e-wallet payments** and **explore alternative technologies e.g. CBDC**		Indonesia to encourage **ultra micro loans** e.g. KUR

39 Electronic National Identity Card

In building financial inclusion, 4 key steps are needed, namely through a single national ID, savings account, digital payments, and lending (Exhibit 65):.

- Single national ID: Create a system to provide individuals a valid proof of identity
- Savings account: With the national ID, individuals are encouraged to open a savings account and be exposed to financial literacy campaigns
- Digital payments: With the savings account in hand, individuals are encouraged to utilize digital payments, in which the data will support credit underwriting purposes
- Lending: Establish access to lending for underserved individuals

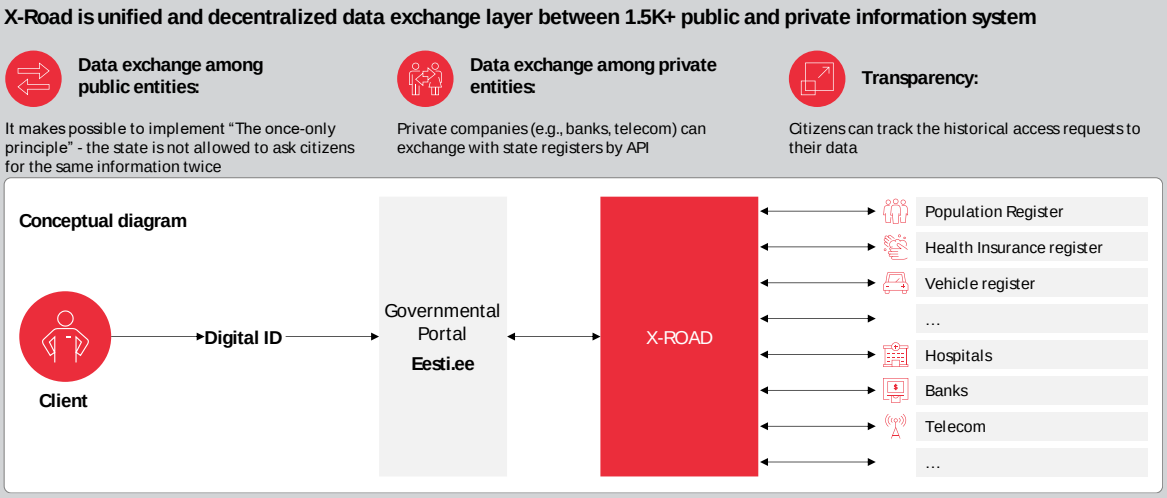
In order to do this, Indonesia needs to develop a data exchange backbone that enables public and private interoperability similar to Estonia's X-Road which allows the public and private sector information systems to link up and function in harmony.[40]

To create a similar system, it is necessary to leverage public (e.g., Sistem Layanan Informasi Keuangan (SLIK)) and private credit rating companies, to obtain credit data.

Case study: Estonia's X-Road

A unified and decentralized data exchange layering system, Estonia uses X-Road to store all public sector data exchange of 1.5K+ information system (Exhibit 66).s

Exhibit 66:
Estonia's X-Road Data Exchange Platform



[40] McKinsey insight: Digital government reusable government services.

Roadmap

MSMEs also have a role to play in implementing the unlocks. Some ways MSMEs can participate are actively participating in data sharing, expand payment transaction methodologies, and partner with pension funds (Exhibit 67).

Exhibit 67:
Role of MSMEs in Financial Services

Bold moves	What MSMEs can do
1 **Explore establishing CBDC**	**Expand their transaction methodology to adopt CBDC** as one of their payment methods
2 **Further develop digital payment solutions**	**Adopt and provide feedback to digital payment provider on improvement areas** based on their experience
3 **Diversify the asset class field** and grow pension and mutual funds	**Partner with established pension funds** to design and implement retirement plans tailored to the needs of small business employees
4 **Explore mandatory national-level insurance**	By being insured, **MSMEs can be better protected of their assets** such as place of business or transportation e.g. trucks for delivery, bikes. This should help them be more resilient
5 **Drive formalization of MSMEs**	**Seek financing opportunities,** so that MSMEs have more access to diversified funding sources and be able to grow
6 **Invest in a data exchange platform**	**Opt in to actively participate and share their own business data,** e.g., track transaction and cash flow data in a more transparent and seamless way

These bold moves will be executed across different phases over the next 22 years (Exhibit 68).

Exhibit 68:
Roadmap for Financial Services

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders
1. Explore establishing CBDC	**Explore feasibility of adopting CBDC and plan for w-Digital Rupiah pilot launch** (following BI's CBDC roadmap) **Launch pilot of w-Digital Rupiah** for issuance, redemption, and transfer of funds	**Expand w-Digital Rupiah use cases that support financial market transactions** e.g., DvP for interbank money market, CCP fund settlements **Develop use cases for r-Digital Rupiah** e.g., distribution and collection, P2P transfers and payments, as well as **integrating wholesale & retail Digital Rp.**			• Ministry of Finance • Bank Indonesia • Financial institutions
2. Further develop digital payment solutions	**Consolidate and accelerate digital payments** using e.g., BI-FAST, QRIS **across organizations to enable low-cost real-time transactions**	**Deliver social assistance digitally to accelerate G2B and G2C transactions**			• Ministry of Finance • Ministry of Communication and Informatics • OJK • Financial institutions
3. Diversify the asset class field and grow pension and mutual funds	**Establish comprehensive regulatory framework** to encourage diversification of investment and facilitate growth **Launch education campaign and learning to increase awareness**	**Launch measures to attract more investor to mutual fund** and encourage employers to provide pension schemes	**Launch incentives to promote private sector participation & PPP** **Continuously diversify asset class field** **Foster innovation and digital transformation**		• Ministry of Finance • Financial institutions • Pension fund providers • Insurance company

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders
4. Explore mandatory national-level insurance	**Explore mandatory national-level insurance for protection of assets from natural disasters** e.g., house, cars	**Grow adoption of elective insurance** e.g., life, health		**Expand into unit-linked products** to grow wealth of population and safeguard their investments	• Ministry of Finance • Ministry of Law and Human Rights • Insurance companies • Financial institutions
5. Drive formalization of MSMEs	**Simplify registration process** by setting up an offline and digital one-stop shop for 1-day business registration	**Build a transaction history for MSMEs**, to enable better access to financing from bank **Build partnership between banks and MSMEs beyond lending** e.g., payroll management tool, accounting, etc.			• Ministry of Finance • Ministry of Communication and Informatics • OJK • Financial institutions
6. Invest in a data exchange platform	**Formalize and integrate use of NIK (single national ID) for all government and commercial channels** e.g., Regional IDs, bank, telecom carrier, EMR, etc.	**Establish a unified data exchange platform** between public and private systems	**Formalize data sharing among entities**, including open banking among banks / non-banks institutions		• Ministry of Finance • Ministry of Cooperatives and SME • Financial institutions

Key metrics and enablers

To achieve these targets, three key enablers are Needed

- **Transversal technology:** Incentive for cooperation in data exchange to build the platform; adoption of a single individual and MSME ID.
- **Talent capabilities:** Analytics capabilities and expertise in CBDC and formalized financial education as part of education curriculum.
- **Infrastructure / logistics:** Strong digital infrastructure that delivers equal internet access across the archipelago.

With increased financial inclusion, Indonesians can grow their businesses, better protect their money and investments, and safeguard their livelihoods during retirement.

The success criteria of the aspirations will be the key milestones to track (Exhibit 69).

Exhibit 69:
Financial services Key Metrics

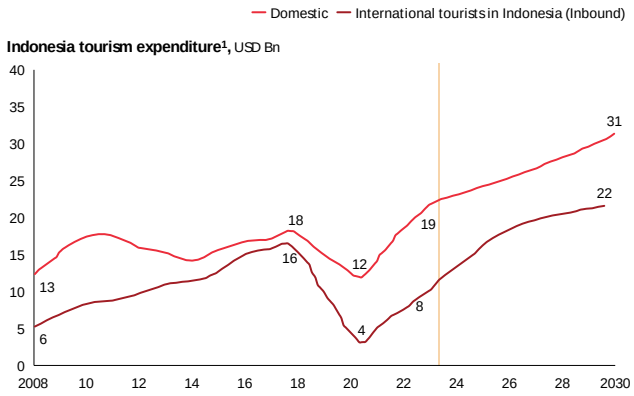
Key metrics	Source	Current	2030	2035	2040	2045	Note
Financial inclusion index	SNLIK 2022	85%	86%	88%	89%	**90%**	2045 targets based on Developed countries today
Financial literacy index	SNLIK 2022, Sina Institute for Financial Studies (2020)	50%	55%	60%	65%	**70%**	2045 targets based on China today
Active digital banking users	McKinsey Personal Finance Survey (2021)	78%	81%	84%	87%	**90%**	2045 targets based on Developed Asia today
Penetration of e-wallet payment	Worldpay global payments report (2022), Global data (2022)	47%	53%	59%	64%	**70%**	2045 targets based on China today
Penetration of lending for MSME	Global banking pool, OECD (2020)	28%	36%	44%	52%	**60%**	2045 targets based on China today
OOP payment as % of current health expenditure	World Health Organization GHED (2016 & 2020)	37%	32%	26%	21%	**15%**	2045 targets based on Australia today
P&C insurance penetration to GDP	Swiss re, secondary research	0.5%	0.9%	1.3%	1.6%	**2%**	2045 targets based on Thailand today
Stock market value traded per GDP	The World Federation of Exchanges (2020)	12%	32%	51%	71%	**90%**	2045 targets based on Thailand today
Mutual fund assets per GDP	The World Bank (2020)	3%	10%	17%	23%	**30%**	2045 targets based on Thailand today

Building world-class eco- tourism & infrastructure, and unleash global creative players in selected sub-sectors

Context and challenges

Indonesia's tourism and creative industries have experienced strong growth since 2008 and have become an important economic driver for the nation. Importantly, Indonesia's fast-growing tourism sector is recovering at a rapid rate after the pandemic. While this recovery is seen in both domestic and international tourism numbers, domestic tourists lead the way, contributing nearly 70% of the tourism expenditure in 2022 (Exhibit 70.)[41]

Exhibit 70:
Indonesia's Tourism Expenditure



Remarkable strides have been made to further enhance tourism, including achieving UNESCO recognition of seven geoparks, the development of 7,300 tourism villages across the archipelago, and investment in transportation infrastructure such as highways and railroads.

The government has also shortlisted areas to become "10 New Balis," prioritizing five of them to be completed by 2025. However, there is still room for improvement. The current development of the "10 New Balis" project demonstrates the need to prioritize locations and have more intensified collaboration with local leadership[42].

However, some challenges remain. When compared to peer countries, there is room for improvement in tourism's contribution to GDP and other metrics. For example, tourism contributes 5% to Indonesia's GDP, a significant but small amount compared to Thailand (18%) or Malaysia (13%). Similar numbers can be found in creative economies, which contribute 4% to Indonesia's GDP as compared to 8% in Thailand and 6% in South Korea.[43]

Another place for improvement is in diversifying away from the tourist hotspots of Bali and Java. 77% of foreign tourists visit Bali annually while 57% of domestic tourists visit Java (Exhibit 71 and 58). This concentrates wealth and benefits from tourism in two narrow geographic areas.[44]

41 McKinsey tourism recovery model, McKinsey Global institute; Globaldata for historical values.

42 "Sampai di Mana Profgres Pengembangan 10 Bali Baru?," Bisnis.com, 16 July 2019.

43 Ministry of Tourism and Creative Economy, Statista, World Travel & Tourism Council, Oxford Economics.

44 Ministry of Tourism and Creative Economy, Statista.

Exhibit 71:
Breakdown of Domestic Tourism in Indonesia

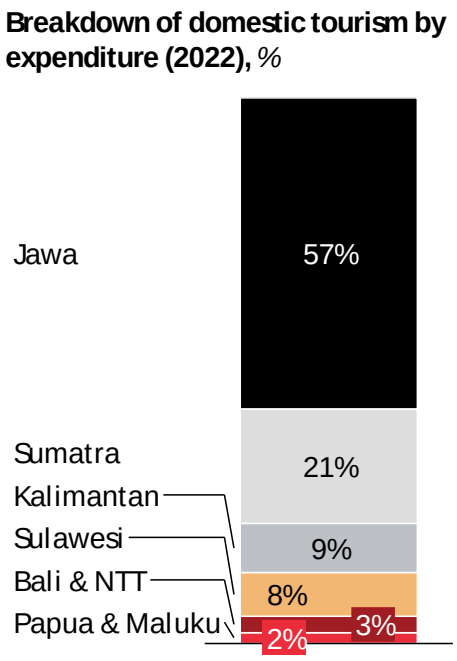
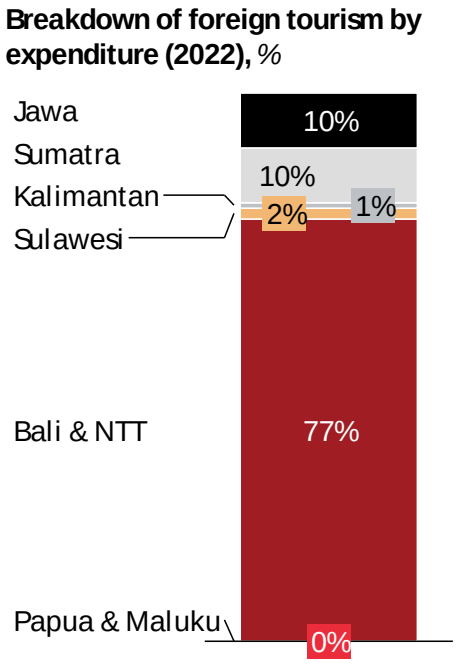


Exhibit 72:
Breakdown of Foreign Tourism in Indonesia



Surveys show that domestic tourists experience three main challenges when travelling.[45]

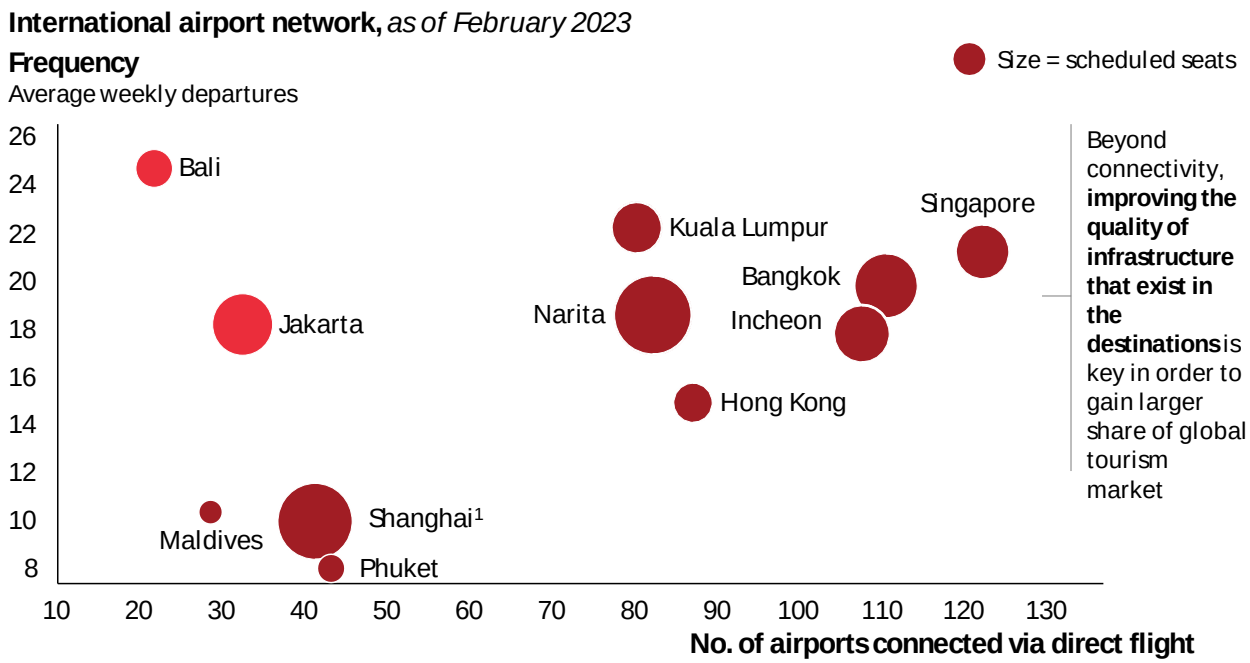
- **Poor connectivity**: Existing public transportation lacks connectivity, especially in reaching rural areas. Inter-city highways are also often severely crowded resulting in traffic jams during public holidays.
- **Lack of unique destinations**: Some cities lack a distinct tourist value proposition which represents untapped potential to unlock tourism. For example, China has adopted a customized approach in each city by, for example, developing cable cars and hiking trails in nature areas, or developing theme parks in barren areas.
- **Lack of high-quality accommodation options**: Compared to neighbouring countries like China, there is a lack of four- and five-star hotels: China has 3,395 while Indonesia provides only 996.[46]

For international travellers, Indonesia's international connectivity is still inferior to other Asian destinations, with few connections and poor infrastructure (Exhibit 73).

[45] Ministry of Tourism and Creative Economy, Statista.

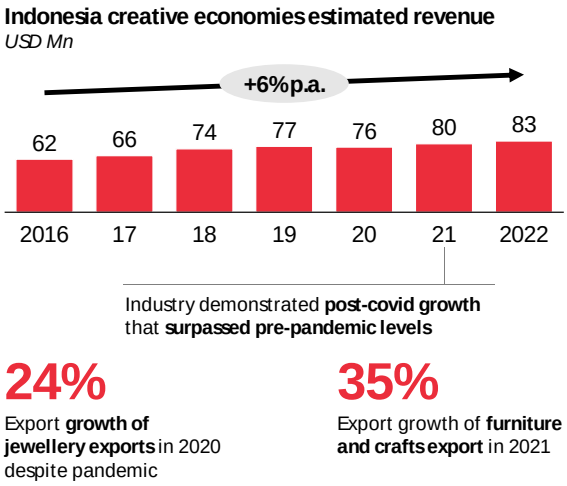
[46] Ministry of Tourism and Creative Economy, Statista.

Exhibit 73:
International Airports' Flight Frequency and Connectivity



In parallel to developing tourism, concentrated efforts to grow creative economies have borne fruit with a 24% growth of jewelry exports in 2020, despite the pandemic, and a 35% growth in the export of furniture and crafts in 2021. The industry continues to show remarkable growth, surpassing pre-pandemic levels (Exhibit 74).[47]

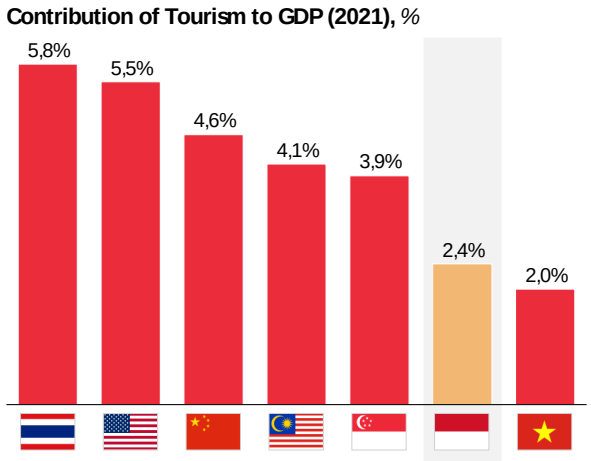
Exhibit 74:
Revenue of Indonesia Creative Economies



When compared to peer countries, there is room for improvement in the creative industry's contribution to GDP. Whereas Thailand's creative industries contribute 8.3% to GDP, Indonesia's creative industries generate a respectable but smaller amount of only 4% (Exhibit 75).

[47] Press search, Ministry of Tourism and Creative Economy, Inidkator Makro Pariwisata dan Ekonomi Kreatif 2022.

Exhibit 75:
Benchmark of Tourism Contribution to GDP



There is opportunity to further grow Indonesia's exports of creative products. For example, currently fashion and crafts contribute to 95% of Indonesia's creative industry exports.

Part of the problem is that the creative economy in Indonesia is dominated by MSMEs without access to financing and the business know-how to scale up. For example, only 17% of creative businesses have received legal status with 93% relying on their own capital and a whopping 97% marketing their products only locally. Indonesia's MSME-dominated creative industries hinder the export potential of its unique products. For example, the total of the creative industries export volume is lower than peer countries: fashion exports stand at $31 per capita versus $256 in Malaysia (Exhibit 76).[48]

Exhibit 76:
Opportunities for Indonesia's Creative Products

Further, the creative economies in Indonesia are dominated by traditional sub-sectors while high-growth potential sectors in the creative digital industries lack prominence even though they experience rare double-digit growth in the number of people they employ (Exhibit 77).[49]

[48] World Trade Organization, Euromonitor, World Bank.

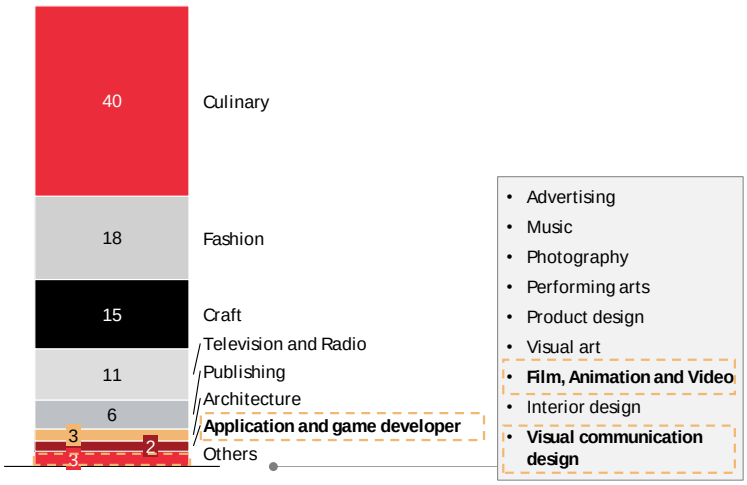
[49] Ministry of Tourism and Creative Economy Statistik Ekonomi Kreatif 2020.

Exhibit 77:
Breakdown of Creative Industry by Sub-sector in Indonesia

XX Digital sub-sectors

Although digital sub-sectors currently have low prominence…

Breakdown of creative industry by sub-sector by value, *%*



..they have a rare double-digit growth in number of people

Growth of people in creative sub-sectors, *Mn*

Subsector	**CAGR 2016 - 2022,** %
Culinary	6.42%
Fashion	-0.98%
Crafts	0.34%
Publishing	-1.61%
Performing Arts	-0.81%
Apps and Games	**27.86%**
Television and Radio	4.73%
Photography	4.57%
Music	4.46%
Film, Animation and Video	**11.55%**
Architecture	2.08%
Visual Art	1.22%
Advertising	-1.55%
Product Design	-2.07%
Interior Design	12.02%
Visual Communication Design	**20.00%**

Indonesia should aim to maximize potential of tourism and creative economies. Indonesia should aim to establish renowned world-class tourism destinations and become a global creative economic player in selected sub-sectors (Exhibit 78).

Bold moves

There are four bold moves that Indonesia needs to undertake to improve its tourism and creative economies (Exhibit 79).

Exhibit 78:
Aspirations for Tourism and Creative Economies

	FROM: Current achievements	**TO:** Future aspirations
Tourism	**Fast-growing tourism sector,** driven by **domestic travel surrounding Java**	**Renowned tourist destinations around large cities in Java** to further boost domestic tourism
	Strong recovery of international tourism post-COVID, despite untapped potential opportunities outside of Bali and Java	**True world-class tourism destination with developed eco-tourism strategy** in nature and culture rich areas, supported by an integrated, world class transport and logistic infrastructure
	Creative economies driven by traditional sub-sectors, while **digital sub-sectors are still nascent**	**Strong growth and high prevalence of digital creative economies**
	Creative economy as a national economic driver, with continuously growing export value	**Established global creative economic player,** with focus in 2-3 strategically selected sub-sectors e.g. fashion and craft

Exhibit 79:
Bold moves for Tourism and Creative Economies

Tourism

1 Boost infrastructure investment in areas surrounding big cities

Raise awareness of surrounding areas through:

- Run marketing campaigns
- Invest in entertainment sites and quality accommodation
- Encourage villages to specialize in one high-value traditional product

2 Pursue world-class partnerships in eco-tourism

Invest in integrated, world-class infrastructure, supported by governance and regulation

Balance between **tourism growth and nature / culture conservation** through effective pricing strategy

- E.g., research centers

Creative economies

3 Strategically invest in 2-3 creative sub-sectors

Potential to grow 3 sub-sectors: fashion, crafts, application / game design, film and music

- Build creative zones
- Provide consultancy services, financial assistance and regulatory support

4 Develop *global* creative hubs for export growth

Pursue **impact investment partners** that can help to **provide educational programs, funding, and foster innovation**

Bold Move One - Boost destination investment in areas surrounding big cities

Within Java alone, there is opportunity to improve the areas surrounding big cities (areas 200km or within convenient public transportation networks) through four key components to boost domestic tourism:

- Marketing: Running general marketing campaigns to raise local awareness of tourism
- Entertainment: Invest in destination entertainment sites (e.g., theme parks, nature parks, zoos, historical sites) in locations nearby to big cities
- Transport and accommodation: Invest in integrated transportation and quality accommodation from nearby cities
- Unique proposition: Encourage communities to specialize in producing one high-value traditional product to encourage visitation to those towns

Case studies from other countries demonstrate effective methods to promote domestic tourism in Indonesia (Exhibit 80).

Exhibit 80:
Benchmark of Other Countries' Methods in Promoting Local Areas

Examples in other countries		
Marketing		• **North Dakota launched their "Legendary" ad campaign** highlighting the state's figures and potential for adventure • Successfully boosted visitors from other states, **growing the tourism industry by $927 million**
Entertainment		• **Used regional park system** to develop existing nature into national parks (e.g, Yellowstone park) • Development is often **partly funded by government**
		• Developed Khao Yai area, **2 hours from Bangkok**, which has **nature park, zoo, winery and hotels** - area attracts many domestic tourists
Accommodation		• Built the **palm islands to provide luxurious and high-quality living spaces,** close to the city center • Named 'World's leading Tourism Development Project' at the 2021 World Travel awards
Unique proposition		• **Implemented OVOP (One Village, One Product) movement** • Oyama town is a success story where they specialized in producing traditional Japanese festival goods • Oyama allowed tourists to visit to the factory attracting 1.9 Mn visitors annually
		• Similar to Japan, **Thailand implemented OTOP (One Tambon, One Product)** • Encourage **villages to select one superior product to receive formal branding**, with a national stage for promotion

Bold Move Two - Pursue world-class partnerships in ecotourism

Indonesia should promote inclusive and sustainable tourism in prioritized locations by developing ecotourism.

Case study: Costa Rica

Costa Rica's three-pronged approach to ecotourism has proven a success, with 3.1 million tourists annually (pre-COVID), 80% of whom come for ecotourism visits.[50] This in turn helps to preserve the environment, with more than a quarter of the country dedicated to protected national parks (Exhibit 81)

Exhibit 81:
Benchmark of Costa Rica's Ecotourism Approach

Case example: Costa Rica's three-pronged approach to eco-tourism which Indonesia could consider implementing

Strong governance to support and regulate tourism

- Costa Rican Tourism Board (ICT) which established **Certification for Sustainable Tourism (CST) which certifies tourism business' sustainability practices**

Community-based tourism

- Community Tourism Development Program (CTDP); program aimed to empower local communities to develop small tourism businesss (e.g., homestays, local tours, etc.)

Building eco-tourism destinations

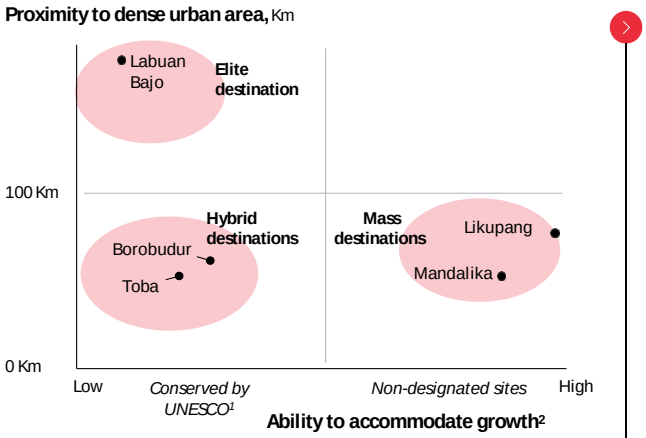
Invest in strong infrastructure

- Set up **national park system** to protect which covers 25%of the land
- Growth of sustainable luxury accommodations to provide unique nature immersion experience (3..g, Rainforest Resort, Lapa Rios Eco Lodge, Areans del Mar Beachfront)

In crafting a unique identity for each location, it is important to define its value proposition based on the target segment rather than just marketing it as a "tourism destination" (Exhibit 82). The scale of "Elite," "Hybrid" and "Mass" tourism is detailed here. This scale takes into account the intrinsic value/s of the site that would be diminished with an incremental increase in raw numbers of visitors.

[50] Instituto Costarricense de turismo (Costa Rican Tourism Board), Press search

Exhibit 82:
Potential Growth Strategy for Prioritized Locations



Destination	Growth driver source	Spending profile[3]	Specific Enablers
(a) **Elite**	International	Luxury / Upscale	• World-class infrastructure • Compelling destination storyline
(b) **Hybrid**	International & Domestic	Midscale/ Upscale	• Compelling destination storyline • Complimentary activities
(c) **Mass**	International & Domestic	Midscale / Budget	• Affordable flight connectivity & lodging • High-speed internet connection

In **crafting a unique identity for each location**, it is important to **define its value proposition based on the target segment** rather than just marketing it as a "tourism destination"

1.Part of UNESCO Global Geoparks/ Biospheres/ World heritage sites
2.Taking into account intrinsic that would be diminished by each additional increase in tourist
3.Budget:<705k USD/trip, Midscale:<705-1000k USD/ trip, Upscale:1000-1200k USD/trip, Luxury: >1200k USD/trip

In developing ecotourism in prioritized areas, it is important to consider the ability to accommodate growth when setting growth strategies. Proximity to urban areas and accessibility should be considered carefully when considering the target segment for tourism.

Bold Move Three - Strategically invest in two to three creative sub-sectors

Based on current contribution to GDP of each sub-sector, and the potential global growth, Indonesia has the potential to focus on fashion, crafts, apps and games, music, and film / animation / video to become a global leader (Exhibit 83).

Indonesia is well-positioned and has a "right to win" as a leading global exporter in these sectors.

a. Fashion:

Indonesia has a fast-growing fashion scene:

- More than 20 fashion schools
- High availability of unique fabrics due to diverse local artisans producing traditional fabrics (e.g., Batik and *tenun*)
- Tenth annual Indonesia Fashion Week invites global buyers and international fashion partnerships, such as between BIN House[51] and the Korea Tourism Foundation[52]

Exhibit 83:
Top 10 Creative Industry Sub-Sectors

	Top 10 creative industry sub-sector	Contribution to GDP	Global growth[1]
	Culinary	40%	High
(a)	Fashion	18%	High
(b)	Crafts	15%	High
	Publishing	11%	Low
	Performing Arts	6%	High
(c)	Apps and Games	3%	High
	Television and Radio	2%	Low
	Photography	0.9%	Low
(d)	Music	0.5%	Medium
(e)	Film, Animation and Video	0.5%	Medium

1. Global growth is based on press search, expert opinion and published forecasted growth rates
2. BIN House is a famous contemporary fashion brand that uses traditional fabrics
3. SLVK - Sistem Verifikasi Legalitas & Kelestarian / Timber Legality Assurance System: Certification that wood is good quality and obtained sustainably

[51] BIN House is a famous contemporary fashion brand that uses traditional fabrics.

[52] "Pelaku Industri Batik Berkolaborasi dengan Kain Sutra asal Jinju Korea," Berita Satu, 11 November 2022.

Indonesia can be the "modest fashion" capital of the world:

- Experience with a large population of Muslims who demand high-quality, fashionable clothing designed with modesty as a key value
- Strong textile industry: sixth largest manufacturing sub-sector contributing $15 billion USD to GDP

b. Crafts:

Indonesia has abundant natural resources and human capital capable of processing them into handicraft products with high added value:

- High quality wood (teakwood and mahogany) with SLVK[53] certification is readily available
- Indonesia became the second largest global exporter of wooden crafts after China in 2018
- Opportunity to increase production where raw material is readily available e.g., rattan products, silver jewellery

Case Study: Italy

Indonesia's current fashion sector has similarities with Italy in the 1950s. The fashion scene in Italy was dominated by highly skilled designers who had small boutiques mostly focusing on producing clothing for wealthy clients. The existence of many small or family-owned textile mills provided a wide variety of high-quality textiles to be incorporated into fashion pieces, with each region specializing in a different type of fabric.

Today, Italy is a global fashion powerhouse, with a market value of US$ 91 billion, the

fourth largest in the world, and clocks US$ 34 billion in fashion exports annually, the fifth largest export market globally.[54] This massive industry employs 650,000 people and commands international recognition through established luxury brands such as Armani, Prada, Versace and many more.

Key learnings from Italy's massive global fashion boom that Indonesia can implement (Exhibit 84):

- Establish "fashion districts" in high potential regions, with support from the government to invest in physical infrastructure e.g. studios, showrooms, production facilities, etc.
- Provide technical assistance on how SMEs can meet global export standard and business skills on exporting
- Provide financial assistance e.g. tax deductions, insurance
- Establish the "Made in Italy" standard through strict quality monitoring by the government

[53] *Sistem Verifikasi Legalitas & Kelestarian* (Timber Legality Assurance System): Certification that wood is good quality and obtained sustainably.

[54] Press sources.

Exhibit 84:
Key Learnings from Italy's Fashion Industry

Key learnings from Italy's massive global fashion boom that Indonesia can implement

1. Creative zones – facilities located nearby each other

"Fashion districts" in high potential regions (e.g., Tuscany Fashion District, Milan fashion district)

- **Government invested in physical infrastructure** in these regions (studios, showrooms, production facilities) and provided fashion designers access

2. Consultancy services

Camera Nazionale della Moda Italiana
ITA ITALIAN TRADE AGENCY

Many organizations, including National Chamber of Italian Fashion and Italian Trade Agency, **provides technical assistance on:**

- **How SMEs output can meet global export standard**
- **Business skills on exporting** (e.g., market research, partnering with foreign channels)

3. Financial assistance

- **Tax deductions for fashion SMEs** (e.g., reduced tax rates, VAT exemptions, 50% tax credits for R&D)
- Italy export credit agency also provides **insurance and financial assistance** to help them mitigate export risk

4. Regulation

- Globally, "Made in Italy" brand represents excellence and quality especially in fashion products
- This was established due to **government strictly monitoring export quality** of products and **regulating what items can be branded "Made in Italy",** while promoting Italian products through fashion shows

c. Apps and Games

Development of applications and games is a fast-growing sector globally with potential to provide high-paying jobs:

- US$ 2.2 billion global market size (2022) with 10.5% growth rate in next five years
- Average salary for game developer jobs is 15% higher than other tech jobs

There is an opportunity for Indonesia to attract tech talent, providing good baseline workforce for foreign companies to set up shop in Indonesia. There has been a 49% growth in digital nomads globally, and Bali is an attractive destination for digital nomads, with more than 3,000 visits from January to August 2022.[55]

d. Music and Film, Animation & Video

While nascent, Indonesia's music and film market is large and fast-growing:

- Indonesia is the fifteenth largest market for Hollywood movies, worth an estimated US$ 300 million with a forecasted 8% CAGR until 2030
- 38% of the population use music streaming services (the Southeast Asia average is 28%) and exhibit a strong preference for local music

Some Indonesian talents and products have started gaining international fame:

- Singer Agnez Mo and Niki have released songs that charted on the global Billboard 100
- *Marlina the Murderer in Four Acts*, a 2017 thriller directed by Mouly Surya, was shown in 40 countries and won five international awards

In fostering growth of digital sub-sectors, Indonesia should focus on attracting established foreign companies to set up shop in the country, learning from Canada's sector growth.

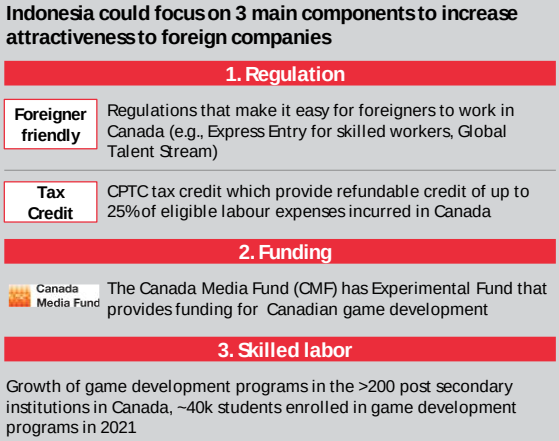
[55] "Indonesia aims to lure more digital nomads to its shores," Reuters, 15 September 2022.

Case study: Canada's gaming industry

In order to kick-start growth in the gaming sub-sector, Canada focused on attracting foreign companies through regulation, funding and skilled labor. The results are an impressive growth in GDP contribution, from US$ 3.6 billion in 2019 to US$ 5.5 billion USD in 2021, 50% more companies added during that same period, and a total of 48,000 well-paid jobs (on average, 40% higher pay than other Canada creative industries).[56]

Learning from Canada, Indonesia could focus on three main components to increase attractiveness to foreign companies: establishing favorable regulations, provide additional funding, and develop skilled labor (Exhibit 85).

Exhibit 85:
Key Learnings from Canada's Gaming Industry



Case study: South Korea's music and film industry

The so-called "K-Wave" started in the 1990s with a regional strategy of creating products targeted for Japan and China, and becoming a true global phenomenon in the 2020s, not only for media output but cosmetics, fashion and even food.

The economic impact of K-Wave is impressive: K-Pop music alone contributed US$ 12.3 billion to GDP in 2019, a growth of 30% from US$ 9.5 billion in 2018.

The export value of K-Pop has grown exponentially, reaching US$ 680 million in 2020, eight times higher than in 2010. Streaming platforms have helped the K-Wave to grow, with 50.54 million downloads of Korean music in 2022. The film industry has also seen massive growth, with US$ 71.5 million in overseas sales revenue between 2018-2022.

Indonesia could emulate how the public and private sectors played key roles in growing South Korea's music and film industry (Exhibit 86).

[56] Press search

Exhibit 86:
Key Learnings from South Korea's Music and Film Industry

Public and private sector played a key role to growing the music and film industry in Korea

Public

1. Protective regulation

Established **Korean Copyright Commission** who is responsible for protecting rights of copyright holders through copyright laws and law enforcement

2. Infrastructure investment

Invested in performance venues, music/film studios for creation and showcasing of arts

3. Financial assistance

- **Tax incentive** to encourage industry growth (e.g., 20% tax credit for investment in films, 50% tax discount for export related expense)
- **Provide funding to creators** (e.g., KOFIC set up Korean Film Production Fund to provide loans and equity investment covering up to 50% of production costs)

4. Focused efforts to market products globally

- **Organize global events to attract international fans** (e.g., K-pop World Festival held in cities around the world)
- **Set up cultural centers around the world** to focus on marketing efforts (events, exhibitions in target cities

Private

5. Strong talent management

Private companies invest in a **comprehensive talent management programs**:

- Active sourcing of talent from a young age (e.g., audition event, sourcing agents)
- Intensive training programs that go beyond performing (e.g., language, social media)
- Paying talent during training program so they can focus on training

6. Creative and differentiated product offering

Music and film followed global trends while having **world-class elements to make it differentiated** from other countries products (e.g., high quality costume, dance, staging)

Bold Move Four - Develop global creative hubs for export growth

Because Indonesia's creative industry is dominated by MSMEs, there is opportunity for existing creative hubs to scale-up these MSMEs into a larger economic and social force. Although about 140 creative hubs exist across Indonesia today, most of them only act as a coworking space providers while a third of them face funding challenges.[57]

There are four key areas that Indonesia can examine to successfully scale-up creative industry MSMEs (Exhibit 87):

- Educational programs: Create targeted programs to improve the skills gap in creative economy players
- Funding programs: Provide funding to MSMEs within creative economies to scale up their business
- Consultancy / business services: Provide services e.g., photography, branding to help MSMEs scale up
- Foster innovation: Host events /competitions to incentivize and encourage innovation

[57] Based on a survey conducted by The British Council of 50 respondents.

Case study: Malaysia Global Halal Hub

Malaysia has developed a sizeable global halal hub, reaching $8 billion of annual export value of halal products. This contributes to 5.1% of Malaysia's overall export value. Malaysia also possesses 25 halal parks (fully operational and in development).

Malaysia was able to strengthen its position as a global halal hub through 3 key steps:

- Developed an agency named the Halal Industry Development Corporation, tasked to grow industrial capacity, and bring in FDI
- Established Halal Parks industrial zones, which allow tenants to share common facilities e.g. storage, cold chain warehousing and service supports
- Introduced a national halal certification – currently an internationally standardized logo approved for use by all Muslim nations

Indonesia's own Global Halal Hub also aims to create an ecosystem for locally produced halal products to be able to enter the global market, especially for MSMEs. Its current initiatives focus on capability and brand building as well as database development.

There is potential for Indonesia to focus on growing MSMEs in key growth halal industries such as F&B, tourism, pharmaceuticals, and cosmetics.

Exhibit 87:
Programs for Creative Hubs

There are 4 activities that Indonesia creative hubs can consider doing to successfully scale up creative industry SMEs

Educational programs	Create targeted educational programs to improve the skills gap in the creative industry players	British Council developed **Creative Hubs Academy** (a program to improve the business skills of creative industry players)
Funding programs	Provide funding to SMEs within creative economies for specific actions to scale up their business	Mauritius EDB **provides funding to support SMEs** in attending trade fairs and producing films
Consultancy / business services	Provide consultancy / business services (e.g., photography, branding) to help SMEs scale-up	Enterprise SG offers selected SMEs **business consultancy services** to help them scale and connect with foreign partners
Foster innovation	Host events / competitions to incentivize and encourage innovation within the creative sectors	Adelaide Creative Comm. Hub hosts **annual competition** between architects to design public space buildings

Roadmap

MSMEs also have a role to play in implementing the unlocks. Some ways MSMEs can participate are building value proposition for their respective areas, foster community-based tourism, investing in building capabilities in enabling sectors of prioritized creative economies (Exhibit 88).

These bold moves will be executed across different phases over the next 22 years (Exhibit 89)

Exhibit 88:
Role of MSMEs in Tourism and Creative Economies

Bold moves	What MSMEs can do
1 **Boost infrastructure investment in areas surrounding big cities**	**Build value proposition specific to each area** (similar to Japan's One Village One Product movement)
2 **Pursue world-class partnerships in eco-tourism**	**Foster community-based tourism** by developing high-quality small tourism businesses e.g. homestays, local tours, etc.
3 **Strategically invest in 2-3 creative sub-sectors**	**Grow businesses in sub-sectors of focus** e.g. modest fashion, handicraft products, at internationally accepted quality **Invest in building capabilities in supporting / enabling sectors** such as: • **Fashion:** sewing classes, textile development, niche stores, etc. • **Music/ film:** acting school, equipment rental, costume design, music classes, etc. **Strive for partnership with world class institutions / entities in select skills**
4 **Develop *global* creative hubs for export growth**	**Be actively involved in creative hubs** by joining training programs, seeking funding / consultancy services, etc.

Exhibit 89:
Tourism and Creative Economies Roadmap

Bold Moves	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders
1 **Boost infrastructure investment in areas surrounding big cities**	**Identify infrastructure gaps in select destinations** e.g. connectivity, sanitation, accommodation, etc. **Invest in end-to-end infrastructure development** **Encourage villages to specialize in one high-value product** to encourage visitation to those cities; provide incentives of a formal branding through a national platform				• Ministry of Public Works and Public Housing • Ministry of Tourism and Creative Economy
2 **Pursue world-class partnerships in eco-tourism**	**Define value proposition of prioritized destinations to identify key requirements** e.g. world-class infrastructure vs cheap flight connectivity **Develop incentives to empower local communities to develop small tourism businesses** **Establish systems to certify tourism sustainability practices** **Partner with world-class players** to develop accommodations and surrounding infrastructure	**Export our ability to deliver world-class eco-tourism**	**Further grow nature / culture conservation programs in select destinations** e.g. research centers		• Ministry of Tourism and Creative Economy • Ministry of Public Works and Public Housing • Ministry of Environment and Forestry • Local governments
3 **Strategically invest in 2-3 creative sub-sectors**	**Establish high potential regions for selected sub-sectors** and invest in physical infrastructure e.g. studios, showrooms for fashion designers' access **Invest to develop skilled labor through programs in post-secondary institutions** for e.g. game development **Conduct exchange programs with world class entities** to stimulate capability building **Incentivize SMEs to build capabilities in enabling industries**	**Boost export sales** of products through a national branding e.g. "Made in Indonesia", with strict quality control			• Ministry of Tourism and Creative Economy • Local governments • Ministry of Cooperatives and SME • Universities / vocational schools
4 **Develop global creative hubs for export growth**	**Pursue impact investment partners** **Create targeted educational programs** to improve the skills gap in the creative industry players **Provide funding to SMEs within creative economies** for specific actions to scale up their business	**Host events / competitions to incentivize and encourage innovation within the creative sectors**			• Ministry of Tourism and Creative Economy • Private / public sector companies • Universities / vocational schools

Key metrics and enablers

There are 3 key enablers to ensure growth in tourism and creative economies:

- Talent: Talent of the future to grow digital creative economies
- Transportation and logistics: Strong transport infrastructure to increase domestic and international

connectivity, as well as strong logistics infrastructure to support sales of creative products

- Regulation: Policies to promote FDI for large CAPEX projects in tourism and attract foreign companies to grow nascent digital creative industry

Progress of these bold moves can be tracked through metrics until 2045 (Exhibit 90).

Exhibit 90:
Tourism and Creative Economies Key Metrics

Key metrics	Source	Current	2030	2035	2040	2045	Note
Number of foreign tourists, #	Kemenparekraf *(2021)*	1.6 Mn	5.5	9.3	13.2	**15-20 Mn**	2045 targets based on Thailand today
Number of domestic trips, #	Kemenparekraf *(2021)*	603 Mn	830	1,050	1,275	**1,500 Mn**	2045 targets based on China today
Average spend per domestic trip, *USD*	Statista *(2021)*	150	175	200	225	**250**	2045 targets based on China/ US today
Income of tourist workers[1]**,** *USD/ year*	Salary Expert *(2023)*	~$9k	Target to be determined				
Share of world exports of creative goods, *%*	UNCTAD *(2020)*	<1 %	1.8%	2.5%	3.3%	**3-5%**	2045 targets based on Vietnam/ India today
Contribution of creative industry to GDP, *%*	Kemenparekraf *(2020)*	4%	5%	6%	7%	**8%**	2045 targets based on Thailand today
% of working population in creative industries, #	Kemenparekraf *(2021)*	15%	Target to be determined				
Average income of creative industry workers, *USD/ year*	Indonesia to start tracking					**~$120k**	2045 targets based on US today

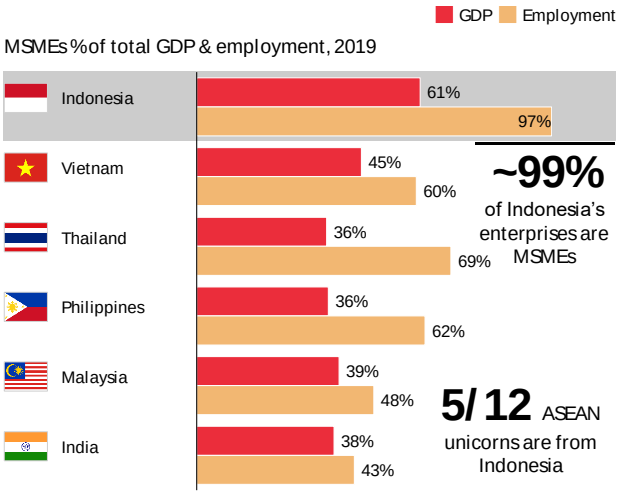
Accelerate MSME growth to mid-size, globally competitive companies

Context and challenges

Indonesia boasts a proud and thriving entrepreneurial culture, with MSMEs being the backbone of the economy. However, Indonesia should aspire for more of its MSMEs to grow to be globally competitive, mid-size companies.

To grow to be a mid-size company, MSMEs will need to scale the access to market, both domestic and export, and ability to attract much stronger talent pool. In order to be globally competitive, they will need to be cost competitive and deliver product at global quality – which means focusing on certain sectors with inherent competitiveness (e.g., product created from resources only available in Indonesia), adoption of I4.0, and leadership with innovation mindset. This can lead to further prosperity.

Exhibit 91:
Contribution of MSMEs to GDP and Employment



Statistically, MSMEs make up 99% of the total business population, employ 97% of the total workforce, and contribute 61% to GDP (Exhibit 91).[58]

However, most small businesses still follow traditional business methods (Exhibit 92).

Exhibit 92:
Traditional Ways of MSMEs

Limited digital penetration - only **13%** of MSMEs (99% of ID's businesses) are digital

Limited access to banking – only **~25%** of Indonesia's MSMEs and SMEs have access to banking

Limited exports – SMEs contribute to only **15.6%** of Indonesia's non-oil exports

Indonesian MSMEs lead by contribution to GDP and employment globally. In most countries, MSMEs contribute more than a quarter of GDP and on average, MSMEs contribute more than half (68%) of total employment. MSME is thus an important social pillar, with MSME contribution to employment being larger than its GDP contribution in most of the major economies studied (19 out of 20).

Despite these successes, Indonesia's MSMEs need to grow its scale significantly have significant room to grow relative to other countries. For example, Indonesia's small enterprise scale is 1/6 of Thailand and Indonesia's medium enterprise scale is 1/2 of Malaysia.[59]

[58] World Bank, IHS, press search.

[59] ADB, OECD, Government statistics, Eurostat, press search.

This variance can be explained by four key challenges Indonesia's MSMEs face along their life cycle (Exhibit 93):

- **Lack of resources, information, and know-how:** 87% of MSMEs do not use digital or online e-commerce platform, and 9% of sales are lost by Indonesian MSMEs to shrinkage versus 1.1% in China
- **Lack of innovation / presence in promising growth sectors:** 51% of formal Indonesian MSMEs face constraints in accessing external financing in sectors like manufacturing
- **Lack of economies of scale and scope:** the lack of a developed network of traders, trading houses and foreign consumers and struggles with access to domestic and international markets leads to limited export capabilities
- **Lack of talent:** Many MSMEs struggle to attract the desired talent. 65% of MSME owners with more than 35 employees have no intention to scale up through upskilling

Exhibit 93:
Challenges of MSMEs across their Life Cycle

Challenges across life cycle	Description
Lack of resources, information and know-how	• Struggles with securing the necessary **finances, technology, market information and partnerships** • Struggles with **making business decisions** based off **market research/ intelligence** • **Higher transaction costs** compared to large enterprises
Lack of innovation / presence in promising growth sectors	• High **upfront capital costs** • Higher **risks**
Lack of economies of scale and scope	• Struggles with **access to domestic and international markets** • Struggles with ambition and foresight of **short- and long-term planning** to drive strategic growth
Lack of talent	• **Scarcity of skilled talent** • Struggles with **attracting the desired talent** and **developing them**

To establish successful MSME ecosystems, global peers focused on addressing these four challenges to leverage them into factors for success (Exhibit 94).[60]

[60] Commerce Bureau of Shenzhen Municipality, Shenzhen Government Online, Dell Technologies, International Data Corp, European Commission, Harvard Business Review, Deutsche Standards, Drucker Society, German Federal Ministry of Economics and Technology, The Economist Group, BMWI, OECD, Korean Ministry of SMEs and Startups, FedEx APAC Business Insights, Deloitte, International Business Review, Konkuk University.

Exhibit 94:
Key Success Factors of Global Peers

Challenges across life cycle	Example initiatives, mindsets or approaches which turned into…	…key success factors
Lack of resources, information and know-how	• **Organically, SMEs learnt and outdid:** in **engineering fields**, SMEs **learn** from foreign partners and "re-innovate" (e.g. CRRC), **develop end-to-end knowledge** (e.g., Huawei) and **leverage on supply-chain partners** (e.g., DJ Powers) for innovation and growth	**World-class production process**
Lack of innovation / presence in promising growth sectors	• Research institutions partnered with 25+ Mittelstand 4.0 Competence Centers to support innovation in SMEs	**Product innovation**
Lack of economies of scale and scope	• While **domestically** serving the Chaebols as **suppliers**, Korean SMEs grew through **exports** in **regional market** • Government initiatives (subsidies and grants) launched to provide market access	**Long-term vision and strategic planning**
Lack of talent	• Universities offering cooperative education tailored to SMEs launched dual-apprenticeship programs • ~300 central government programmes for SMEs including talent attraction and upskilling measures spearheaded by Ministry of SMEs and Startups, Ministry of Trade, Industry and Energy, and Small and Medium Business Administration	**Talent development** **Top Management modernization and excellence**

Indonesia could be more aspirational and strategic in accelerating growth of MSMEs into mid-size companies that can produce global quality products/services. (Exhibit 95).

Exhibit 95:
Aspirations for MSMEs

FROM	TO
Small in scale and scope driven by lack of talent, resources and traditional ways of doing business	**High adoption of best-in-class technology and modernized business models,** resulting in **high productivity, innovation** and **internationally competitive** scale and scope
15% export share	**30%+** export share
92mn IDR average annual revenue of a micro-scale org	**500mn+** IDR average annual revenue of a micro-scale org
~2bn IDR average annual revenue of a small-scale org	**12bn+** IDR average annual revenue of a small-scale org
~32bn IDR average annual revenue of a medium-size org	**60bn+** IDR average annual revenue of a medium-size org

Bold moves

There are four bold moves that can accelerate the growth of MSMEs in Indonesia (Exhibit 96).

Exhibit 96:
Bold Moves for MSMEs

✓ Challenges addressed by the bold move

Bold moves		Challenges MSMEs face along their life cycle: Lack of resources, information and know-how	Lack of innovation/ presence in promising growth sectors	Lack of economies of scale and scope	Lack of talent
For all segments	1 **Set up and scale national Single ID**, leveraging existing infrastructure, ensuring QR codes are given to registered micro & SMEs, digitizing data collection and record management; and connecting sales transaction to tax collection	✓		✓	
	2 **Accelerate existing financial and capability building support through encouraging private sector involvement**	✓	✓	✓	✓
For micro- and small- scale	3 **Foster One Village, One Product with deeper involvement from national government, and ensure support from regional government**	✓	✓	✓	
For medium-scale	4 **Promote local champions in prioritized sectors and commodities through equity linked and/ or "scale-up" (growth) programs** (e.g., Saudi Arabia's Monsha'at program, Singapore's Enterprise SG Scale-Up program)	✓	✓	✓	✓

Bold Move One - Roll Out a National Digital ID System for MSMEs

A digital ID system for MSMEs will enable ease in delivering support and collecting payments. This is done through leveraging the existing infrastructure, to ensure QR codes are given to all registered MSMEs, digitizing data collection and record management, and connecting sales transaction to tax collection. Similar to e-KTP and India's Aadhaar card, Indonesia could issue a digital ID for MSMEs (refer to 'Leapfrogging growth in financial services': Bold Move Six - Invest in a Data Exchange Platform Based on Single National ID).

Bold Move Two - Accelerate Existing Financial Capability Building through the Private Sector

Today, there are several initiatives that support growth of MSMEs. These initiatives can be combined to create "closed loop" programs that offer end-to-end ecosystem enablers for MSMEs. At the same time, these initiatives can be further encouraged through increased number of private sector players who offer quality capability programs such as DCC.

Case Study: WikiWirausaha

WikiWirausaha, an example of a closed loop program, is a one-stop-shop platform being built to scale next generation medium enterprises to be part of global supply chain. Since launching in late 2022, it has gathered 33 corporate partners, brought in 500+ participating MSMEs and curated 40+ programs across Indonesia. WikiWirausaha is still in development stages, with 3 key features of Wiki Learn, Wiki DO, and Wiki Scale (Exhibit 97).

Exhibit 97:
Key Features of WikiWirausaha

	Key features description	End state output
1. Wiki Learn 	**Online knowledge and information (product/ services) platform:** • Collaborators can share knowledge[1] • Companies[2] can list their product/ services that could support MSMEs	• Online knowledge and information platform with various contributors from knowledge partners and MSMEs • Potential use of virtual-reality to enhance user experience
2. Wiki DO (Digital and operation technology) 	Support **manufacturing MSME** to **adopt digital/ tech**, leveraging a **curated ecosystem** of **tech providers** and **business sponsors**[3] to build: • **Wiki DO Online: Online showcase and training platform** to build I4.0 skills for MSME, able to be accessed globally • **Wiki DO Offline:** Center for **offline immersive learnings**, a place to physically experience I4.0 and onboard MSME in I4.0 journey	• Online DO platform consisting of publicly-accessible online showcase and online training courses • Multiple offline DO centers across different cities with immersive I4.0 showcase and venue available to be used for offline training
3. Wiki Scale 	**Online B2B matchmaking portal:** • For MSMEs to connect with **major companies to become a potential supplier** • To **facilitate import/ export** between **priority G20 countries** – through an aggregated **list of MSMEs products** for potential buyers to **explore**, and vice versa	• Online B2B matchmaking portal to showcase selected export-ready MSMEs based on the country's commodity demand (e.g., coffee for Japan) • To expand partnership to other countries once more funding is secured

1. Collaborators (e.g., industry associations, fellow mid-size companies); knowledge/ insights (e.g., market priorities, consumers trends, business tips)
2. Tech providers (e.g., cloud providers, IoT, and digital IT services); business sponsors (e.g., manufacturers, material suppliers, importers)
3. E.g., global manufacturing companies, global platforms. Targeting manufacturing MSME that will likely need "WikiCoaches" to adopt solutions at scale

Linked with WikiWirausaha, KADIN is fostering UMKM[61] programs to provide Indonesian MSMEs with market access, financing, and technical assistance to grow their business.

Learnings from the British Chamber of Commerce and German Chamber of Commerce indicate that WikiWirausaha and UMKM programs can be expanded to offer dual vocational education and training abroad to support companies in training skilled workers

Today, select companies in the private sector in Indonesia offer capability building programs to MSMEs (Exhibit 98).

Exhibit 98:
Examples of KADIN's Existing UMKM Programs

Problem statement:
How to provide SMEs with market access, financing, and technical assistance to grow their business

Inclusive closed loop (both market access, financing, technical assistance)

Examples of existing programs

Corn (Triputra)	Banana (Crowde & GSK)	Fisheries (Efishery)	Spare parts (Astra)
Inputs, financing, and off-take provided by Triputra	Inputs, financing provided by Crowde, offtake by GSK	Inputs, financinig and off-take provided by Efishery	Technical assistance and off-take provided by Astra

Market access		Financing access	Technical assistance
Domestic/ Daerah • Off-taking by provincial companies (e.g., Tong Tji, Marifood) • Government procurement (e.g., LPDP, Padi UMKM)	**International/ G20** • B20 Wiki Legacy for medium sized companies targeting Japan • Kadin International Trading House	• BNI Explora for exporters • BRI Tangkap Peluang with Kadinda Jateng • Visa and UOB Financial Access	• Digitalisasi Nusantara and Kadin Tech Hub for technology adoption

61 Usaha Mikro, Kecil dan Menengah.

Programs such as these where large businesses provide capability building support to MSMEs should be further encouraged and supported.

Another lever that can be used is a DCC, which offers MSMEs support with adopting and scaling I4.0 technologies (refer to 'Unlocking global lighthouses for scaled adoption of I4.0 in strategic manufacturing sectors': Bold Move One - Improving Productivity through Scaling Industry 4.0).

From becoming aware of which technologies to use to assessing current state, creating a digital transformation roadmap, and piloting and scaling the technology, digital capability centres can model what success looks like and coach MSMEs along their digital transformation journey.

Bold Move Three – Foster a One Village One Product movement in Indonesia

To help stimulate growth of MSMEs, fostering the "One Village One Product" movement in Indonesia can be helpful. The objective would be to provide support for MSMEs who have products that reflect Indonesia's traditions and pride to meet global demand. In essence, it is to take small local firms global based on two success stories – Japan and China.

One Village One Product (OVOP) is an economic revitalization program that started in Japan in 1979 with the aim to improve household welfare and local economies at the village level. OVOP became successful due to its transforming local products into competitive products in local, national, as well as global markets.

The success of the OVOP movement in Japan has motivated more than 40 countries across Asia, Africa, and South America to adopt and adapt the OVOP concept into their own models of economic development. The OVOP approach emphasizes product uniqueness, high added value activities, and local cultural resources.

The OVOP concept has three main principles:

- Local but Global: develop products that can reflect local traditions and pride, but at the same time meet global demand
- Self-Reliance and Creativity: produce a creative product independently by using local resources
- Human Resource Development: visionary local leadership and community empowerment are crucial for OVOP to succeed

Indonesia could also foster the OVOP concept for its micro and small scaled enterprises through tailored incentives that can stimulate focus and quality at the same time. It will be important to enable access to export market at scale and support to adopt technology to produce internationally competitive products in a cost effective and efficient manner. For example, in China, there are strong incentives from the governments in promoting local industries.

Case Study: China's Performance Evaluation System

Leveraging strong incentives from local governments, SMEs have become the backbone of the Chinese economy. China's fiscal reform[62] in 1994 and the performance evaluation system have given local governments a strong incentive to promote local industries by setting targets.

Based on this performance management, local officials are evaluated based on whether their jurisdictions can catch up with or outpace the economic development of other areas in China.

As a result, to achieve the regional growth targets, local governments give incentives to local businesses and SMEs. Incentives to improve the MSME ecosystem include:

- Reducing taxes such corporate income tax and VAT
- Nurturing local industries clusters, e.g., Haining's world class warp knitting centre
- Building economic development zones (EDZs)[63]
- Creating professional platforms for training, trading, finance, and business consulting by providing management courses in partnership with local universities

Bold Move Four - Build "Lighthouse" Medium Enterprises in Prioritized Sectors and Commodities

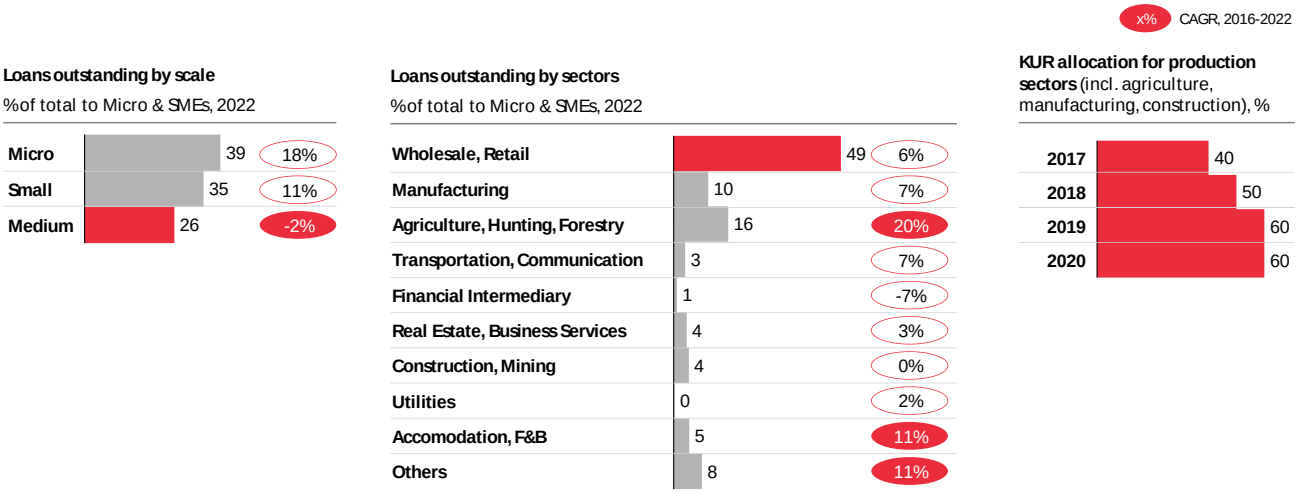
Interventions can be targeted to accelerate growth of small enterprises to be medium/large enterprises in sectors where Indonesia has strong competitive advantage, or sectors that are important for the broader economic development of Indonesia. Whilst the intent is there, the execution has not been as effective. For example, while the government has tried to mandate Kredit Usaha Rakyat (KUR) distribution to priority sectors, such as manufacturing, loans predominantly have been distributed to wholesale and retail trade (Exhibit 99).[64]

[62] Since the fiscal reforms beginning in 1994, the tax revenue from enterprise income has been split: 60% to the central government and 40% to local governments.

[63] EDZs are modern industrial areas established by the State Council and provincial government and offer incentives such as a variety of tax exemptions, land and building subsidies, and preferential employment policies. Currently, there are over 2,000 national and provincial EDZs in China.

[64] Oxford Economics, ADB.

Exhibit 99:
MSME Loans Outstanding by Scale and Sectors



Potential interventions to consider are building a one-stop-shop to accelerate growth of medium enterprises in priority sectors, through public-private partnerships in industries prioritized by the Ministry of Industry such as chemicals, F&B, textiles, electronics and automotives.

Medium enterprises in prioritized sectors and commodities that undergo the program would be 'lighthouses' that signal to other similar-sized companies across the nation what success looks like.

Two successful examples of these "scale-up" programs are Monsha'at from Kingdom of Saudi Arabia (KSA) and Scale-up SG from Singapore. Two successful examples of the one-stop-shop funds are Bank of Tourism Development (OEHT) from Austria and Bpifrance from France. The following describes what they do and their success to date.

Case Study: Monsha'at, KSA

In 2016, the Small and Medium Enterprises General Authority, or Monsha'at, was formed with the aim to promote the culture of entrepreneurship and established SME sector policies and standards in the Kingdom of Saudi Arabia (KSA). This initiative was primarily driven by "Saudi Vision 2030," which is KSA's long-term plan to diversify their economy away from fossil fuel extraction.

Monsha'at's main goal is to increase the productivity of SMEs and their contribution to GDP from 20% to 35% by 2030. To achieve this aim, Monsha'at has provided various capacity building solutions to develop Saudi SMEs.

One of their initiatives was to launch Monsha'at Academy in 2020, which offers over 200 training events, including boot camps, workshops, and self-paced e-learning programs. To further foster innovation among SMEs, Monsha'at organizes Biban, a global start-up and forum for local and international entrepreneurs, investors, and government officials to collaborate and share insights.

Monsha'at also provides financial support, distributing $60.7 billion to SMEs in 2022 and launching SME Bank in 2023 to help entrepreneurs overcome financial hardships (Exhibit 100).

Exhibit 100:
Impact of Monsha'at in KSA

Impact achieved

~$1Bn	Venture capital total funding in KSA (2022), with 72% YoY increase
2nd	Rank on NECI[2] 2022 out of 51 countries, (KSA ranked 41st in 2018)
1.1mn	Number of SMEs in KSA (2022), ~2x from 2016 number
>6mn	New jobs opportunity were created in KSA through SMEs

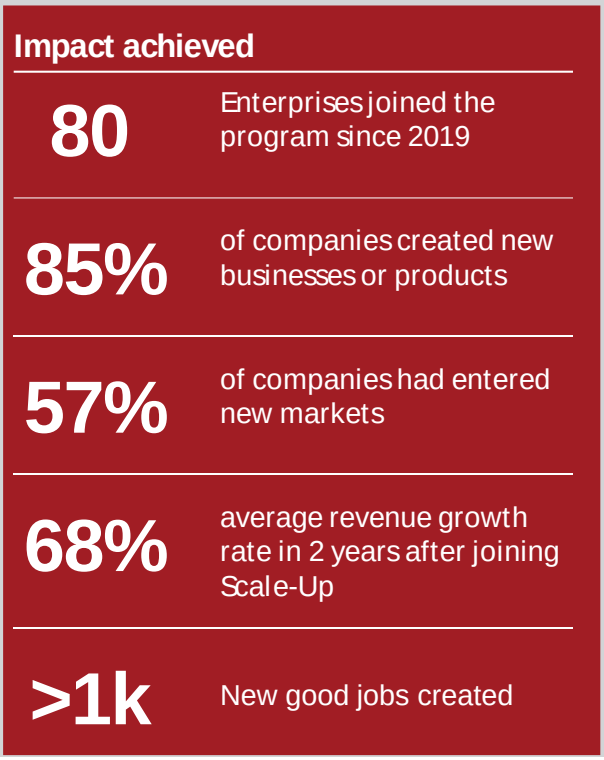
Case Study: Scale-up SG, Singapore

Launched in 2019, Scale-up is a Singapore government program to support selected local companies to become leaders in their fields. The program is by invitation only: Scale-up reaches out to selected companies that meet the program criteria. As these companies grow, they contribute to Singapore's economy, create good jobs, and strengthen the Singapore brand. Within a 12–18-month duration, the program aims to groom the next generation of Singapore Global Enterprises.

By working closely with the Singapore government and program partners, participants learn about management development, business innovation, and market penetration. The program is structured and delivered by expert partners to help companies develop and sharpen their business growth plans via product and process innovation, global market expansion, and M&A.

Companies are closely supported by Scale-Up on their growth journey and receive targeted assistance to execute their growth plans and innovation ambitions. The program also offers exclusive access to leaders and a mentorship network for peer learning, support, and advice (Exhibit 101).

Exhibit 101:
Impact of Scale-up SG in Singapore



Case Study: Austria's Bank for Tourism Development (OEHT)

Through a public, private partnership, Austria's Bank for Tourism Development (OEHT) provides a one-stop-shop fund for SMEs to access mentorship and capital across the public and private sectors. OEHT is open to any tourism and leisure SMEs in Austria's Chamber of Commerce, which counts 90K+ enterprises as members.

Following an innovative approach, the fund is a Public Private Partnership. In its private sector role, it allocates capital, provides advice and mentorship and bears administrative costs. In its public sector role, it convenes capital from multiple public funds, sets tourism strategy, and maintains an enabling policy and regulatory environment.

The OEHT structure is entirely self-financing: costs incurred by government are solely the costs of the subsidies: there are no labor or administrative costs. OEHT is empowered to intervene countercyclically, offering public guarantees to borrowing demands during economic downturns. Applications to the program have average around 800 per year since 2012, and about 13% of these are from new firms, demonstrating its success.

Case Study: Bpifrance, France

Bpifrance is a one stop shop for entrepreneurs in the tourism sector with a vastly comprehensive toolbox offered to customers through 50 local branches (Exhibit 102). It financed over 80,000 companies and provided over 6,000 investment loans and 50,000 short term loans in 2018 with a total outlay of 19 billion euros.

In 2018, €2 billion in direct investments were made to 1,000 in SMEs and 400 investments through partnering funds. Since its inception in 2013, Bpifrance has accelerated over 600 companies, organized over 1,200 consulting missions and around 100 networking events for CEOs.

Exhibit 102:
Bpifrance targeted segment and offering

Bpifrance targeted segment and offering

Targeted segment	Micro-businesses, SMEs and mid-caps in innovative sector Large caps that are important to the interests of France in terms of national economy
BpiFrance offering	**Bank for entrepreneurs:** Offering loans, providing guarantees and awarding buyer credit and supplier credit to encourage business abroad **Private equity:** invest in start ups, SMEs and mid-caps through direct investment and a fund of fund activity **Coach for entrepreneurs:** helps accelerate the growth of companies through accelerator programs, consulting services for executives and training sessions

These bold moves can be implemented from today until 2045 (Exhibit 103).

Exhibit 103:
MSMEs Roadmap

		2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders
1	**Set up and scale national Single ID**	**Build a single national ID platform to register MSMEs** leverage available platform providing support for MSME for maximum registration	**Connect the National ID with broader admin system (e.g. tax)** with tailored approach			• Kemenkeu • KemenkopUKM
		Embed analytics/ AI/ Gen AI to identify needs and tailor support for MSME	**Link to scale up program 3/ 4**			
2	**Accelerate existing financial and capability building support through encouraging private sector involvement**	**Build 1-2 digital capability cente (DCC)** in areas with largest MSME concentration	**Build 3-4 satellite DCC to stimulate broader MSME growth across Indonesia;** integrate with WikiWirausaha/ UMKM programs			• KemenkopUKM • Kemenkeu
		Scale WikiWirausaha and UMKM Programs, aim to increase private sector involvement				
		Setup community of private sector champion to accelerate MSME financing in their ecosystem	**Tailor financial and capability building support for MSME leveraging analytics from Single ID Platform**			

		2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders
1	**Set up and scale national Single ID**	**Build a single national ID platform to register MSMEs** leverage available platform providing support for MSME for maximum registration	**Connect the National ID with broader admin system (e.g. tax)** with tailored approach			• Kemenkeu • KemenkopUKM
		Embed analytics/ AI/ Gen AI to identify needs and tailor support for MSME	**Link to scale up program 3/ 4**			
2	**Accelerate existing financial and capability building support through encouraging private sector involvement**	**Build 1-2 digital capability cente (DCC)** in areas with largest MSME concentration	**Build 3-4 satellite DCC to stimulate broader MSME growth across Indonesia;** integrate with WikiWirausaha/ UMKM programs			• KemenkopUKM • Kemenkeu
		Scale WikiWirausaha and UMKM Programs, aim to increase private sector involvement				
		Setup community of private sector champion to accelerate MSME financing in their ecosystem	**Tailor financial and capability building support for MSME leveraging analytics from Single ID Platform**			

Key metrics and enablers

There are three key enablers to ensure growth of the MSME ecosystem in Indonesia (Exhibit 104).

Progress of these bold moves can be tracked through four key metrics (Exhibit 105)

Exhibit 104:
MSME Key Enablers

	Enabler	Details
	Talent capabilities & leadership development	**Vocational education and upskilling programs** through partnerships with government, universities and multinational organizations **Incentivize upskilling through fiscal support** (e.g., credits for GLG calls, tax breaks for completing capability building programs)
	Logistics	**Transportation and distribution** throughout Indonesia to ensure everyone faces equal access and prices
	Policy	**Adaptive trade regulation** to adjust trade practices depending on supply and demand dynamics e.g., international trade agreements **National regulation that could stimulate export** and ease access to high quality raw materials or services for MSME

Exhibit 105:
MSME Key Metrics

	FROM	TO				
Key metrics	2019[1]	2025	2030	2035	2040	2045
Avg. annual revenue of micro-scale org	92mn IDR	+95mn IDR	+190mn IDR	+290mn IDR	+400mn IDR	+500mn IDR
Avg. annual revenue of small-scale org	~2bn IDR	+3bn IDR	+5bn IDR	+7bn IDR	+10bn IDR	+12bn IDR
Avg. annual revenue of medium-scale org	~32bn IDR	+35bn IDR	+40bn IDR	+45bn IDR	+50bn IDR	+60bn IDR
Micro & SME export share	15%	+16%	+19%	+23%	+26%	+30%

1. Latest available year

4

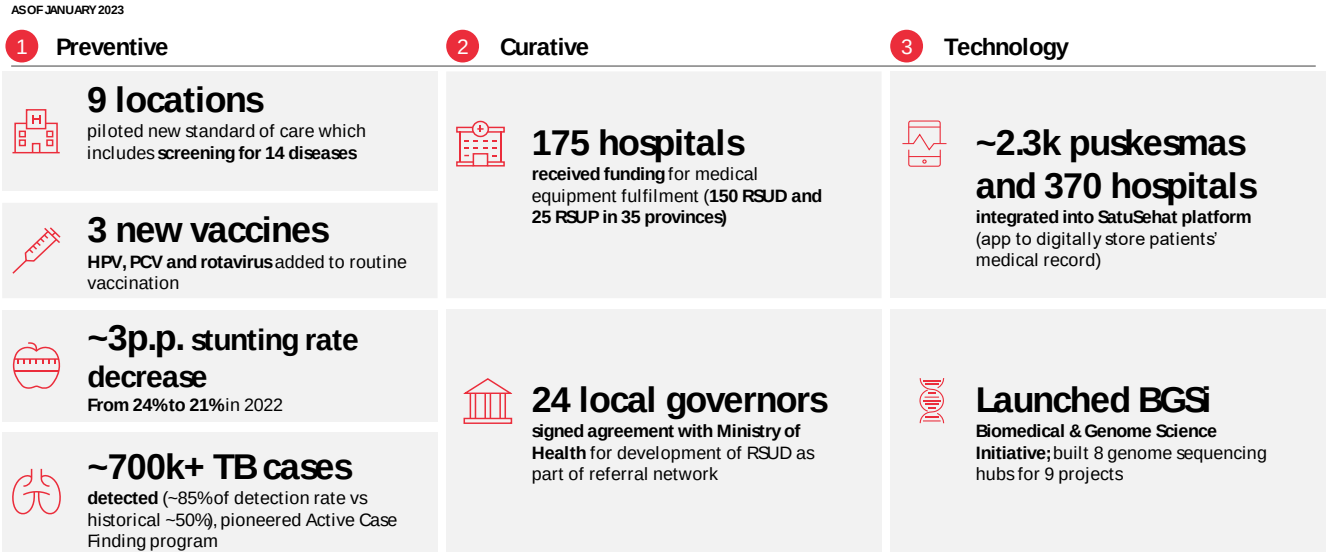
STRENGTHEN INCLUSIVITY

Become the role model of end-to-end transformation of healthcare services ecosystem

Context and challenges

In recent years, Indonesia has made significant progress in improving healthcare services. In 2021, the Ministry of Health (MOH) set out to transform healthcare across Indonesia through a 6-pillar approach. As a result, significant improvements have been made in Indonesia's healthcare system (Exhibit 106).

Exhibit 106:
Improvements in Indonesia's Healthcare System

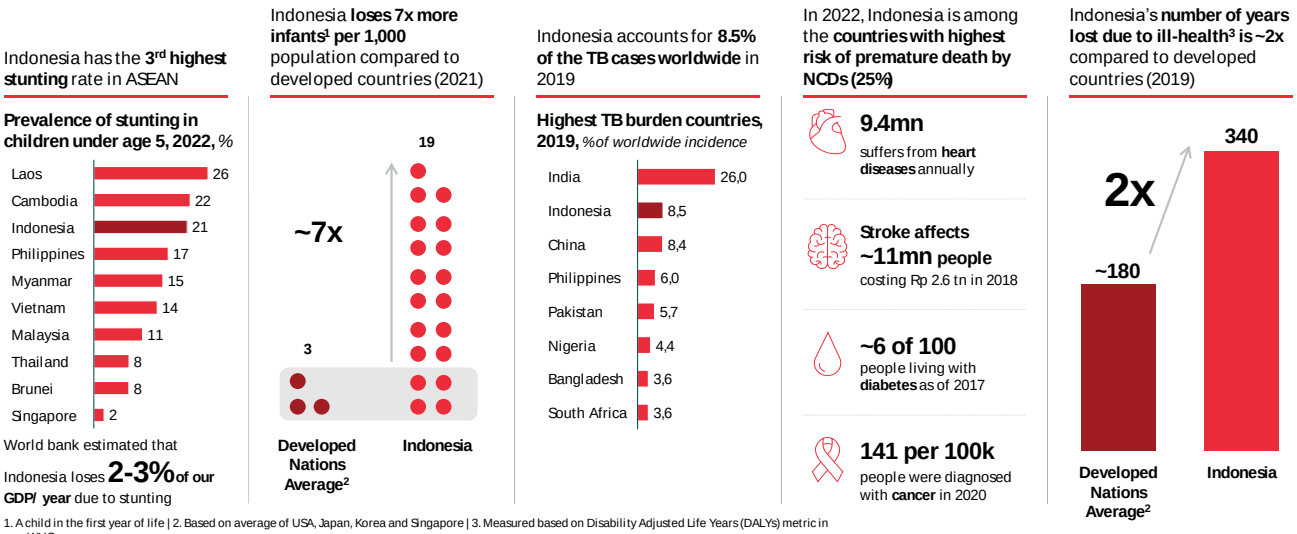


Indonesia's 2020-2024 RPJMN (*Rencana Pembangunan Jangka Menengah Nasional /* National Medium-Term Development Plan) aims to improve health services by strengthening primary health care and encouraging promotive and preventive efforts.

However, there are still improvement areas in healthcare metrics as a result of challenges within the larger healthcare system. Key health outcomes in Indonesia, such as stunting and TB, are still lagging compared to ASEAN peers.[65] (Exhibit 107)

[65] Social Progress Index (2022), WHO (2021), Institute for Health Metrics and Evaluation, Global Burden of Disease (2019).

Exhibit 107:
Indonesia's Key Health Outcomes



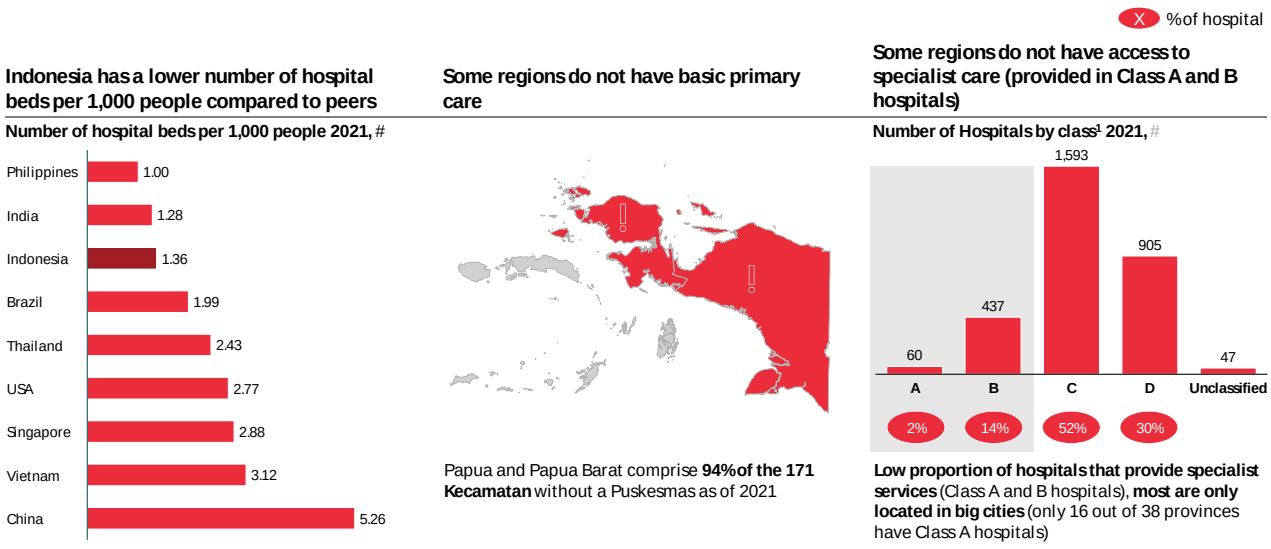
1. A child in the first year of life | 2. Based on average of USA, Japan, Korea and Singapore | 3. Measured based on Disability Adjusted Life Years (DALYs) metric in WHO

There are three main challenges holding back improved healthcare in Indonesia:

1. Limited care facilities

As of today, Indonesia is faced with a critical challenge of limited healthcare facilities, significantly impeding the accessibility of healthcare services throughout the nation. On the curative pillar, improvement needs to come from providing quality and efficient care when and where it is needed. Despite enhancements, there is still a lack of healthcare facilities across Indonesia with some regions lacking primary care facilities and specialty hospitals (Exhibit 108).[66]

Exhibit 108:
Indonesia's Challenges in Lack of Healthcare Facilities



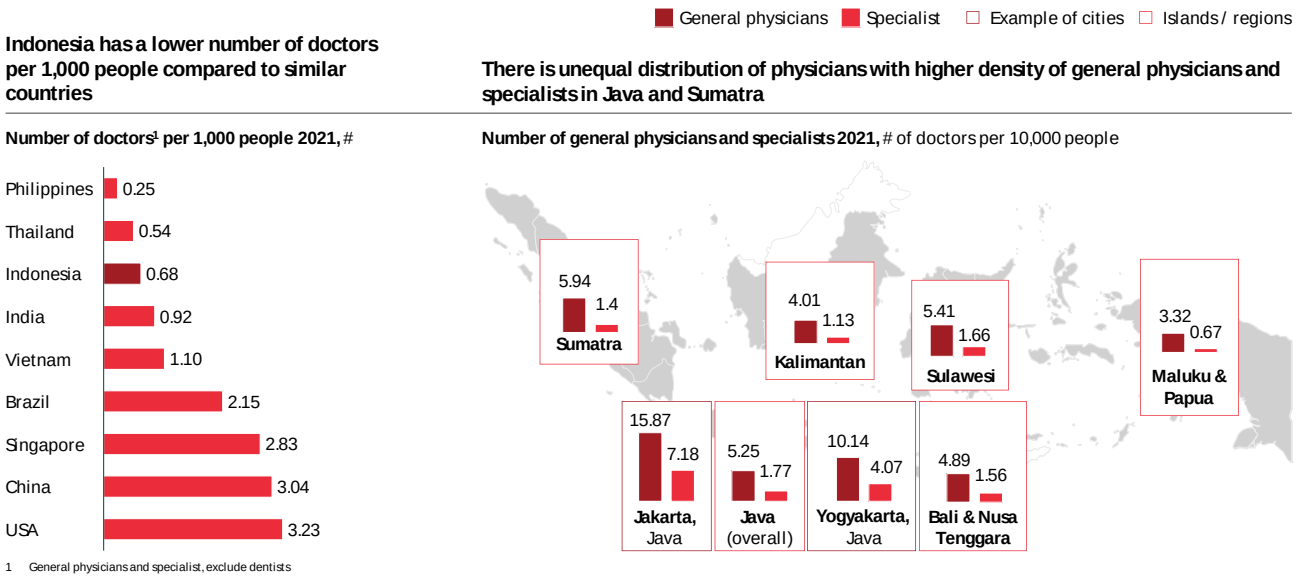
1 Class A: Min 400 beds (extensive specialist and sub-specialist services), Class B: Min 200 beds (extensive specialist and limited sub-specialist services), Class C: Min 100 beds (Min. 4 basic specialist services), Class D: Min. 50 beds (basic medical facilities)

66 Ministry of Health, Government statistical bureau, World Bank, press search.

2. Varying physician availability

Indonesia also faces a significant issue of low physician availability. There is a general shortage of doctors in Indonesia versus ASEAN peers, as well as unequal distribution of Health Care Professionals (HCPs), posing a substantial barrier to accessing adequate healthcare services in the country. Most doctors are concentrated in Java and Sumatra, leaving outer islands without proper healthcare coverage (Exhibit 109).[67]

Exhibit 109:
Indonesia's Challenges in Physician Availability



3. Lack of healthcare budget

Indonesia has a lower spend on healthcare (by % of GDP) compared to other countries. Although the budget allocated to healthcare has gone up through the years, from IDR 92 trillion in 2017 (2.6% of total state budget) to IDR 255 trillion in 2022 (9.4% of total state budget), foreign aid remains key in healthcare spending:

- >77 million USD foreign aid to handle COVID-19 pandemic in 2020
- >1 billion USD foreign aid for healthcare from the United States in the past 20 years[69]

This lack of sufficient healthcare budget in Indonesia has posed significant challenges to the provision of healthcare services across the nation. Currently, Indonesia allocates (Exhibit 110):

— 3.3% of GDP allocated to healthcare versus 4.6% in Turkey, and 8.8% in South Korea

— $141 USD healthcare spend per capita versus ~$400 in Turkey and ~$3,000 in South Korea

Indonesia should aim to improve the coverage and quality of healthcare services, by having equal access to facilities, well-distributed HCPs and ultimately improved health outcomes that surpass peer average (Exhibit 111).

[67] Ministry of Health, Government statistical bureau, World Bank, press search.

[69] Fitch solutions, WHO, World Bank, OECD, Ministry of Finance, press search.

Exhibit 110:
Benchmark of Healthcare Spend

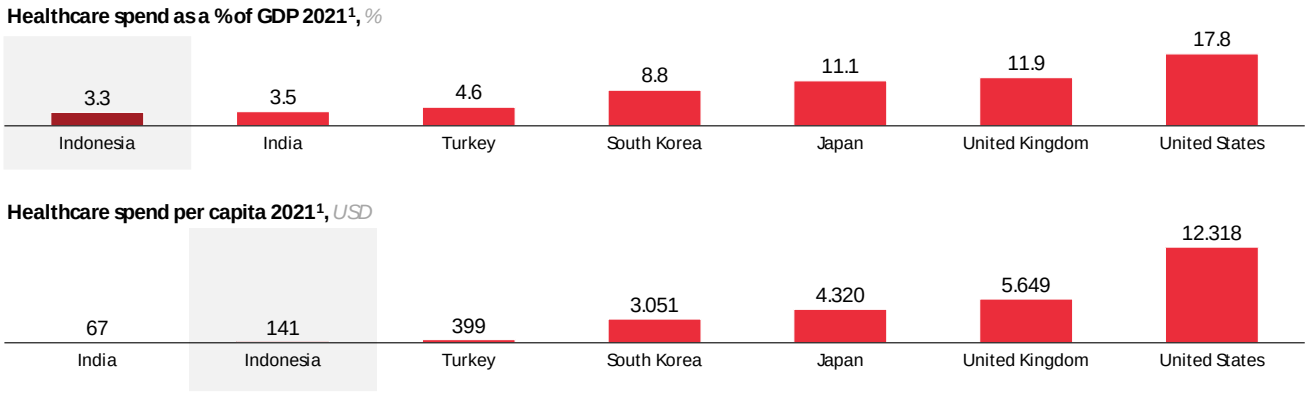


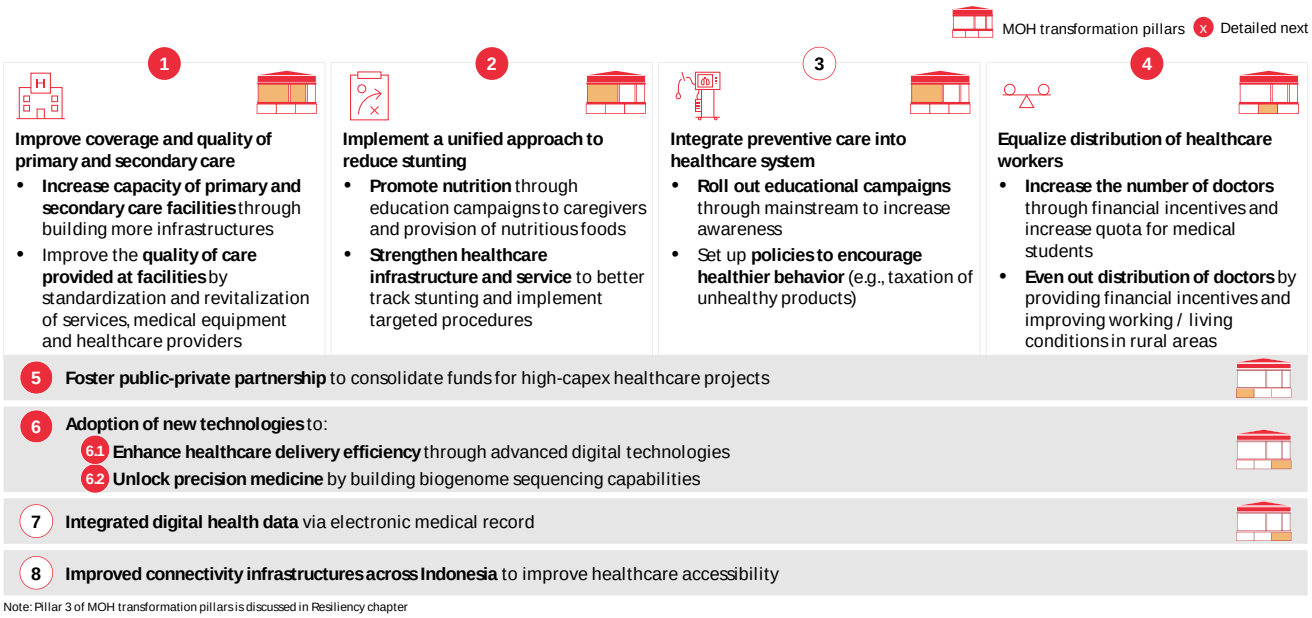
Exhibit 111:
Aspirations for the Healthcare Sector

From	To
Limited capacity of healthcare facilities with some regions not having primary and specialist hospitals	**Equal access to high quality healthcare facilities across Indonesia**
Inadequate number and unequal distribution of HCPs across Indonesia	**High number and well-distributed HCPs** to serve healthcare demand across Indonesia
Key health outcomes lagging behind peers	**Improved health outcomes surpassing peer average**
19 in Infant mortality rate per 1000 births	**5** in Infant mortality rate per 1000 births
129 in communicable disease mortality rate per 100k people	**20** in communicable disease mortality rate per 100k people
660 in communicable disease mortality rate per 100k people	**400** in communicable disease mortality rate per 100k people

Bold moves

To realize the vision of enhanced healthcare access and quality throughout the nation, and to fulfill Indonesia's healthcare sector aspirations, 4 pivotal bold moves and 4 key enablers have been identified (Exhibit 112).

Exhibit 112:
Healthcare Services Bold Moves



Note: Pillar 3 of MOH transformation pillars is discussed in Resiliency chapter

These strategic bold moves are aligned closely with the Ministry of Health of Indonesia's healthcare transformation program launched in 2022.

Bold Move One - Improve Coverage and Quality of Primary and Secondary Care

Enhancing primary and secondary care has been on top of Indonesia's agenda, as it is a crucial step to help Indonesia enhance its health outcomes, reduce healthcare disparities, and foster a healthier and more prosperous nation. MOH has laid out plans to drive the transformation of primary and secondary care services in the country.

The primary care sector is set to undergo significant changes, starting with the standardization and revitalization of services provided by Puskesmas and its network, ensuring they have the necessary resources, including medical professionals, infrastructure, and equipment, to deliver quality care. Additionally, MOH aims to revitalize approximately 300,000 Pustu prima[71] (integrated health posts) across regions, aligning them with the standards of primary care.

In the realm of secondary care, the focus lies on establishing a robust hospital referral network specifically designed to address priority diseases e.g., stroke, cancer, cardiovascular diseases. To support this expansion, funds will be allocated for the procurement of essential medical equipment in approximately 200 hospitals across Indonesia. Through these initiatives, MOH aims to improve the accessibility and quality of primary and secondary care services.

However, there are challenges faced by Indonesia in ensuring a successful implementation of these initiatives.

1. **People constraints in number and capabilities:** Shortage of HCPs, with low willingness from key stakeholders to change and low capabilities / knowledge of HCPs

[71] Previously Posyandu Prima

2. **Financial constraints:** Large CAPEX is required to improve the components of primary and secondary care
3. **Difficulty in monitoring progress:** Lack of data infrastructure to track progress and impact of change resulting in difficulties in implementation

There are three main levers to address these challenges, namely People, Funding, and Data Infrastructure:

- ○
- ○

People *(detailed on bold move 4)*

- Increase number and equalize distribution of HCPs
- Improve working conditions for HCPs
- Facilitate cooperation between HCPs in rural and urban areas
- Establish capability transfer programs to bring in experienced foreign HCPs with unique specialties
- Improve clinical excellence through the development of national Centre of Excellences

Funding *(detailed on bold move 5)*

- Establish a unified body that will enable healthcare funding coordination from multiple sources of funds, e.g., Corporate Social Responsibility (CSR) of private companies.
- Ensure transparent monitoring of fund allocation.

Data infrastructure *(bold move 7)*

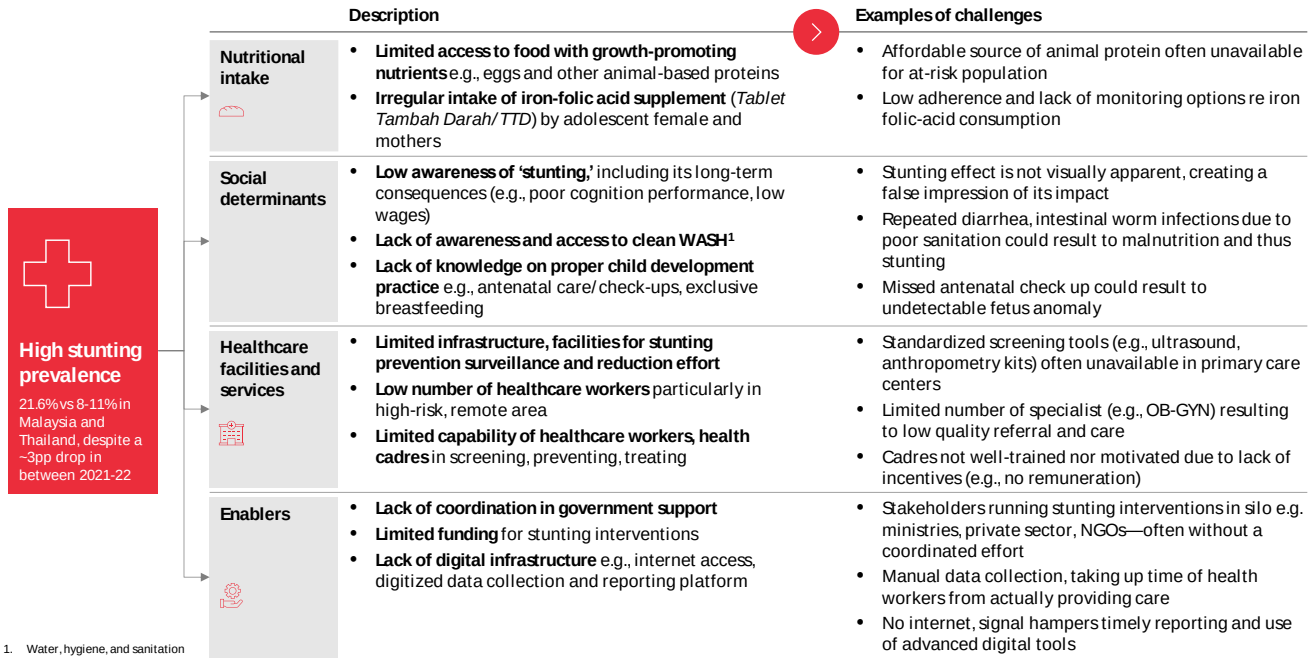
- Build upon existing Satu Sehat application for electronic medical records.
- Develop analytics infrastructure to create real-time data visualizations to enable monitoring.

Bold Move Two - Implement a Unified Approach to Reduce Stunting

Stunting rate in Indonesia is considerably high. Despite a 3-percentage point drop between 2021-22, the rate of 21.6% is nonetheless high compared to 8 to 11% in Malaysia and Thailand. Reducing stunting is of critical importance in Indonesia, and is key to the nation's long-term social, economic, and human development.

The root cause of Indonesia's high stunting rate is multifaceted across nutritional intake, social determinants, and the facilities themselves (Exhibit 113).

Exhibit 113:
Main Challenges in Reducing Stunting Prevalence



Nutritional intake

One key area of concern is nutritional intake of toddlers, adolescent female, and mothers. There are 2 examples among a long list of challenges:

- Limited access to food with growth-promoting nutrients e.g., eggs and other animal-based proteins
- Irregular intake of iron-folic acid supplement (*Tablet Tambah Darah/TTD*) by adolescent female and mothers due to low adherence and lack of monitoring options re iron folic-acid consumption

Social determinants

Beyond nutritional intake, social determinants also play a crucial role. There are 3 key challenges in this area:

- Low awareness of 'stunting,' including its long-term consequences, e.g., poor cognition performance, low wages
- Lack of awareness and access to clean WASH (water, hygiene, and sanitation) which cause repeated diarrhea and intestinal worm infections that results in malnutrition and thus stunting
- Lack of knowledge on proper child development practice e.g., missed antenatal checkup could result to undetectable fetus anomaly

Healthcare facilities and services

Another significant area that contributes to high stunting rate in Indonesia is limited healthcare facilities and services, with 3 key challenges:

- Limited infrastructure, facilities for stunting prevention surveillance and reduction effort, e.g., unstandardized screening tools, such as ultrasound and anthropometry kits, in primary care centers
- Low number of healthcare workers particularly in high-risk, remote areas
- Limited capability of healthcare workers, health cadres in screening, preventing, treating due to lack of training and incentives (e.g., remuneration) for cadres

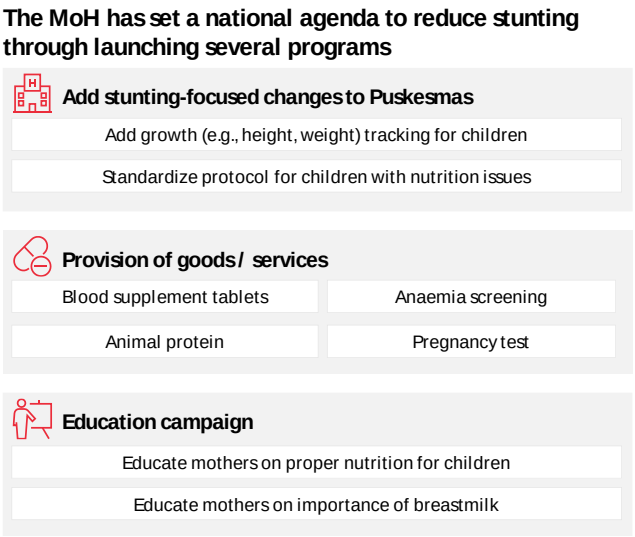
Enablers

Lastly, the absence of supportive enablers significantly impacts the rate of stunting in Indonesia. Such challenges include:

- Lack of coordination in government support, as stakeholders are running stunting interventions in silo
- Limited funding for stunting interventions
- Lack of digital infrastructure e.g., manual data collection, taking up time of health workers from providing care

To tackle the challenges in stunting in Indonesia, MOH has set a national agenda to reduce stunting through launching several programs, including implementing stunting-focused changes to Puskesmas, providing goods and services, and launching an educational campaign on stunting (Exhibit 114).

Exhibit 114:
MOH Agenda on Stunting



On top of that, additional course of action could be deployed to reinforce the initial implementation, such as:

- **Officialise and incentivise the role of health cadre** as a motivation for better performance in tracking stunting cases
- **Scale up anti-stunting campaign to broader group in the high-risk areas**
  - — Younger population to increase awareness in the next generation
  - — Mothers of all ages to correct misconception of the cause of stunted growth e.g., genetic factors
- **Provide internet connectivity and digital platform for health workers** to alleviate administrative burden allowing better anti-stunting care and effort e.g., accurate tracking, documentation
- **Increase anti-stunting support** through monetary and non-monetary means e.g., eggs, meats, potentially involving private sector
- **Better coordination of effort** through clearer mapping and assignment of responsibility to produce more effective and efficient effort

Bold Move Four - Equalize Distribution of Healthcare Workers

Equalizing the distribution of healthcare workers is a crucial endeavour for Indonesia, as it holds the key to bridging the healthcare gap between regions and ensuring equitable access to quality services for all.

To achieve an equalized distribution of healthcare workers, MOH has rolled out a plan that are segmented into 4 topics:

- **Planning for the need of health workers**
  - — Integrating health workers data
- **Increasing the number of doctors**
  - — Scholarship for specialist doctors for 9 priority diseases
  - — Opening up investment opportunity to fund doctors' education especially in East Indonesia
- **Evening out the distribution of health workers**
  - — Scholarship for "*putra daerah*" starting from Puskesmas, RS, and then laboratories
- **Increasing quality of health workers**
  - — Knowledge and technology transfer by diaspora to *puskesmas* and government hospitals

— Placement of foreign graduates in government facilities, with knowledge transfer to local colleagues

To accelerate the implementation, the private sector should be leveraged. There are 3 key roles that the private sector can play:

First, the private sector could incentivize the admission of students with higher willingness to serve in rural areas into medical schools e.g., students with rural background, by providing admission allocation and financial aids for the target students and creating a dedicated fund to provide financial aids for students with commitment to serve rural healthcare facilities for a certain period.

Second, the private sector could also help improve rural working conditions for HCPs to increase quality of life by enhancing the infrastructure, such as building high quality housing near medical facilities, providing transportation for convenient access to bigger cities, and ensuring adequate medical equipment and supplies.

Third, the private sector could promote implementation of telehealth to facilitate collaboration between HCPs in urban and rural areas, by providing necessary equipment for rural HCPs and ensuring protected allocated time for urban HCPs to collaborate.

Enabler Number Five - Foster public-private partnerships

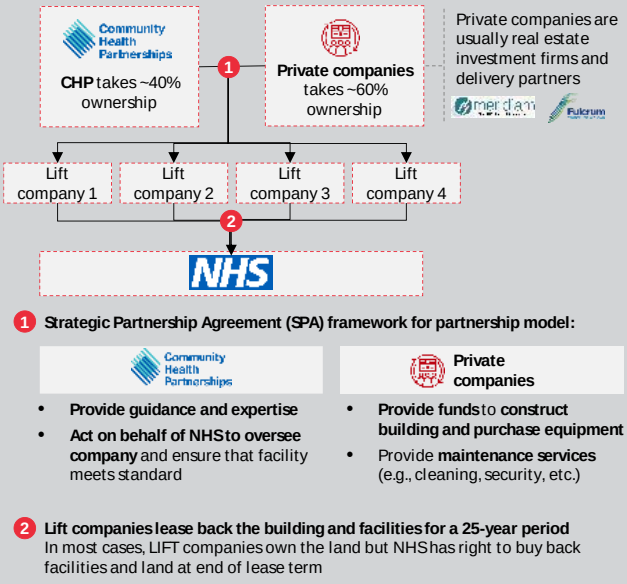
Fostering public and private partnerships in Indonesia has become increasingly critical to unlock additional funding opportunities for high capital expenditure (CAPEX) healthcare projects. As the demand for quality healthcare services continues to grow, the need for substantial investments in healthcare infrastructure, technology, and facilities has become evident. Today, public-private partnerships in Indonesia exist but are still very fragmented.

Case Study: UK's Local Improvement Finance Trust (LIFT)

Indonesia could consider a more unified approach in unlocking private-public partnerships by learning from the UK's Local Improvement Finance Trust (LIFT). LIFT is a vehicle for procuring private-public partnerships delivered by Community Health Partnerships (CHPs). LIFT was launched in 2001 with the purpose of improving the quantity and quality of primary care centers in the UK. Please see below for details on LIFT operating model (Exhibit 115).

So far, the program has 49 lift companies with a portfolio worth 2.5 billion GBP, more than 350 new health facilities that serve 60% of the population, and more than 30,000 people employed for construction and maintenance.

Exhibit 115:
LIFT Operating Model



Enabler Number Six.One - Adoption of new technologies to enhance healthcare delivery efficiency through advanced digital technologies

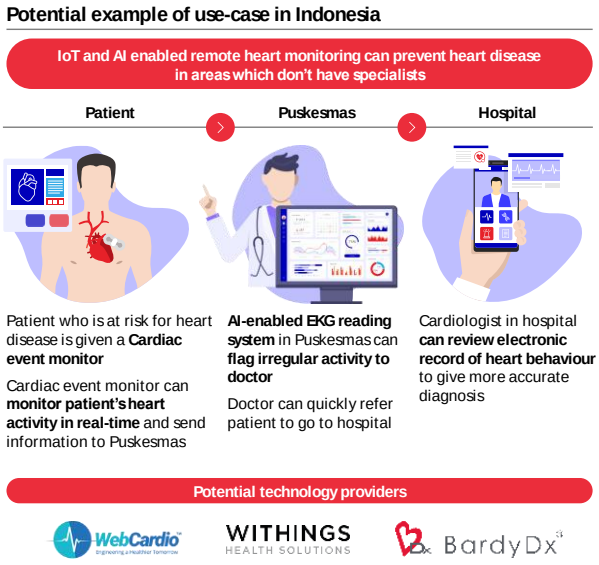
The adoption of new technologies and the integration of advanced digital solutions have the potential to revolutionize healthcare delivery in Indonesia. There are several sample use-cases from other countries that could be adopted in Indonesia, such as remote monitoring through IoT-enabled portable ECG (Electrocardiogram) devices and automation of repetitive analyses through Artificial Intelligence (Exhibit 116).

In Indonesia, IoT and AI can enable remote heart monitoring in areas that do not have any specialist doctors. By real-time monitoring, doctors can quickly refer the patient to go to the hospital, while the cardiologist continue monitoring (Exhibit 117).

Exhibit 116:
Sample Use-cases of New Technologies in Healthcare

Type of technology	Sample use-cases (Highlighted in example)
Internet of Things (IoT)	**Remote monitoring** IoT-enabled portable ECG devices to help monitor patients in rural areas
	IoT sensors used monitor hospital environment to reduce risk of infection spread
Artificial intelligence (AI)	**Automation of repetitive analyses** AI-powered EKG reading systems to detect arrhythmias with high accuracy
	AI-enabled hospital management systems AI HMS to improve patient flow and resource allocation at Oxford Hospitals
Robotics	**Automation of simple procedures** Surgical robot used to automate minimally invasive surgeries (e.g., hysterectomy)
	Therapy robot in rehabilitative care Therapy robot can provide feedback on how patient is performing exercises
3D Printing	3D printing to create bone replacement implants
	3D printing used to create artificial tissues for organ transplant

Exhibit 117:
Example of Remote Heart Monitoring Use-case in Indonesia



Enabler Number Six.Two - Adoption of new technologies to unlock precision medicine by building bio genome sequencing capabilities

The adoption of new technologies and the establishment of bio genome sequencing capabilities hold immense significance for Indonesia, paving the way for precision medicine and transforming the landscape of healthcare. Hence, the Ministry of Health of has launched the Biomedical and Genome Science Initiative (BGSi) for the purpose of enabling precision medicine and improving medical research. However, there is still room for BGSi to be scaled up and improved further.

Case Study: UK Biobank

Established in 2006, UK Biobank is a not-for-profit that charges research institutions for data access and receives funding from donation. The UK Biobank has received over 300Mn of funding from government, charitable foundations, and research institution and has highly experienced CEO operating and managing the institution. The UK The Biobank established a large and diverse database that represents the UK population, as it is essential for enabling precision medicine research and biomedical research. In fact, it is the largest medical database and research resource containing in-depth health information with 500k samples with complete health information collected within 3 years. It also facilitates global access to data through data sharing infrastructure and is used by >30k researchers from 100 countries for >6k published research.

There are four key lesson that Indonesia BGSi can learn and adopt from UK Biobank:

- Establish partnerships with charitable, research institutions or pharma companies to have secure source of funding
- Create a targeted recruitment strategy, partner with healthcare facilities to streamline collection
- Invest in data collection, storing and sharing infrastructure linking to electronic medical record for comprehensiveness of data
- Hire skilled human capital with experience working in Biobanks, especially for leadership positions

Roadmap

MSMEs also have a role to play in implementing the unlocks. Some ways MSMEs can participate are the following (Exhibit 118):

Exhibit 118:
Role of MSMEs in Healthcare Sectors

Bold moves	What MSMEs can do
1. Improve coverage and quality of primary and secondary care	**Establish satellite clinics and pharmacies in rural areas** where healthcare facility is minimum
2. Implement a unified approach to reduce stunting	**For F&B MSMEs: provide affordable nutritious food at affordable price** to local residents **Support local stunting effort** through monetary or non-monetary means **and be actively involved in anti-stunting campaigns**
3. Integrate preventive care into healthcare system	**Actively avoid selling or being involved in the production and distribution of unhealthy products** e.g., tobacco **Promote educational campaign** on healthy lifestyle through the **social media**
4. Equalize distribution of healthcare workers	**Provide an inclusive working environment to healthcare workers** serving in the area

Furthermore, these bold moves can be potentially implemented through initiatives that are phased up until 2045 (Exhibit 119).

Exhibit 119:
Healthcare Sector Roadmap

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders
1. Improve coverage and quality of primary and secondary care	**Build healthcare facilities to increase capacity and coverage of primary care to rural areas** across country **Enhance the development of domestic HCPs** through accelerated medical program for top performing HCP candidates **Integrate digital solution to increase the efficiency of frontline healthcare workers** especially in remote areas	**Improve clinical excellence through the development of national center of excellence** in **Increase the quantity and quality of specialists** through the provision of support for general practitioners to pursue specialization at world-renowned hospitals	**Expand the scope of center of excellence to secondary and tertiary care**		• Ministry of Health • BPJS Kesehatan • Ministry of Home Affairs • Ministry of Village, Development of Disadvantaged Regions and Transmigration • Bappenas • Private and public healthcare providers • Local governments
2. Implement a unified approach to reduce stunting	**Provision of essential nutrition for the first 1000 days of life** as stunting prevention measures **Scale-up anti-stunting campaign to broader group** e.g., younger population **Support frontline healthcare workers through monetary and non-monetary workers** e.g., incentivization of the role of health cadre, provision of internet and digital platform				• Ministry of Health • Local governments • Ministry of Home Affairs • Ministry of Village, Development of Disadvantaged Regions and Transmigration • Bappenas • BKKBN • Private and public healthcare providers
3. Integrate preventive care into healthcare system	**Set up policies to encourage healthier behavior** e.g., taxation of unhealthy products **with periodic update** **Roll out educational campaigns** through mainstream media to increase awareness of preventive care and behavior	**Leverage the future technology platform** e.g., metaverse, AR/VR to refresh the campaign strategy in increasing awareness			• Ministry of Health • Private and public healthcare providers • Health organization
4. Equalize distribution of healthcare workers	**Incentivize the admission of students with higher willingness to serve in rural area into medical schools** **Improve rural working conditions for HCPs** to increase quality of life **Implement telehealth to facilitate collaboration between HCPs in urban and rural area**	**Build an integrated living facilities for HCPs in healthcare facilities** with all-inclusive basic amenities **Invest in implementing innovative remote communication strategies for HCPs for better collaboration** e.g., VR, holographic communication			• Ministry of Health • Medical schools • Medical colleges • Private and public healthcare providers • Health associations

Key metrics and enablers

To ensure the success of the achievement of Indonesia aspirations in healthcare sector, four essential enablers must be in place:

1. **Technology:** Foster adoption of advanced technology to improve efficiency of healthcare
2. **Public-private partnership:** Public-private partnership to streamline allocation of private CSR funds for healthcare
3. **Data:** Integrated patient health data via electronic healthcare record
4. **Connectivity:** Improved connectivity infrastructures across Indonesia to improve healthcare accessibility

Lastly, progress of these bold moves can be tracked through a few metrics until 2045 (Exhibit 120).

Exhibit 120:
Healthcare Sector Key Metrics

	Key metrics	Source	Current	2030	2035	2040	2045	Note
Input	**Number doctors per 1,000 people,** *#*	WHO *(2020)*	0.63	1	1.4	1.7	**2.14**	2045 target based on Brazil today
	Number of beds per 1,000 people, *#*	WHO *(2020)*	1.04	4	7	10	**13**	2045 target based on Japan/ South Korea today
	Healthcare expenditure as % of GDP, *%*	WHO *(2020)*	3.4	5	6.7	8.4	**~10%**	2045 target based on UK today
Output	**Infant mortality rate,** *deaths per 1,000 births*	WHO *(2021)*	19	15.5	12	8.5	**~5**	2045 target based on China/ US today
	Communicable disease mortality rate, *deaths per 100,000 people*	IHME[1] *(2019)*	129	102	74	47	**~20**	2045 target based on China/ US today
	Non-communicable disease mortality rate, *deaths per 100,000 people*	WHO *(2019)*	660	595	530	465	**~400**	2045 target based on Brazil/ US today
	Number of years loss due to illness, *DALYs[2] per 1,000 population*	IHME *(2019)*	340	300	260	220	**~180**	2045 target based on Japan/ South Korea today
	Annual spending on medical tourism abroad, *Bn USD*	CARI[3] *(2017[4])*	11.5	No benchmark metric available				

1 Institute for Health Metrics and Evaluation | 2. Disability-adjusted life-years | 3. CIMB ASEAN Research Institute | 4. Latest available data

Empowering the vulnerable population

Context and challenges

Indonesia has made significant strides in the development of social protection programs for vulnerable populations

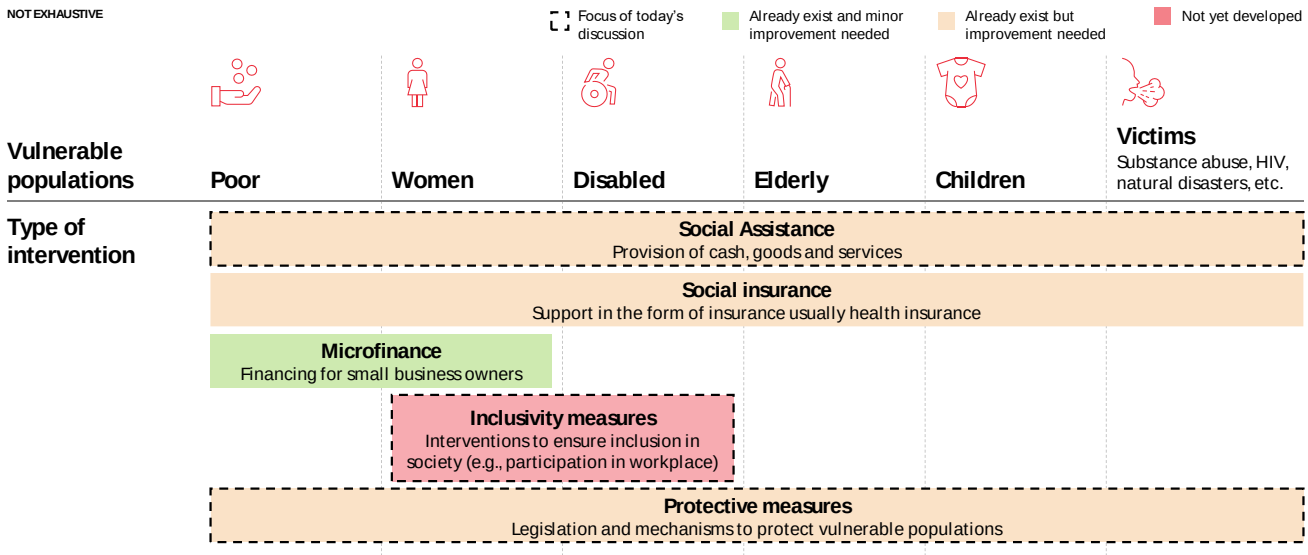
Indonesia also runs up to 20 social services programs covering 77 million people in the bottom 38%[72] as well as significant social insurance programs including universal health coverage via BPJS.

On top of that, Indonesia has progressed significantly on gender equity and equality, with the government setting a national agenda to continually improve it in areas of education, maternal healthcare, regulations to support women in the workforce. There are 4 key areas of improvement that have been witnessed:

- Inclusion of females in education system: 75% enrolment of girls in secondary school (doubling from in 20 years) closing the gap to males
- Improvement in maternal healthcare: maternal mortality fell from 212 deaths per 100,000 to 126 in 2015
- Access to microfinancing enabling women to be entrepreneurial: many microfinance programs target women; strong entrepreneurial spirit (~51% of small business owners are women)
- Regulations in place to support women participation in workforce and politics

Additionally, in accessing microfinancing to enable entrepreneurship, Indonesia beats the global average of women opening and running MSMEs by a significant margin, with 51% of small businesses owned by women as compared to 35% worldwide (Exhibit 121).[73]

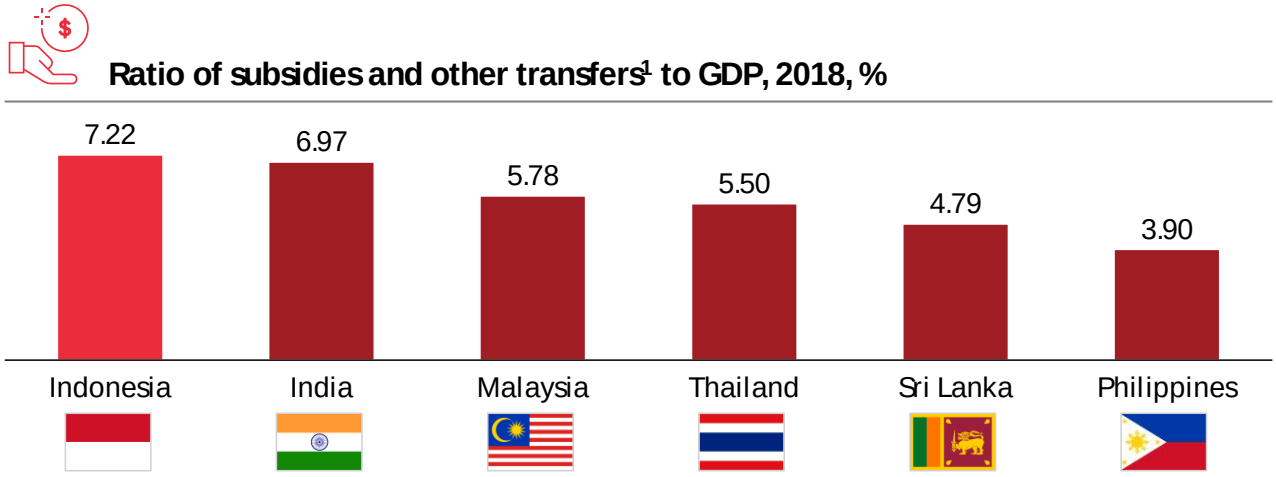
Exhibit 121:
Groups of Vulnerable Population and Types of Interventions



[72] The target is 40% but realization in 2020 is at 38% (TNP2K).

[73] McKinsey Power in Parity Report.

Exhibit 122:
Benchmark of Subsidies as % of GDP



1. All unrequited, nonrepayable transfers on current account to private and public enterprises; grants to foreign governments, international organizations, and other government units; and social security, social assistance benefits, and employer social benefits in cash and in kind.

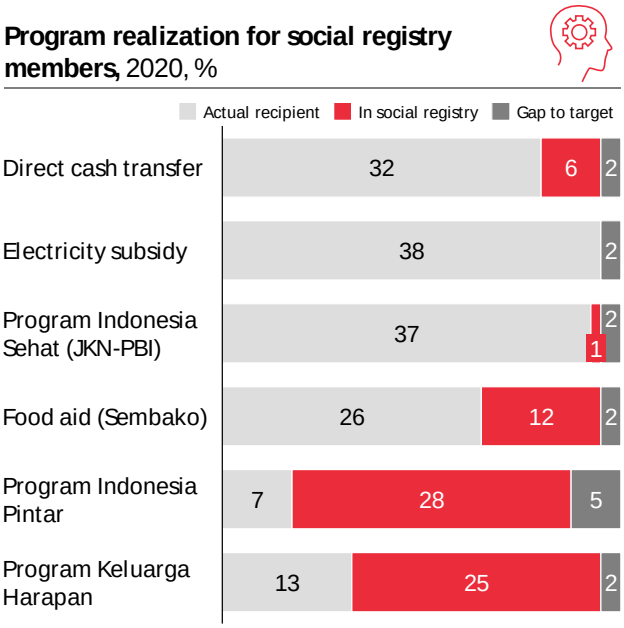
Indonesia spends around 7% of GDP in social assistance, slightly over its emerging Asia peers.[74] (Exhibit 122)

However, despite the achievements, there is room for improvement for Indonesia's inclusivity measures, particularly in 1) social assistance program delivery; 2) sustainable program outcome; and 3) inclusivity in workforce. With a decreasing potential in demographic dividend, more population segments need to be empowered by inclusivity measures and interventions.

1. Social assistance program delivery

Today, Indonesia's social assistance program delivery is below target with fewer than 40% receiving benefits across several programs (Exhibit 123).

Exhibit 123:
Program Realization for Social Registry Members



74 All unrequited, nonrepayable transfers on current account to private and public enterprises; grants to foreign governments, international organizations, and other government units; and social security, social assistance benefits, and employer social benefits in cash and in kind.

There are 2 main challenges in Indonesia's social assistance schemes:

1. Gaps in targeting recipients:
   - — The targeting system (SPSN) is not streamlined, and the social registry (DTKS) is not regularly updated[75]
   - — Current regulations limit insurance coverage for informal workers discouraging BPJS Ketenagakerjaan (social security) enrolment
2. Gaps in delivery of social assistance:
   - — Social benefits delivery relies on non-optimal channels such as a "spans and layers" operating model for program delivery (e.g., too many different bodies and levels of decentralization)
   - — Leakages occur due to cost inefficiency caused by manual validation and fraudulent practices
   - — Social benefits come in inefficient forms, such as physical goods with no control over subsidies reach and cash benefits that come in many different forms, from paper money to e-money to SOE bank transfer

Moreover, the current social assistance program delivery is overly complex, creating potential for leakages. It has too much span and too many layers, it relies on more than six different ministries with the involvement of local governments.[76]

Social assistance format and channel are very fragmented, causing gaps in implementation, which hinders holistic assistance and further increases the chance of leakage.

2. Sustainable program outcome

Despite the commendable efforts made to accelerate social security assistance programs in Indonesia, recent data showed that approximately 70% (consist of aspiring middle class and vulnerable population) of the Indonesian population remains highly vulnerable to go back to poverty.

This potential downfall is mainly driven by limited access to quality education, inadequate healthcare services, and a lack of sustainable livelihood opportunities. There needs to be a comprehensive strategy beyond financial assistance, that focused on improving education and skill development, bolstering healthcare infrastructure, promoting inclusive economic growth, and strengthening social protection mechanism and effectivity, to address these systemic issues.

3. Inclusivity in workforce

Although women make up 39% of the labour-force, a large proportion of women are working in the informal sector, with a wage gap of 53%, while the formal sector is 28%. Additionally, women in informal sector get no legal protection, health insurance or other company benefits.

Lower women participation in formal sector is mainly driven by hours spent on necessary but unpaid care work at home. Today, 36% of women perform unpaid care work and only 4% of men do.[77]

There is a prevalent societal view that women should prioritize their domestic roles such as caring for children, house chores, caring for elderly relative. A lack of access to household infrastructures, e.g., clean drinking water and sanitation, and low enrollment of primary school children unfairly disadvantages women from participating in the workforce.

This causes Indonesia to miss massive opportunities and potentials. A 2014 McKinsey & Company study showed that increasing female labor force participation, hours worked, and productivity can have significant impact on GDP (Exhibit 124).[78]

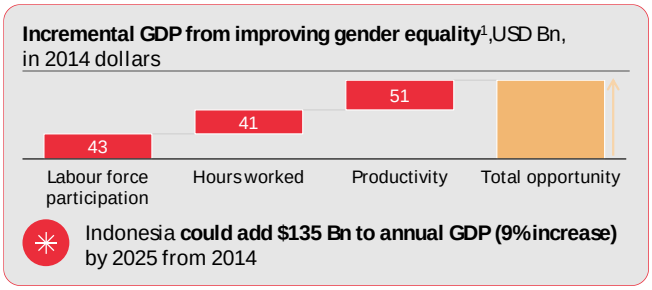
[75] SPSN – Sistem Penetapan Sasaran Nasional; DTKS - Data Terpadu Kesehjahteraan Sosial

[76] TNP2K, press search

[77] Estimation based on survey done by McKinsey Global Institute. Further information from International Labor Organization (ILO) and BPS.

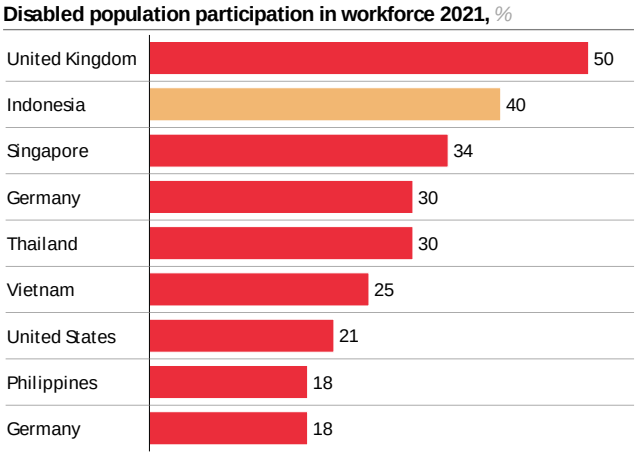
[78] Assumptions made for estimation are that female labor force participation increases from 50% to 56%, female full-time rate increases from 85% to 95% and weighted productivity of females increases from $4,000 to $11,000.

Exhibit 124:
Incremental GDP Impact from Improving Gender Equality



Beyond women, there is also room to further improve inclusivity of the disabled in the workforce. Although disabled population participation rate in Indonesia is considered high compared to peers at 40% (Exhibit 125), most of them are participating in informal sectors.[79]

Exhibit 125:
Disabled Population Participation in Workforce



Many disabled people face challenges to get formal work due to accessibility challenges, particularly in public places, making it difficult for the disabled population to be fully independent. Public transportation often has low coverage and lacks accessibility features. Furthermore, there are low incentives for companies to create a more inclusive workplace.

Overall, Indonesia should aim to accelerate its social inclusivity to improve the quality of life of the vulnerable population and unlock GDP opportunity, transforming Indonesia. (Exhibit 126)

Exhibit 126:
Aspirations for the Vulnerable Population

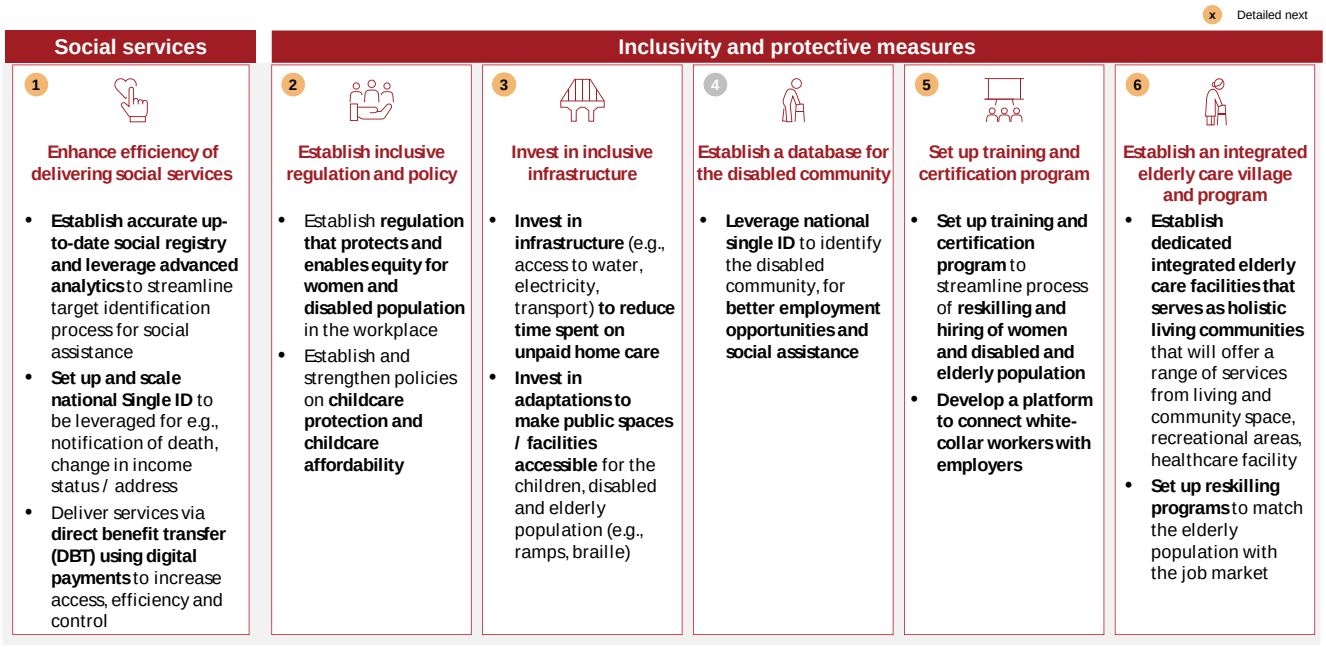
From	To
Ineffective social assistance program delivery	**Effective social assistance delivery** to protect vulnerable population from falling into poverty
54% **Female participation in labor force**	**75%+** **Female participation in labor force**
Inadequate infrastructure to address the diverse needs of the vulnerable population, including women, children, elderly and disabled population	**Public/ private sector collaboration to build inclusive, high-quality infrastructure to protect and foster the needs of vulnerable population,** including women, children, elderly and disabled population

[79] There is high likelihood that this number is inaccurate due to a lack of a database on the disabled population in Indonesia. Based on information from ILO and government websites.

Bold moves

To foster an inclusive society that empowers its vulnerable population, Indonesia could embark on six bold moves. (Exhibit 127)

Exhibit 127:
Bold Moves for the Vulnerable Population



Bold Move One – Enhance the Efficiency of Delivering Social Services

Enhancing the efficiency of delivering social services is a critical move for Indonesia to uplift and provide support to its vulnerable population. A multi-faceted approach encompassing innovative strategies is needed:

1. Establish an accurate and up-to-date social registry and leverage advanced analytics to streamline target identification process for social assistance programs
2. Implement and scale national Single ID system to effectively manage vital events, e.g., notification of death, change in income status / address, ensuring accurate and timely information for social service provision
3. Transition to and leverage direct benefit transfer (DBT) through digital payment platforms to increase access, efficiency, and control of benefits transfer.

Direct Benefit Transfer (DBT) is a mechanism when benefits and subsidies are directly given to beneficiaries. Indonesia could leverage DBT to achieve a wide target reach without compromising accuracy and security.

Case Study: India

India is one of the countries that implemented DBT programs for social service deliveries. There are 2 main DBT operating model in India:

1. Cooking gas DBT disbursed through subsidy transferred to bank account
2. Food DBT disbursed directly through Fair Price Shops, where shops would validate eligibility based on Digital ID

However, there are 3 key technological backbone to enable this program: bank account linked to Digital ID for each citizen, digital ID (Aadhaar) as a unique identifying number for each citizen, and biometric authentication ATM that enable citizens to use fingerprint to withdraw money.

Since its launch, DBT has boosted India's social service delivery with the following impact:

- USD $55 billion disbursed in 2020-2021
- 21% reduced in cost from leakage prevention

In implementing the digital DBT, Indonesia can utilize a fully digital scheme like Togo to unlock cost-savings.

Bold Move Two - Establish inclusive regulation, policy, and incentive to boost inclusivity at work

Strengthening the regulations and enforcement of laws in Indonesia is critical to boost inclusivity and protect the vulnerable populations, particularly in the workforce.

Most leading countries have strong regulations enforced to foster hiring of vulnerable population and unlock their full potential at work (Exhibit 128)

Exhibit 128:
Benchmark of Regulations to Foster Vulnerable Population at Work

	Regulations to foster the hiring of vulnerable populations	Regulations to protect and ensure full potential at work
Women	**Gender quotas requiring minimum proportion of women in leadership** Norwegian LLC law added provision requiring 40%of board members of public companies to be women **Ensure no gender bias exists throughout the recruitment process** Equality Act prohibits gender bias during recruitment including potential discriminatory in interview questions	**Prevention of sexual harassment in the workplace** Sexual discrimination act mandates companies to prevent sexual harassment at work, with a clear how to **Expand paternity leaves mandates to allow women to go back to work** Employment Insurance Act mandates companies to give 18 months of parental leave, shared between parents
Disabled	**Disabled population quota requirement in the workplace** Minimum 5%of the workforce of any employer with 20+ employees must be disabled in order to avoid fines **Ensure recruitment process accommodations are made** Equality Act requires employers to make reasonable adjustments to ensure inclusive recruitment process	**Ensure accommodations are made in workplace to cater to disabled** Persons with Disabilities Act obligates companies to make reasonable accommodations for disabled employee **Ensure accommodations are made in workplace to cater to disabled** Health Insurance Act provides 60 days of sick leave or flexible work options for individuals with disabilities
Elderly	**Ensure no age discrimination in employment** The age discrimination in employment act prohibits age discrimination in employment, protecting older workers **Ensure fair and inclusive recruitment process** This act prohibits age discrimination in recruitment, selection, promotion, and termination	**Act on Stabilization of employment of elderly persons** This act encourages employment to provides measures to promote older workers continued employment, e.g., training **Ensure equal treatment in employment and occupation** The EU publish a framework that prohibits age discrimination in employment to ensure older adults have equal opportunities

To strengthen the law enforcement, Indonesia could consider to:

- Review and refine the current regulations to ensure inclusion of vulnerable populations
- Build relationships with local champions to tailor and drive implementation
- Provide support such as detailed guides and subsidies to implement laws
- Improve accessibility of courts and dispute mechanisms

Beyond regulation, Indonesia could further boost gender inclusivity at work by enhancing childcare services programs and policies. This should allow more time for women (and parents in general) to return to the workforce. Australia is one of the frontrunners in promoting gender equality, including in promoting childcare services

Case Study: Australia

Australia is one of the frontrunners in promoting gender equality, including in promoting childcare services, such as:

- Increasing the accessibility of childcare services for children aged below 13, e.g., through financial aid
  - — The number of childcare places increased by 3 times from 1991 to 2001
  - — Enrollment rate of childcare services for infants under 3 surged by 5 times from 1984 to 2021
- Improving the affordability of childcare, e.g., subsidy for parents
  - — 85% childcare fees subsidy for lower income household

As a result of this incentives from the government, Australia has seen reduced gender wage gap from 18.2% in 1990 to 9.9% in 2022, as well as increased in female labor participation rate from 69% in 1997 to 80% in 2021.

Boosting the accessibility and affordability of childcare services could accelerate gender inclusivity in Indonesia, particularly in workforce. There are 4 things that Indonesia could consider:

- Providing monthly subsidy and/or financial aid for childcare services for low-income household
- Promote public-private partnership in building childcare places and services
- Establish regulation and policy that promote quality and quantity of childcare
- Increase government budget allocation for improving accessibility and affordability of childcare

To further push the social inclusion in Indonesia, there needs to be a shift in the Nation's mindset. Instead of seeing women as bearing the responsibility of domestic care while men are the breadwinners, women and men each deserve equal opportunity to excel in the workplace. Instead of thinking that disabled populations cannot contribute to the workplace, understand that disabled populations can make meaningful contributions with proper accommodations. Instead of assuming elderly population has limited skills and insights to contribute to the society and community, be open to learn from elderly population to provide wisdom, expertise, and valuable insights from their life-long experiences.

Indonesia could consider three approaches: nation-wide educational campaign, building network of communities to provide support, and recruit local champions to spearhead grass-roots movement at the regional level. (Exhibit 129)

Exhibit 129:
Potential Approaches in Shifting Mindset

Nation-wide educational campaign

HeforShe campaign is a global campaign on gender equality; the campaign highlights stories of accomplished women and male champions to change perception on women holding domestic roles

Building network of communities to provide support

Working Women Community Center in Toronto provide services to support women in the workplace; services include counselling, job search, day care services and community building activities

Recruit local champions to spearhead grass-roots movement at the regional level

Educate Girls is an NGO that works to improve girls' education in rural communities; program recruits and trains local women as community volunteers to build community encouraging girls' enrolment and retention rates

Bold Move Three – Invest in Physical Infrastructure

Well-developed inclusive physical and digital infrastructure is a key enabler to uplift Indonesia, connecting and creating opportunities for all Indonesian to thrive and fostering a future where no one is left behind. There are 4 key physical and digital infrastructure improvement areas with biggest impact:

1. **Basic household:** Improving household infrastructure, e.g., access to water, sanitation, to reduce unpaid homecare and improved quality of life for children, disabled and elderly population
2. **Transportation:** Improving coverage and safety of public transportation by tailoring transportation features for women and accessibility accommodations for infants, disabled, and elderly population
3. **Digital connectivity:** Tailoring digital platforms and products to accessibility for disabled, elderly populations, and women
4. **Healthcare:** Improving healthcare facilities in rural areas to increase accessibility for mothers and children, as well as disabled and elderly population

Indonesia could consider public-private partnerships to fulfil these needs. An example of public-private partnerships seen in other countries are the following (Exhibit 130):

Exhibit 130:
Examples of Public-Private Partnerships in Building Infrastructure

P Public P Private

Clean Water
- P Government built the dedicated bus lanes and bus stations
- P Private company provide the bus and operate the transport system

Building bus rapid transit system in Lagos
- P Government built the dedicated bus lanes and bus stations
- P Private company provide the bus and operate the transport system

Increasing inclusivity of digital platforms
- P Federal Ministry of Labor and Social Affairs established guidelines on how to create inclusive digital platforms

Building large hospital in Victoria
- P Government coordinated efforts and provided subsidies
- P Private companies conducted the funding, construction, facilities and hospital management

Bold Move Five - Set up training and certification programs

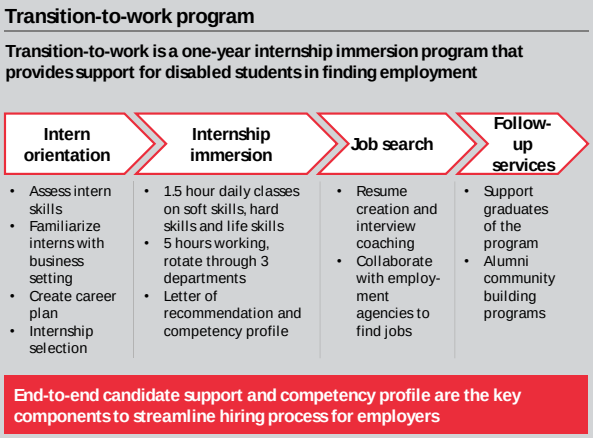
To address the unique challenges faced by the vulnerable populations in Indonesia, there is a pressing need to establish targeted programs that provide end-to-end training and certification catered specifically for their needs. The targeted training and certification program is key to unlock full potential of Indonesia, equipping everyone in the nation with the necessary skills and knowledge to overcome barriers and increase their inclusion and participation in Indonesian workforce and community.

Case Study: Project Search, USA

Project Search is a non-profit that helps people with disabilities to find and keep meaningful employment utilizing a "transition-to-work" model. Internship sites are usually hospitals, education institutions or businesses; interns usually hold entry-level positions which involve complex and systematic tasks such as administrative work. The program a one-year internship immersion program that provides support for disabled students in finding employment that consist of 4 phases (Exhibit 131).

Project Search has helped ~16,000 students, with 76% success rate in finding meaningful jobs.

Exhibit 131:
Project Search's Transition-to-work Program



Indonesia could help to support the disabled population in workforce by equipping them with necessary skills and knowledge needed, by considering the following actions:

- Setting up an integrated database linked with hospitals and schools to easily identify students to be a part of the program
- Incentivizing companies to hire disabled people through providing subsidies for meaningful accommodations
- Setting up local employment agencies similar to state-level employment agencies in the United States to oversee program at a state-level
- Establishing upskilling and certification program that is tailored for disabled population

Bold Move Six - Establish an integrated elderly care village and program

Based on the 2019 National Socioeconomic Survey, there are more than 25.7 million people, or around 10% of the total population aged 60 years and over in Indonesia. Hence, it is crucial for Indonesia to put more attention in the living quality of the elderly population. There are 2 main things that Indonesia could consider:

- Establish dedicated integrated elderly care facilities that serves as holistic living communities for older adults that will offer a range of services from living and community space, recreational areas, healthcare facility
- Establish programs to encourage community involvement and support for eldercare

Case study: Singapore and Japan

Singapore is one of the countries with a well-established elderly population facility, called family members' care. This program is intended to promote community involvement and support for eldercare.

Kampung Admiralty. Kampung Admiralty integrates housing and community for the elderly with a wide range of social, healthcare, communal, commercial, and retail facilities. As of today, Kampung Admiralty has over 100 elderly housing units.

Besides Singapore, Japan also has a strong eldercare support. Japan has launched "Fureai Kippu" initiative, which allows individuals to earn credits by providing care services to seniors, which can be exchanged for their own future or

Indonesia could establish similar initiatives to improve the quality of life of elder population by:

- Fostering collaboration between government, private, and public companies to establish facilities tailored to the needs of elderly population in Indonesia and
- Creating an incentive for community to partake in eldercare involvement and support to increase availability of care services and enhance social interaction and community engagement

Roadmap

MSMEs also have a role to play in implementing the unlocks. Some ways MSMEs can participate are the following (Exhibit 132):

Furthermore, these bold moves can be potentially implemented through initiatives that are phased up till 2045. See the exhibits for a proposal (Exhibit 133).

Exhibit 132:
Role of MSMEs in Empowering Vulnerable Population

Bold moves	What MSMEs can do
1 **Enhance efficiency of delivering social services**	**Become local champions to ensure everyone is registered in the national single ID system**
2 **Establish inclusive regulation**	**Foster women, elderly, and disabled friendly program and policies within the company** (e.g., flexible work arrangement), whenever applicable **Grow businesses in childcare / daycare** to support women in the workplace
3 **Invest in inclusive infrastructure**	**Ensure caregiver and disabled friendly facilities whenever possible** (e.g., ramps)
4 **Establish a database for the disabled community**	**Collaborate with local employment agencies / organizations** to engage and connect with disabled community for potential employment
5 **Set up training and certification program**	**Provide reskilling and training programs** focusing on caregiver, women, elderly and disabled population within and outside the company
6 **Establish an integrated elderly care village and program**	**Take proactive role in supporting elderly community** (e.g., organize social activities tailored the elderly needs) **Provide supply or donate relevant products and services for the elderly** (e.g., nutritious and customized meal)

Exhibit 133:
Roadmap for the Vulnerable Population

Bold Moves	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholder[1]
1 **Enhance efficiency of delivering social services**	**Develop a centralized social registry** that collects citizens information to identify eligibility of social assistance program and maintain disbursement of assistance **Invest in technology and advanced analytics tools** and technique to establish accurate data source and streamline source allocation **Establish digital payment systems and platform to enable DBT for social assistance program** **Set up and scale up digital national ID** and integrate data of social registry	**Scale up the implementation of integrated social assistance program to ensure comprehensive coverage** **Regular review and enhancement** of the social assistance and delivery **Conduct training for relevant stakeholder to ensure efficient social assistance delivery**			Ministry of Social Affairs Ministry of Home Affairs Local governments
2 **Establish inclusive regulation**	**Conduct a comprehensive review** of existing policies and regulations **Engage with organizations, advocacy group, associations, and public and private** companies to **develop new or amend existing regulation** to address the rights and protection of vulnerable population; **conduct pilot** in major cities **Increase public awareness on inclusivity and equality** through social media	**Conduct regular meetings with organizations, advocacy group, associations, and public and private** companies to proactively improve the regulation in inclusivity **Expand regulation implementation** to other cities **Continue to promote awareness in diversity and inclusivity** across all cities			Ministry of SOE, Ministry of SMEs, Ministry of Law Advocacy group and associations Public and private company
3 **Invest in inclusive infrastructure**	**Foster collaborations between government, private and public sector, and organization to jointly invest in and develop an inclusive infrastructure,** through policies and potentially incentive **Develop and enforce standard for accessible and reliable facilities** (e.g., disabled reserved seat) **in public infrastructure** tailored to the needs of vulnerable population in major cities **Provide training** to enhance skills in providing designing inclusive infrastructure **Build and ensure availability of basic infrastructure in rural areas**	**Continuous improvement of facilities** to foster the need of vulnerable population **Expand the development of accessible and reliable facilities** to other smaller cities **Engage with companies to promote awareness** and encourage to **make adaptation** in **providing accessibility and support** for vulnerable population in workplace			Ministry of Public Works and Housing, Ministry of Social Affairs Advocacy group and associations Public and private company
4 **Establish a database for the disabled community**	**Develop digital platform as a database for the disabled community** **Engage with disabled individuals, disability advocacy group, government agencies, and relevant stakeholders** to collect data and insights **Develop a standardized data collection framework and mechanism**	**Engage with companies to integrate data** **Active improvement of platform**	**Formalize data sharing among entities** **Establish fully digital self-service platform** **Promote the use of the data** for decision making and empowering disabled community		Ministry of Social Affairs Disabled advocacy group and associations Employment agency
5 **Set up training and certification program**	**Conduct comprehensive assessment on key skill gaps and needs** **Sign up 'Champions' from SOEs/ Private Sector together with the relevant ministry(s)** to jointly develop the training and certification program; including commitment for employment post training/ certification **Conduct training pilot**	**Scale up training program to upskill and reskill** the vulnerable population **Active assessment and refinement of the training program** to ensure modules are up to date to the latest skill trends and needs			Ministry of Social Affairs Ministry of Education Private and public companies
6 **Establish an integrated elderly care village and program**	**Build lighthouse ecosystems/ locations that support elderly population in areas where there are most demand** **Establish standards for elderly care ecosystem**	**Launch pilot of the elderly facility & program** **Market and spread awareness of the facility and program**	**Continuous expansion, improvement, and marketing of the facility and program to provide support to more elderly population** **Develop incentive and leverage influencer to attract people to participate in program**		Ministry of Public Works and Housing, Ministry of Social Affairs Private and public companies

Key metrics and enablers

To ensure the success of the achievement of Indonesia aspirations for vulnerable population, three essential enablers must be in place:

1. Technology: Strong data infrastructure and national single ID to have up-to-date data on vulnerable populations for better social service disbursement and targeted inclusivity measures
2. Regulation: Inclusive regulation to foster the hiring, protects and enables equity for women and disabled (*Part of bold move 2)*
3. Infrastructure: Invest in improvements in infrastructures, e.g., household, transport, to reduce unpaid care work and increase its accessibility (*Part of bold move 3)*

Lastly, progress of these bold moves can be tracked through a few metrics till 2045 (Exhibit 134).

Exhibit 134:
Key Metrics for the Vulnerable Population

	Key metrics	Source	Current	2030	2035	2040	2045	Note
Country-level	**Population below poverty line[2],** %	BPS *(2022)*	9.5%	7%	4.5%	2%	0.1-1%	2045 targets based on China today
	Income GINI coefficient[1], %	BPS *(2022)*	38%	36%	34%	32%	29%	2045 targets based on Netherlands today
Output	**Female participation in the labour force,** %	ILO *(2022)*	54%	59%	64%	70%	75%	2045 targets based on US today
	Disabled participation in the labour force, %	ILO (2022)	40%	42.5%	45%	47.5%	50%	2045 targets based on UK today
Input	**% of households with drinking water,** %	BPS (2022)	91%	93%	95%	97%	>99%	2045 targets based on Brazil today
	% of households with adequate sanitation, %	BPS (2022)	81%	84.5%	88%	91.5%	95%	2045 targets based on China today
	Program realization of social services, %	BPS (2021)	40%	55%	70%	85%	>99%	2045 targets based on India today

1 Institute for Health Metrics and Evaluation | 2. Disability-adjusted life-years | 3. CIMB ASEAN Research Institute | 4. Latest available data

5

ADVANCE SUSTAINABILITY

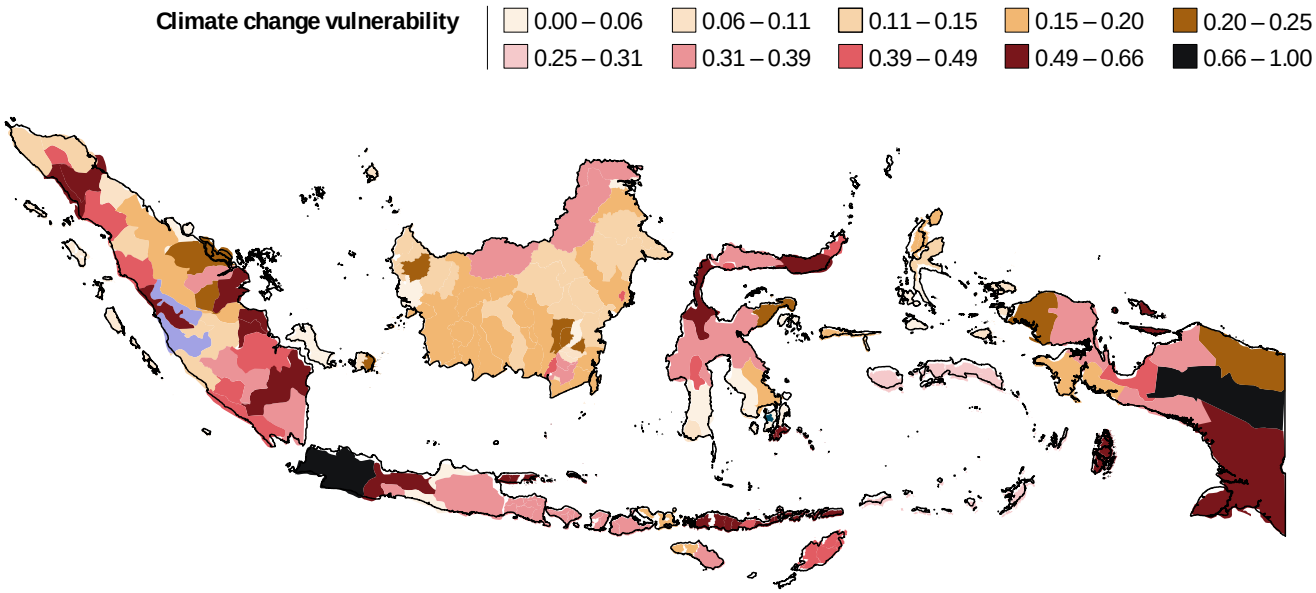
Becoming the world reference in innovative and affordable decarbonization, and world's largest hub of green business build

Contexts and challenges

The shifts in temperature and weather patterns that we experience today highlight key vulnerabilities across the globe. Indonesia is among the world's most vulnerable countries to sea level rise with its extensive coastline and millions of people living in low-lying areas.

The numbers are stark, with an estimated USD 350 million in losses due to climate change linked flooding events since 2019. Forty-two million Indonesians live in territories at risk of being submerged due to rising sea levels, with 2,000 smaller islands projected to be submerged by 2050.

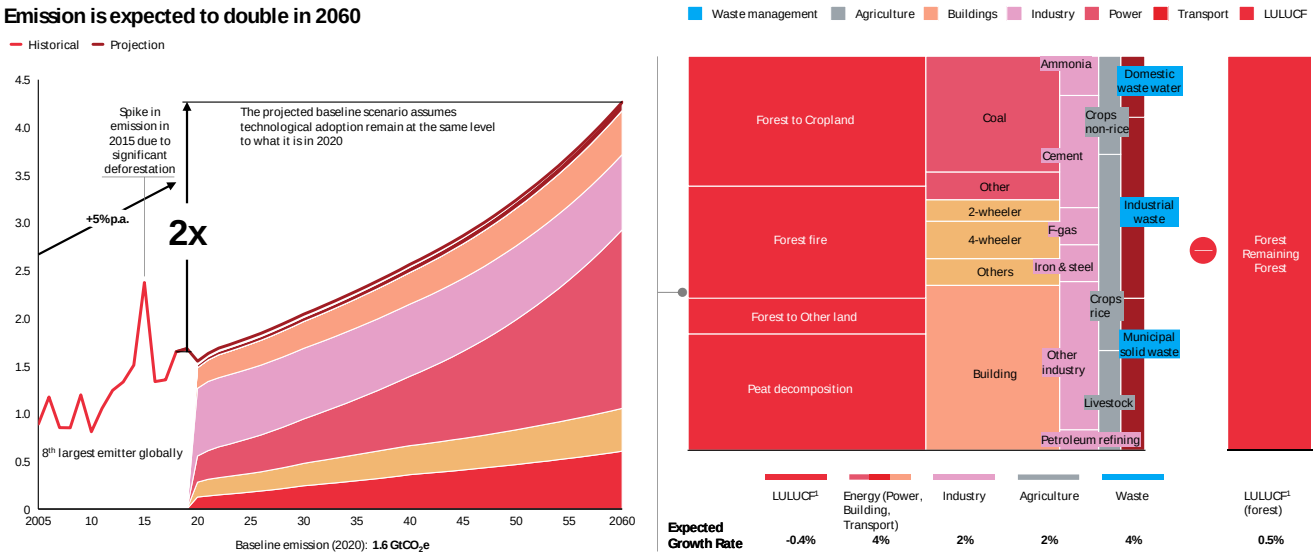
Exhibit 135:
Vulnerability to Climate Change in Indonesia



Thus, addressing climate change is a key national imperative and a key priority of Indonesia Emas 2045. If no abatement actions are taken, Indonesia is expected to double emissions by 2060.[89] Indonesia is currently the eight largest emitter of greenhouse gases (GHG) globally, with emissions growing 5% p.a. over the past 15 years. Failure to accelerate decarbonization could lead to serious climatic and natural disasters such as increased flooding and poor air quality, with direct economic impact from lost lives and crops to exclusion from global trade.

[89] UNFCCC 2019 National Inventory Report, McKinsey Decarbonization Scenario Explorer (DSE) model - Indonesia

Exhibit 136:
Indonesia Greenhouse Gas Emissions Trend



1. Some processes under LULUCF (turning forest into croplands and other lands, decomposing peat) emits CO2, while the forest that remain forest serves as carbon sink

To take action to mitigate the greater risks of climate change, Indonesia has committed to reach Net Zero by 2060. It has also pledged to reduce GHG emissions by 32% by 2030 and 43% conditionally with international assistance, as part of the enhanced NDC commitment of the 2015 Paris Agreement[90]. Today, the government has already taken bold steps to confront the challenges of climate change, including:

- Joining the Global Methane Pledge to reduce 30% methane emissions by 2030 compared to 2020 levels.
- Committed to have "forestry and other land use" sectors reach a carbon net sink[93] by 2030.
- Issued a presidential regulation on carbon pricing and exploring a potential collaboration with the London Stock Exchange on a carbon market setup, as well as issuance of ministerial regulations by Ministry of Environment and Forestry, and Emission Trading System Pilot in some PLTU[94]
- Launched a National Plastic Action Partnership (NPAP) to support the national goal of reducing 70% marine plastic pollution by 2025.

However,

the road to decarbonization is challenging given Indonesia's unique circumstances as an archipelagic nation with a wide dispersion in rural and urban areas and economic growth:

- Indonesia's archipelagic geography presents a challenging environment for renewable adoption, e.g., solar potential in Nusa Tenggara, Papua islands while consumer demand is centered around Java and Sumatra.
- Dispersion in rural and urban areas makes it challenging to implement mass transportation and leads to high reliance on personal mobility such as automobiles and motorbikes.

90 Nationally determined contributions (NDCs) are at the heart of the Paris Agreement and the achievement of its long-term goals. NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs

93 A carbon sink is anything, natural or otherwise, that accumulates and stores carbon-containing chemical compounds for an indefinite period, thereby removing carbon dioxide from the atmosphere.

94 Pembangkit Listrik Tenaga Uap

- Indonesia is one of the fastest growing economies with anticipated growing emissions over the next 30 years.

Indonesia's decarbonization journey has some challenges to overcome:

- Indonesia possesses plentiful existing coal assets that result in low-cost electricity generation, making it challenging to shift to renewables
- The economics of clean energy adoption is not yet viable in most places in Indonesia, e.g., not enough scale to adopt carbon capture and storage (CCS) or hydrogen-based fuels; low economic viability to adopt electric induction stoves
- Domestic waste generation is a growing problem with limited coordinated planning
- The agriculture sector is dominated by smallholders making it challenging to implement changes at scale

To meet Indonesia Emas 2045 goals and reach net zero by 2060, a significant effort across all of Indonesia's sectors will be required, creating opportunities for industrial decarbonization and green business building.

Bold Moves

To reach Net Zero, Indonesia would need to take on seven bold moves to enable industrial decarbonization and green business building (Exhibit 137):

1. Industrial decarbonization
   - — Accelerate industrial decarbonization (including CCS, hydrogen clusters)
2. Green business building
   - — Scale Natural Climate Solutions (NCS) (incl. biodiversity credits)
   - — Unlock carbon markets
   - — Scale regenerative agriculture and agroforestry
   - — Foster the circular economy
   - — Accelerate renewables
   - — Drive electrification

Exhibit 137:
Sustainability Bold Moves

Industrial decarbonization	1 **Accelerate industrial decarbonization** (incl. CCS, hydrogen clusters)	**~40% of emissions in 2035 come from point sources e.g., power, ammonia, iron & steel – directly addressable by CCS application** Indonesia has **~375-480 MTPA CCS potential** from industrial facilities; ~45% can be captured from establishing 10 CCS clusters
Green business build	2 **Scale Natural Climate Solutions (NCS)** (incl. biodiversity credits)	**Indonesia has the 2nd largest global low cost NCS potential after Brazil but, to date, only 7 nature-based carbon offset projects exist, generating ~45 MtCO2e (since project launch)** **Biodiversity credits (biocredits) can also be created to stop and reverse species loss in line with CCB Standards** **'Quick wins' could come from stopping deforestation and restoring peatlands and forests**
	3 **Unlock carbon markets**	While Indonesia has made steps towards developing its domestic carbon markets, **significant effort and regulatory clarity will be required**, such as: • Ecosystem establishment • Set up of national MRV system
	4 **Scale regenerative agriculture and agroforestry**	Agriculture Greenhouse gas emissions (GHGe) is expected to reach **~500 MtCO2e by 2060** Multiple levers across **yield increase, waste recovery, sustainable farming practices** (e.g., optimizing fertilizer use) could be deployed to decarbonize the Agriculture industry
	5 **Foster the circular economy**	**Waste emissions** expected to **increase 4-5x through 2060** • **Unabated, waste could account for 11% of total emission in 2060**; 50~ driven by municipal solid waste and ~30% by domestic wastewater (DWW) • **Decarbonizing MSW** through new business opportunities, waste segregation and waste prevention has the potential to **generate USD ~1.7bn value in 2030** • Wastewater treatment can help to reduce emissions and capture secondary values (heat and power generation)
	6 **Accelerate renewables**	**Significant RES potential** in Indonesia (1,000-1,250GW), 90% from solar and wind **Current renewable mix only at 15-20% Target to reach +30% by 2030, +50% by 2045 and +70% by 2060** This requires interconnections, energy storage systems, grid modernization and resiliency, component manufacturing and regulatory support
	7 **Drive electrification**	Indonesia can **reduce vehicle emissions via EVs;** current E2W & E4W penetration at <1% Target to reach 50% by 2045 and 100% by 2060 Buildings could also be decarbonized through electrification e.g., **energy efficiency** in the short-term and **transition to induction stoves**

Bold Move One – Accelerate industrial decarbonization

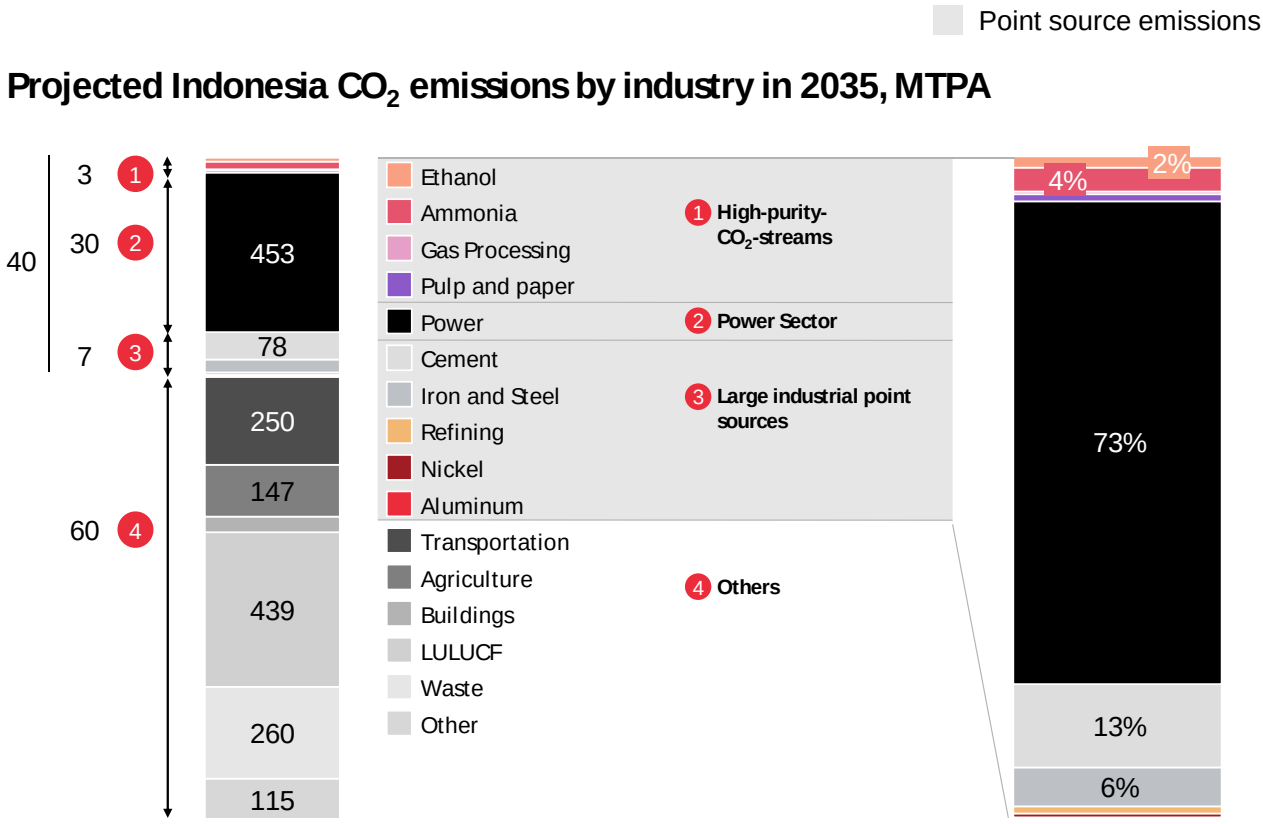
The category of industrial decarbonization requires one bold move with multiple facets: the setting up of 10 green industrial CCS clusters over the next 10-15 years and a rapid acceleration in industry efficiency, especially in cement, ammonia, oil & gas production.

By 2035, 40% of Indonesia's total GHG emissions will remain from point sources which are directly addressable by application of CCS such as cement, ammonia, oil & gas production. Indonesia has 375-480 Megatons per annum (Mtpa) of CCS potential from industrial facilities and 45% can be captured from establishing just ten CCS clusters (Exhibit 138).

Over 70% of these emissions come from the power sector which is expected to decarbonize by following two main schemes: existing coal and gas-powered plants will be required to capture carbon output while new power capacity additions will be from renewable sources such as solar and wind.

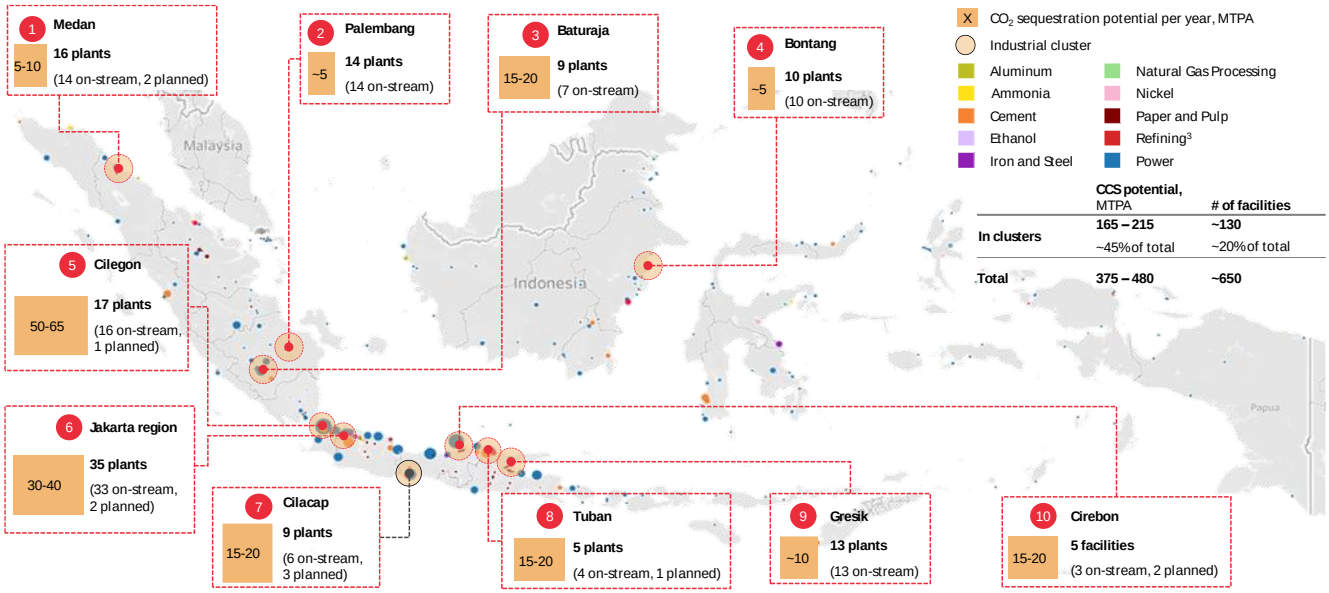
For the foreseeable future, CCS remains the most feasible pathway for decarbonization of industrial point source emissions (and estimated 10% of the total). Creating CCS clusters in the next 10-15 years could help create a critical mass of cross-industry players to drive down the cost of abating emissions.

Exhibit 138:
Projected Indonesia CO2 Emissions by Industry in 2035



Indonesia has a staggering 375-480 million tons per annum (Mtps) of CCS potential from both planned and existing industrial facilities and 45% of this amount can be captured by establishing just ten CCS clusters across the archipelago, with six built on Java alone.

Exhibit 139:
Potential Industrial CCS clusters in Indonesia and their Estimated CO2 Sequestration Potential



Next, we explore the six bold moves that are needed to build green businesses.

Bold Move Two – Scale Natural Climate Solutions (NCS)

Indonesia has the second largest global low-cost natural climate solutions (NCS) potential after Brazil. It has the #1 largest mangrove cover with 4mn Ha, the #2 largest tropical rainforest and peatland cover, 17% of the world's fauna species, and about ~300 GtCO2e carbon stored in the land (up to 40x annual GHG emissions from fossil fuels).

While Indonesia has the potential to abate emissions at 1.5 GTCO2e/year, nature-based carbon offset projects that exist are limited.

The first of these projects, the Rimba Raya Biodiversity Reserve, 64,000 Ha of tropical peat forest in Kalimantan, was started nearly 15 years ago, in 2009, while the most recent, the Sumatra Merang Peatland project, consisting of 22,000 Ha of protected peatland and habitat for the Sumatran tiger, and Rimbak Pakai Pengidup, 1,450 Ha of village forest protected by the Nanga Lauk community in West Kalimantan, were started in 2016, nearly a decade ago. Clearly there is large potential for new NCS projects to begin today.

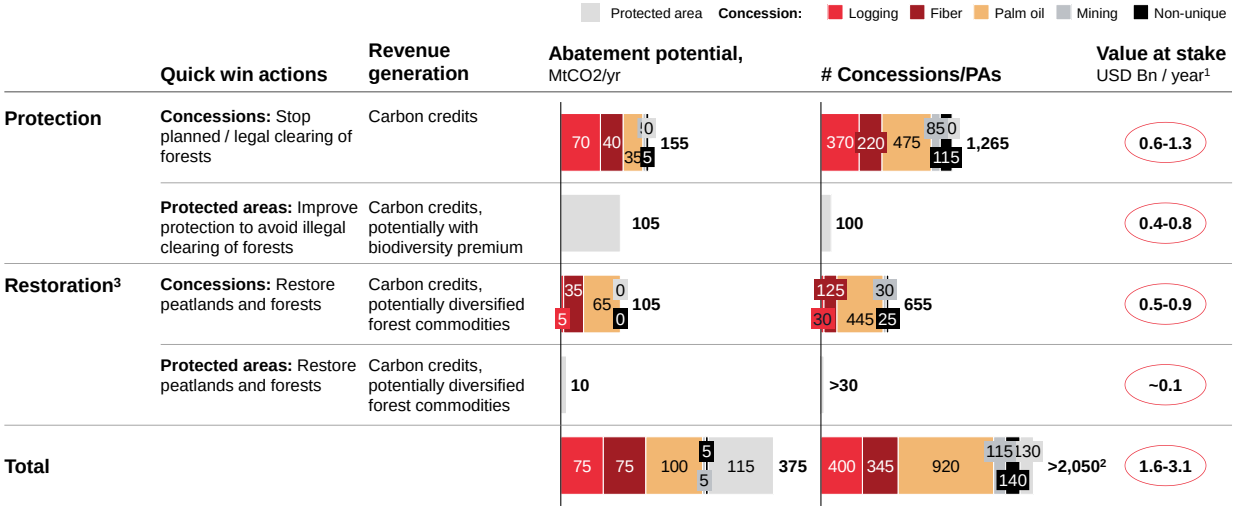
"Quick wins" could come from land management actions with a total potential value of USD 1-3 billion per year[96] in protection and restoration projects across mining, logging, palm oil and plant-fiber plantations.

Protection requires halting planned, legal clearing of forests and/or improving existing protection schemes and concessions to stop the illegal clearing of forests.

Restoration is a combination of avoidance and the replenishment of carbon sinks to restore peatlands and forests damaged by human activity and creating protected areas to preserve and restore damaged peatlands and forests.

[96] High level and highly preliminary estimates based on carbon credit revenue generation only; excluding carbon credits issued to buffer pools, but not factoring in leakage; assuming prices of US$5-10tCO2, in line with prevailing price trends.

Exhibit 140:
Quick Wins for NCS



1. High level and highly preliminary estimates based on carbon credit revenue generation only; excluding carbon credits issued to buffer pools, but not factoring in leakage; assuming prices of US$5-10/tCO2, in line with prevailing price trends
2. Some concessions or PAs feature in the list for both (i) avoided deforestation and (ii) peatland restoration/reforestation
3. Combination of avoidance and carbon sink

In addition, NCS can also protect biodiversity and bring benefits to communities. Indonesia can also create biodiversity credits (biocredits) to stop and reverse species loss in line with CBB standards.

Bold Move Three - Unlock Carbon Markets

The share of global emissions covered under compliance carbon markets[97] is increasing and may cover >50% of emissions by 2030. NCS projects presents an opportunity for Indonesia to meet its environmental commitments while opening new revenue streams, with the current system earning participating countries USD 1-3 billion in revenue in 2020, an amount that is only going to increase as more countries enter the global carbon compliance marketplace.[98] It is projected that voluntary commitments will significantly drive offsets demand until 2030, after which growth will be led by compliance markets.[99]

To maximize benefits, allowance and offset markets should follow international best practices and be launched in parallel. While similar, they are different with the allowance and offset markets best suited for different sectors.

The allowance market (compliance) is best suited for hard-to-abate sectors, e.g., power and industry, while the offset market (voluntary) is best suited for capture demand ramped up from voluntary commitments and carbon-neutral product offerings. Many allowance markets permit the use of offsets from voluntary carbon markets to reduce compliance costs.

In Indonesia, domestic demand is underpinned by voluntary commitments from local and international companies that have made commitments to reduce their carbon footprint.

Indonesia has made significant progress towards developing its domestic carbon markets with big steps taken in the past few years. Since 2020, all public-listed companies are required to prepare annual sustainability reports.

In early 2025, a carbon tax is set to enter into force that includes a cap-and-tax scheme for several sectors to form a hybrid "cap-trade-and-tax" system. The domestic carbon trading scheme will be managed by the Indonesian Stock Exchange.

Despite these achievements, there is significant effort and regulatory clarity is still required to unlock Indonesia's full carbon market potential, including exports (Exhibit 141).

97 Compliance carbon markets are exchanges in which regulated entities obtain and surrender emissions permits, allowances, or offsets in order to meet predetermined regulatory targets.

98 The World Bank (2021) State and Trends of Carbon Pricing 2021.

99 McKinsey's Voluntary Carbon Markets (VCM) model

Exhibit 141:
Measures to Stimulate Carbon Markets

Public sector measures to accelerate and stimulate carbon markets

1. **Carbon accounting, MRV:** Set up national carbon accounting system – to ensure rigorous monitoring, reporting and verification (MRV), operationalize Article 6.2 with clarity on domestic market obligations
2. **Market mechanism, ecosystem establishment:** Conduct VCM[1] pilots to optimize design, build capabilities within SOEs; develop underlying tech infrastructure
3. **Project pipeline:** Define inventory of carbon stock across Indonesia and pipeline of sustainable land use projects aligned with international standards
4. **Financing:** Provide access to funding through favorable financial regulations, investment attraction initiatives etc. to encourage conservation / decarbonization at scale
5. **International standards:** Facilitate international accreditation for projects, clearer environmental and social safeguards e.g., community land ownership, land expansion

underpinned by **awareness building and alignment across stakeholders**

Key private sector and stakeholders' engagement needed to generate high quality supply

1. **Emissions reporting:** Advocate for annual emissions reporting, especially per facility or subsidiary, to enable a monitoring system of implementation and mitigants
2. **Net zero and corporate claims:** Urge companies to make voluntary commitments towards abatement pathways, which can remove carbon and generate domestic carbon credit demand earlier
3. **International standards:** Educate developers to use standards that are accepted by key jurisdictional or sectoral compliance (e.g., CORSIA) to ensure business readiness with access to verification and auditing bodies
4. **Capacity building:** Encourage and educate more potential project developers regarding voluntary market, including on the principles for developing high quality carbon credits
5. **International government collaboration:** Collaborate with governments in the region (e.g., Singapore) to develop a carbon credit exchange and trading hub and induce liquidity

1. Voluntary Carbon Market

Bold Move Four - Scale Regenerative Agriculture and Agroforestry

Indonesia can scale regenerative agriculture and maximize agriculture productivity to reduce land use change pressure and minimize mangrove degradation to protect aquaculture. Agriculture GHG emissions are expected to reach 500 MtCO2e by 2060. Multiple levers across yield increase, waste recovery, farming practices, including consolidating farms, could be deployed to decarbonize the agriculture industry.

It is a fact that globally most current farming and land use practices are unsustainable. Indonesia needs to move away from the current unsustainable practices towards regenerative practices. Beyond just reducing emissions, Indonesia is in a strong position to create carbon sinks to absorb emissions from the atmosphere.

KADIN's research on regenerative agriculture indicate that current farming and land use practices are unsustainable (Exhibit 142).

Exhibit 142:
KADIN's Report on Regenerative Agriculture

Agriculture is a primary cause of land use change globally

- **90% of tropical deforestation is linked to agricultural expansion**
- **Deforestation causes CO2 emissions and the degradation of carbon sinks, accelerating climate change**

Biodiversity loss driven largely by agriculture and risks undermining future production

- **62% of IUCN globally threatened species are adversely affected by agriculture – primarily due to land use change and use of chemical pesticides**

Current farming practices accelerate climate change, which in turn will reduce crop yields

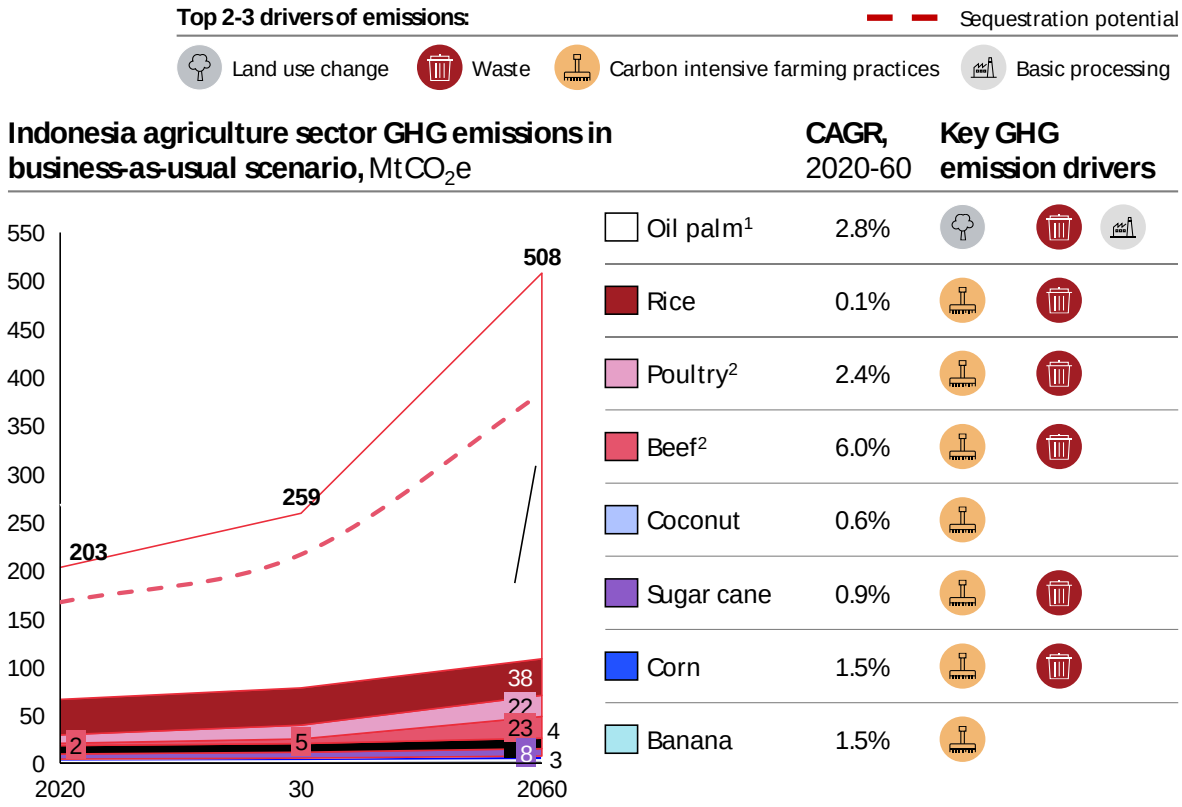
- **Food and land use** system accounts for **30%** of **GHG** emissions
- **Accelerated** by land use change, deforestation, food loss & waste etc.
- **Methane, N2O** and **CO2** emissions from farming accumulate in atmosphere and create **a heat-reflective layer** (methane has 80x global warming potential of CO2)
- Climate change is expected **to decrease crop yield,** rising temperatures will **reduce the area suitable for farming**

We need to move away from the current unsustainable farming towards regenerative practices. Beyond just reducing emissions, we need to create carbon sink (to absorb emissions from the atmosphere).

Under a business-as-usual scenario, Indonesia's GHG emissions from agriculture is expected to reach 500 MtCO2e by 2060. This is at odds with rising global demand for regenerative agriculture across institutions and consumers. For example, the EU Renewable Energy Directive ensures crops used to produce biofuels are not sourced from recently deforested areas or peatlands.

Multinational corporation Unilever, with a long and wide footprint in Indonesia, aims to make all its supply chains deforestation-free by 2023 by utilizing traceability technology. On the consumer side, there has been a 70% increase in internet searches for sustainable products over past five years.

Exhibit 143:
Drivers of Agriculture GHG Emissions



1. ~25%of palm oil GHG emissions are driven by land use change
2. Excludes emissions from use of agricultural inputs

The KADIN Regenerative Forest Sub-Hub will facilitate the learning, dialogue and implementation of regenerative forestry business practices by supporting a pilot program, commencing in 2023, in which seven pioneer companies in Indonesia will implement regenerative practices.

Preliminary findings indicate from KADIN Regenerative Forest Sub-Hub's research study there are opportunities in regenerative agriculture businesses, particularly in five areas:

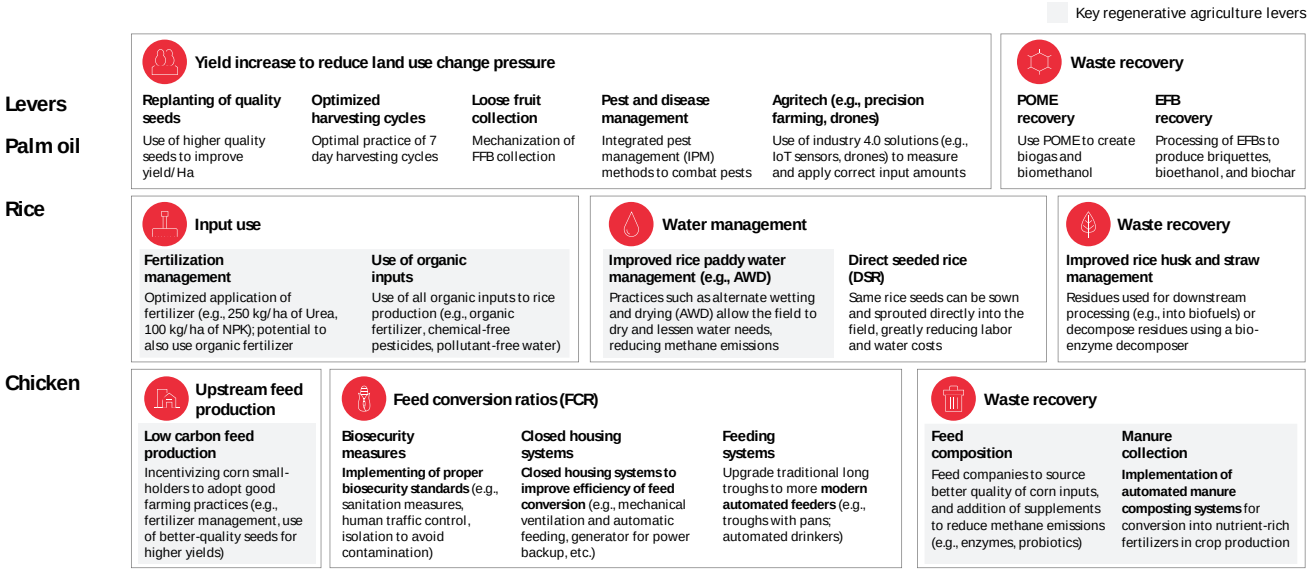
- Indonesia has about 20 million Ha of critical lands that have potential for regenerative forest businesses.
- 500 forestry companies (150 active) operate in Indonesia and around 50 forestry companies have registered or are applying for multi-purpose forestry permits from the Ministry of Environment and Forestry.
- Research findings identified five prospective commodities to diversify current forest business practices: Vanilla, Cocoa, Coffee, Arenga sugar,[100] Essential oils
- Diversifying forest business practice could generate an internal rate of return (IRR) of 15-40% (excluding carbon trading). Cultivating other commodities would generate faster positive cashflow due to a faster growing and harvest turnaround time (1-3 years), as opposed to the logging business which has a 7-12 year growing and harvest turnaround time.
- Regenerative forestry practices have the potential to scale up businesses given the high global market demand. For example, the global market export for

[100] The Arenga sugar palm is often touted as a wonder plant for degraded agricultural lands since it "lives on damaged, infertile, and eroded soils, improves the ecosystem of forest floors, removes CO2 from the atmosphere and produces a sugary sweet juice at an amazing rate." The plants do best as part of complex rainforest ecosystems and can be grown among other food crops such as vanilla, bamboo, bananas, and figs. https://www.reuters.com/article/idUK115545511820110718

coffee and cocoa combined is estimated at USD 50 bn annually. This could potentially be the next CPO business for Indonesia.

Multiple levers in the major agricultural industries of palm oil plantations and rice and chicken farming be deployed to decarbonize and regenerate agriculture across factors of yield increase, waste recovery and farming practice.

Exhibit 144:
Levers to Decarbonize and Regenerate Agriculture



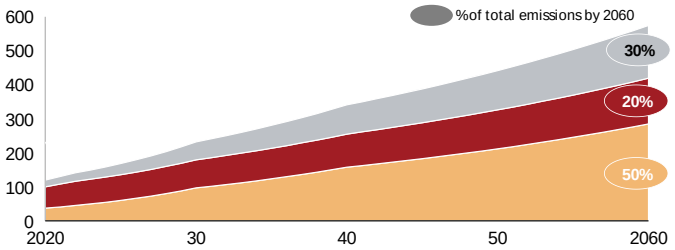
1. Expert input
2. L. Woittiez "Yield gaps in oil palm: A quantitative review of contributing factors"
3. A. Enstrom "Introducing a new GHG emission calculation approach for alternative methane reduction measures in the wastewater treatment of a palm oil mill"

Bold Move Five - Foster the Circular Economy

Waste emissions are expected to increase 4-5x through 2060. Unabated, waste could account for 11% of total emissions by 2060, with 50% driven by municipal solid waste (MSW) and 30% by domestic wastewater (DWW). Wastewater treatment can help to reduce emissions and capture secondary values such as heat and power generation and agricultural composts. Decarbonizing MSW through new business opportunities, waste segregation and waste prevention has the potential to generate USD 1.7bn value in 2030.

Exhibit 145:
Waste Sector GHG Emissions Projections

Waste sector GHG emissions in business-as-usual scenario, $GtCO_2e$	**CAGR,** 2020-60
Domestic waste water	6.1%
Industrial waste	1.9%
Municipal solid waste	6.1%



Key challenges in waste sector decarbonization include:

- 80% of solid waste is mixed at source, limiting the viability for recycling, and making treatment costly.

Solid waste

- Limited waste processing capacity and suboptimal utilization due to limited operational budget allocation.
- Long and inefficient recyclable waste collection value chain. Despite a large recycling economy that exists today, with a value of USD 7 Bn, only 50% plastic recycling capacity uses local feedstock.

Wastewater

- 70-85% of domestic wastewater is disposed in closed systems such as septic tanks and is not treated, emitting greenhouse gases.
- Currently, there is very limited treatment, only about 1%, of industrial wastewater, even though wastewater constitutes 99% of total industrial waste emissions.

A circular economy is the key to driving value in decarbonizing waste and in fact, decarbonizing waste presents new business opportunities across the value chain (Exhibit 146).

Exhibit 146:
Key Levers for a Circular Economy

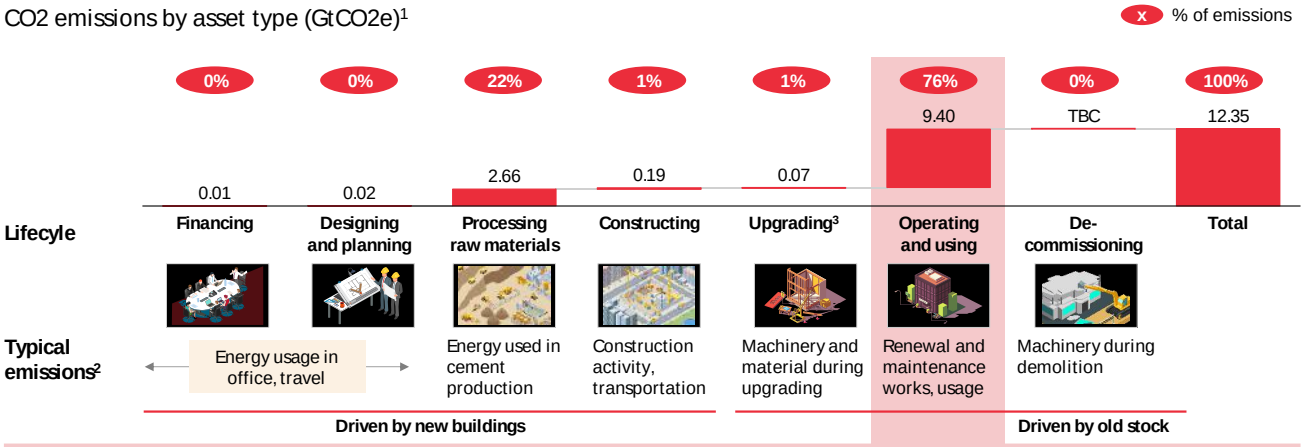
	Solid waste					Wastewater	
	Organic waste		Dry waste	Residue / unsorted waste		Domestic and industrial wastewater	
Levers	Composting	Anaerobic digestion	Recycling	Pyrolysis[1] / gasification	Refuse-derived fuel (RDF)	Anaerobic digestion with gas capture	Sludge treatment with gas capture
Description	Decomposition by microorganism (in the presence of oxygen) or by earth worms to produce fertilizer or animal feed	Decomposition by microorganisms in the absence of oxygen to produce biofertilizer and biogas	Material recovery through mechanical (sorting, grinding, compounding, etc.), chemical or thermal processes	Thermochemical conversion of organic matter with controlled amount of oxygen to produce biochar, biooil or syngas	Compacted organic waste into small pieces as fuel for co-firing in various processes	Biological treatment with (aerobic) or without (anaerobic) oxygen, producing biogas and biomass (sludge)	Biological treatment of organic solids in the sludge into biogas and stable biomass, which can be used as fertilizer or safely disposed
Decarboniza-tion impact	Up to **85%-100%**	**>100%** if replaces fossil fuels	**>100%** by reducing raw material needs	**>100%** if replaces fossil fuels	**>100%** if replaces fossil fuels	**>100%** if replaces fossil fuels	**>100%** if replaces fossil fuels

1. Also applicable to plastic waste, producing fuel oil

In fact, decarbonizing waste presents new business opportunities across the value chain (Exhibit 147).

1. Integrated waste management: Sorted waste pick-up service with recyclables sold to industry
2. Black Soldier Fly (BSF) composting: BSFs consume food waste with the output sold as animal food protein, biogas feedstock and a variety of other end uses
3. Anaerobic digestion (AD): Convert organic waste into biogas for use as industrial heating, electricity, or cooking fuel
4. Gasification / pyrolysis: Produce chemicals from syngas, bio-char, bio-oil
5. Refuse-derived fuel (RDF) facility: Compacted organic waste as fuel for co-firing in various processes

Exhibit 147:
New Business Opportunities for Decarbonization



Specific challenges in Indonesia

Over ~75% of energy consumption is driven by residential buildings versus commercial buildings
COVID-19 has shifted workers into a **'work-from-home' culture, driving significant energy consumption in residential buildings**
Energy use per m^2 of **residential buildings is 0.71 GJ per m^2** (vs 0.54 GJ per m^2 G20 average[4]); mostly driven by:

- **Intensive use of air-conditioning units**
- Use of **gas stoves for cooking**, with high costs of adoption for induction/ electrical stoves

1. Data not specific to Indonesia; 2. Includes scope 1 (direct emissions from owned and controlled sources), scope 2 (indirect emissions from generation of purchased energy) and scope 3 (all other indirect emissions that occur in a company's value chain); 3. Emissions allocated to upgrading based on construction spend on renovation vs new. Data only available for real estate - same factor applied for infrastructure; 4. Climate Transparency Report - Indonesia https://www.climate-transparency.org/wp-content/uploads/2020/11/Indonesia-CT-2020-WEB.pdf

Bold Move Six - Accelerate Renewables

Optimizing renewables is a key lever in decarbonizing the power sector. Renewables penetration needs to be enlarged from the current 15% to 65 – 75% by 2060.

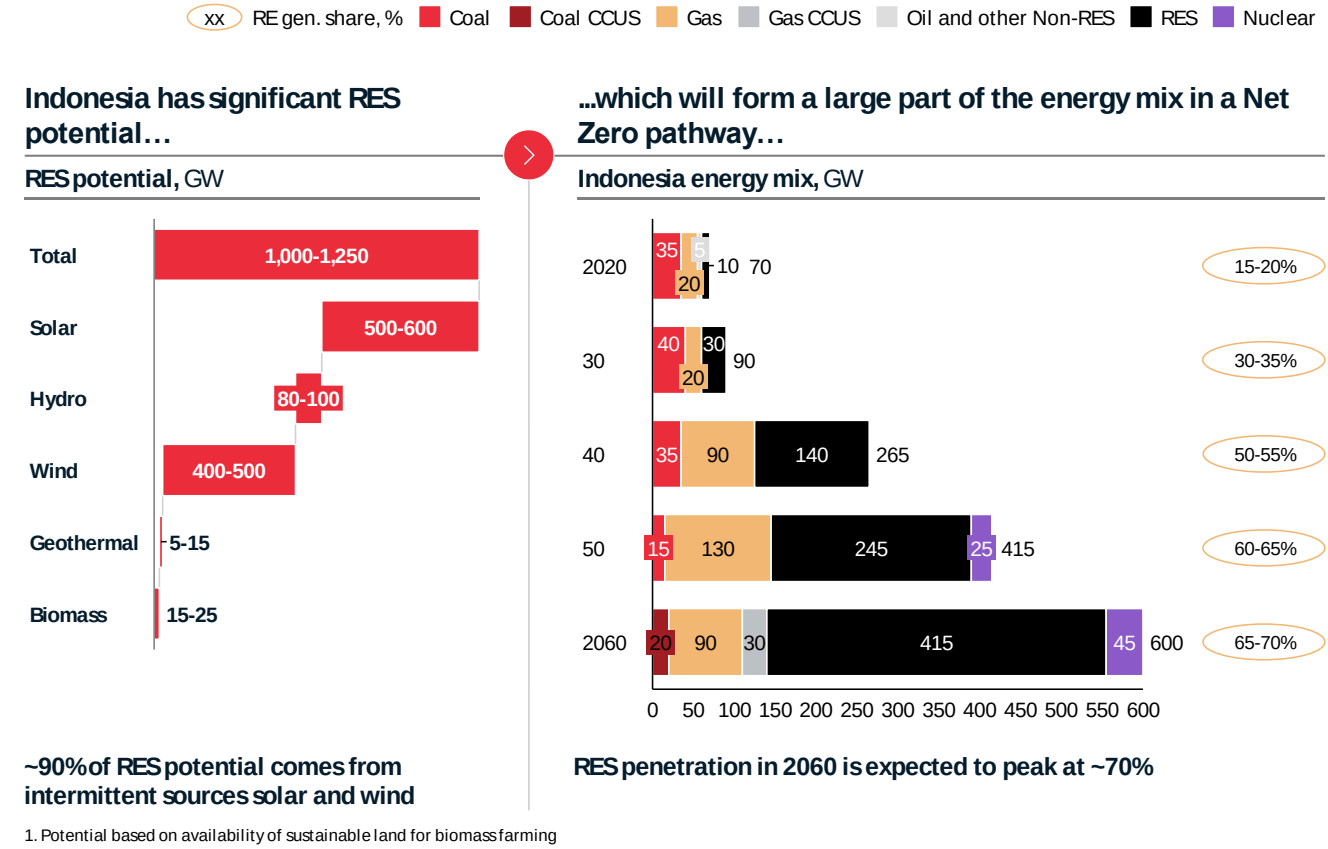
There is significant renewable energy systems (RES) potential in Indonesia (1,000-1,250GW), with 90% from solar and wind alone. To facilitate this transition, new opportunities lie in improving energy storage systems, building resilient, modern grids, and expanding component manufacturing.

Optimizing RES is an essential lever to decarbonize the power sector and eliminating ~1,000 Mt of emissions by 2060 (Exhibit 148 and Exhibit 149). There are four key enablers required to optimize this potential:

- **Interconnections** to manage supply-demand mismatches by facilitating energy transfers between regions.
- **Energy storage systems** to manage intermittent generation by storing excess energy and discharging accordingly, balancing the grid as well as regulating frequency, etc.
- **Grid modernization and resiliency:** Development and provision of hardware, software, and services for utilities to modernize and digitize grids.
- **Component manufacturing:** Manufacturing and assembly of renewable power plant components (e.g., solar cells, wind turbines), balance of plant, battery cells.

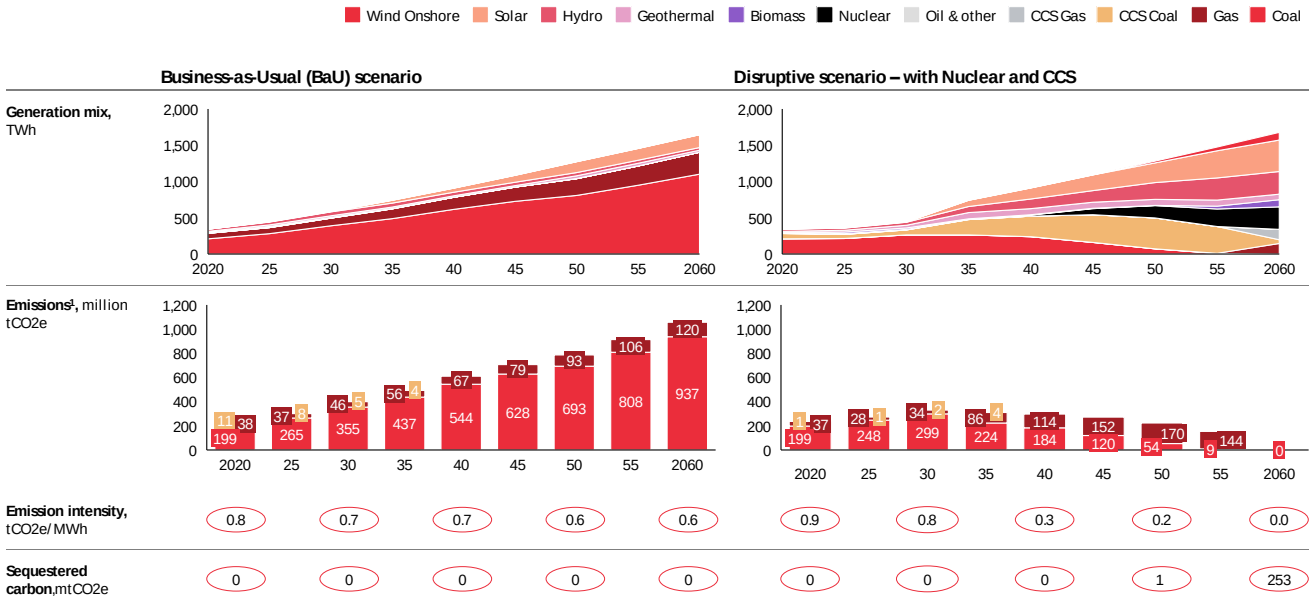
Regulatory support through policies and subsidies and incentives, as well as relaxing local content requirements and adjusting energy tariff levels and control mechanisms where necessary for RES to be competitive in the near term

Exhibit 148:
Indonesia's RES Potential



1. Potential based on availability of sustainable land for biomass farming

Exhibit 149:
Indonesia's Energy Mix Projections



Bold Move Seven - Drive Electrification

Electrification is the biggest lever to achieve Net Zero, through scaling use of electric vehicles (EVs) and transitioning to fully electrified buildings in the long-term.

It is possible to electrify 80-100% of road transport and 40-60% of residential cooking where there is sufficient supply of renewable power. By driving electrification, Indonesia can reduce vehicle emissions via EVs. The current electric two-wheelers and electric four-wheelers (E2W & E4W) penetration is at <1% and can be enlarged greatly through incentives.

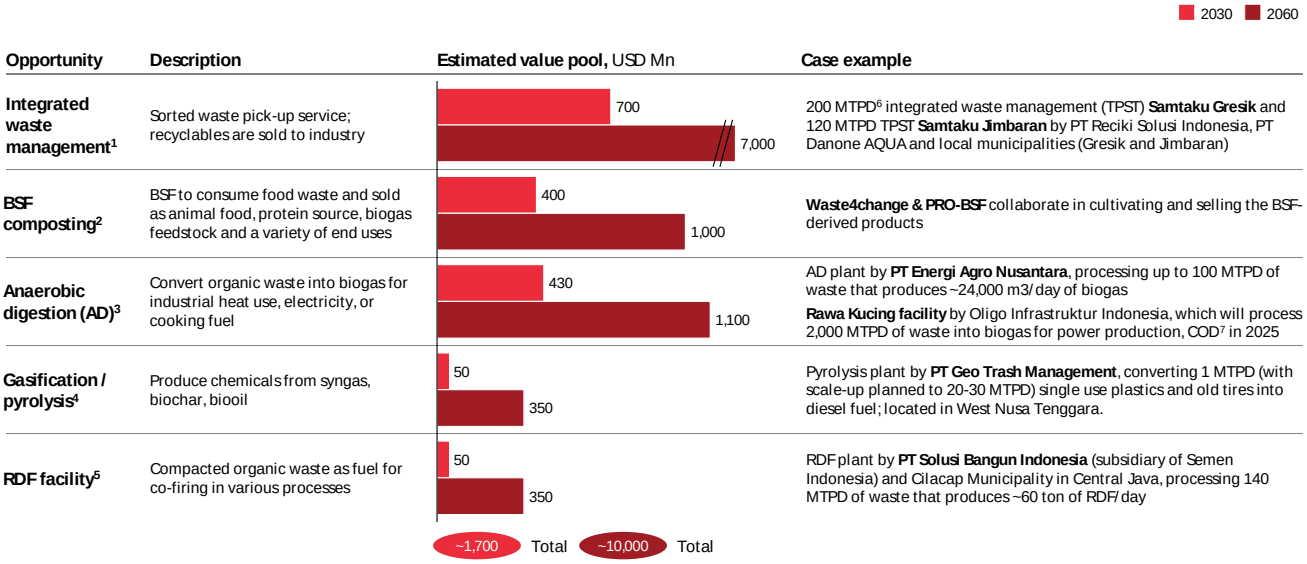
Indonesia can reduce GHG emissions via scaling up adoption of Electric Vehicles enabled by regulations, total-cost-of-ownership (TCO) parity and market access.

Buildings could be decarbonized mainly through electrification. Unabated, the buildings sector emissions will reach 83 MtCO2 by 2060. Over 70% of energy consumption is driven by residential buildings versus commercial buildings, mainly from the use of gas or biomass stoves for cooking. However, electrification and energy efficiency levers are the most effective to reduce emissions with electrification being the quick win (Exhibit 150).

For instance, in the short run, induction stoves could be scaled by strategically targeting early adopters, partnering with upstream (manufacturer) and midstream (retailers, developers) players to drive awareness and with launching incentive programs to reduce switching costs.

In the long run, for instance, energy consumption can be upgraded by transitioning to fully electrified buildings, incentivizing distribution with rooftop solar, using EV as storage mechanism to reduce the need of dedicated home battery storage system, and mandating energy efficiency labeling for appliances and sustainable building practices.

Exhibit 150:
CO2 Emissions by Asset Type



1. Based on tipping fees and recyclables sales with ~30% and ~50% waste collection in 2030 and 2060 respectively; 2. Based on animal feed sales with ~15% organic waste processed by BSF in 2030 and 2060; 3. Based on biogas sales (15% sales margin) with ~15% organic waste processed in 2030 and 2060; 4. Based on syngas conversion into bioethanol sales (15% sales margin) with 5% and 30% residual waste processed in 2030 and 2060 respectively; 5. Assuming similar price to biocoal with 20% and 30% residual waste processed in 2030 and 2060 respectively; 6. Metric ton per day; 7. Commercial operation date

Key Metrics and Enablers

To recap, there are seven unlocks that will help foster sustainability through industrial decarbonization and green business building. MSMEs also have a role to play in implementing the unlocks (Exhibit 151).

Exhibit 151:
Role of MSMEs in Sustainability

	Bold moves	What MSMEs can do
Industrial decarbonization	① **Accelerate industrial decarbonization (incl. CCS, hydrogen clusters)**	• For larger-sized SMEs, contribute in part of the value chain (e.g., building pipelines for CO2 transport)
Green business build	② **Scale Natural Climate Solutions (NCS)** (incl. biodiversity credits)	• Adopt land management practices facilitating widespread adoption of NCS (incl. biodiversity credits)
	③ **Unlock carbon markets**	• Actively participate in carbon markets, e.g., through supplying carbon credits
	④ **Scale regenerative agriculture and agroforestry**	• Actively participate through adopting regenerative practices
	⑤ **Foster the circular economy**	• Actively participate in circular economy through reducing waste production, participating in waste collection and in developing and/or adopting niche decarbonization techniques
	⑥ **Accelerate renewables**	• Actively participate in facilitating the transition, e.g., through playing in parts of the manufacturing or installing processes
	⑦ **Drive electrification**	• Adopt use of electric vehicles • Participate in assembly of spare parts and design of bikes; and/or setting up charging infrastructure

The seven bold moves can be implemented through initiatives until 2045. A proposed implementation roadmap can be found in the exhibits below (Exhibit 152).

Exhibit 152:
Sustainability Roadmap

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders[1]
1 Accelerate industrial decarbonization	**Incentivize partnerships to accelerate CCS cluster development** **Pilot 10 CCS clusters across hydrogen and key point sources**, e.g., power, ammonia, iron and steel		**Scale CCS clusters across the nation,** capturing 5% of industrial activity's emissions via CCUS. Continue to scale to 2060 to cover 30% of industrial activity's emissions covered by CCUS		• KemenESDM KemenBUMN
2 Scale Natural Climate Solutions (NCS)	**Finalize regulations** (incl. carbon tax and monetization of CCS capacity) **Drive deforestation avoidance** **Restore peatlands and forests in concessions and Protected Areas**				• KemenLHK (Ministry of Environment and Forestry)
3 Unlock carbon markets	**Establish ecosystem** through MRV services, carbon market exchange, regional collaborations, carbon credits standards (aligned with international standards e.g., Verra, Gold Standard) **Accelerate development of ETS, clarifying use of offsets** (e.g., expand use of credits across sectors) **Educate potential project developers** on economic potential of carbon markets **Develop carbon market exchange for carbon credits** (to identify price) **Connect Indonesia to export credits to the world market** (i.e., enable participation in global NDC) **Develop a VCM playbook to help players navigate the market and have a working group to convene and tackle barriers that exist** (e.g., point of contact for key institutions like how Mexico and Australia have done)	**Continuously improve ETS system**			• KemenESDM • Kemenkeu • KemenLHK • KemenESDM • Kemenkeu • KemenLHK
4 Scale regenerative practices	**Use of organic inputs** (e.g., fertilizers, pesticides, water, etc.) **in crop production and maintenance** **Incentivize producers to adopt low-carbon growing practices** (e.g., AWD, dry-direct seeding, etc.), **paying farmers per tCO_2 reduce** **Use of palm oil mill effluent (POME) feedstock and residues** (e.g., rice husks/ straws) to create biofuels **Build a regenerative coffee, cocoa, vanilla and essential oil sector**				• KemenLHK (Ministry of Environment and Forestry)
5 Foster the circular economy	**Implement an integrated waste management system** **Improve waste prevention campaign** to drive consumption shift and reduce waste generation **Optimize Wastewater Treatment Plant** to convert wastewater into biosolid sludge that can be re-used as fertilizer or biogas				• KemenESDM (Ministry of Energy and Mineral Resources) • KemenBUMN (Ministry of SOE)
6 Accelerate renewables	**Restrict new non-renewable** (e.g., coal-, oil) **power plants** **Provide regulatory support** through policies and incentives, through relaxing local content requirements and adjusting energy tariff levels/ mechanisms **Build interconnection** to manage supply-demand mismatches by facilitating energy transfers between regions, e.g., between Java-Sumatera **Invest in energy storage systems** to manage intermittent generation by balancing the grid and regulating frequency **Develop and provide hardware, software and services for utilities to modernize and digitize grids** **Invest in manufacturing and assembly of (at-scale) renewables power plant components** (e.g., solar cells, wind turbines), **and in plant maintenance**				
7 Drive electrification	**Issue sustainable building practices** **Implement energy efficiency labelling** **Provide financing options for existing buildings to adopt energy efficient appliances** Build manufacturing hub to **produce battery components/ battery assembly, ensuring circularity**, focusing on 2W from now to 2034 and on 4W from 2030 onwards. SMEs can help with packaging and distribution of battery reuse and as contractors in nickel mining **Upgrade existing grid and develop safe charging systems** (incl. home charging, public charging, fast charging, maintenance and spare parts ecosystem) **Build and scale battery management systems** (through incentivizing SMEs) Investment in HPAL processing plants and work with foreign consortiums to **supply battery-grade nickel** **Align on single charging standard**	**Build local design capabilities** to personalize automotives to Indonesian demand			• KemenESDM • KemenBUMN • Kemenperin

1. Apart from private sector and international organizations

Progress can be tracked against key targets, for example, the percentage of an industrial activity's emissions covered by CCS can be quantified as a key measure of progress (Exhibit 153).

Exhibit 153:
Sustainability Key Metrics

		FROM	TO				
Bold moves	**Key metrics**	**2019, most recent data available**	**2025**	**2030**	**2035**	**2040**	**2045**
1 **Set up CCS & hydrogen clusters**	%of industrial activity's emissions covered by CCUS	0%	0+%	0.3+%	0.5+%	1+%	5+%
2 **Scale NCS**	Additional hectares for peatland restoration	222,030	15+ mn	18+ mn	20+ mn	22+mn	22+mn
	Reduction in forest fire	1%	5+%	20+%	50+%	80+%	90+%
	High feasibility abatement potential achieved	0%	1+%	5+%	15+%	35+%	70+%
3 **Unlock carbon markets**	Regulation clarity on ETS[1] and VCM[2]	✓	✓	✓	✓	✓	✓
4 **Scale regenerative practices**	%of smallholders improve productivity, efficiency, and sustainability of crops production	0%	0+%	0.5+%	2+%	10+%	25+%
	%of livestock farming	0%	0+%	0.3+%	0.8+%	1+%	2+%
	%of land managed under regenerative practices	0%	0+%	1+%	2+%	10+%	25+%
5 **Foster the circular economy**	Solid waste reduction	0%	~0%	1+%	2+%	5+%	8+%
	%of solid waste treated	1%	3+%	5+%	10+%	20+%	30+%
	Waste-water reduction	0%	0.1+%	0.5+%	0.8+%	1+%	2+%
	%of wastewater treated with gas recovery	0%	1+%	3+%	5+%	10+%	25+%
6 **Accelerate renewables**	Renewable power generation mix	15%	15+%	30+%	40+%	45+%	50+%
	Abatement potential with biomass-cofiring	0%	0+%	0.3+%	0.5+%	0.8+%	1+%
7 **Drive electrification**	%of cooking electrified	1%	1+%	1+%	2+%	4+%	8+%
	%of commercial buildings decarbonized	7%	10+%	15+%	25+%	35+%	40+%
	%of residential buildings decarbonized	0%	1+%	3+%	5+%	15+%	20+%
	%of 4W, 3W, 2W and buses electrified	0%	0+%	1+%	5+%	20+%	50+%
	%of truck and trains electrified	1%	1+%	1+%	2+%	5+%	15+%
	Penetration of hybrid plane	0%	0+%	0+%	1+%	10+%	30+%

Key enablers are needed to ensure success of the seven bold moves, which thereby foster sustainability. This includes developing the sectoral decarbonization roadmap (e.g., from each sectoral Ministry) and gaining clarity and setting up regulatory support (including incentives, reporting system). Other initiatives ensure investment in transversal technology, acceleration of talent capabilities, improvement in infrastructure across the nation and development of leaders to unlock partnerships and realize the “Gotong Royong” spirit (Exhibit 154).

Exhibit 154:
Sustainability Key Enablers

Key enablers	Examples
A **Regulation with dual mission of safeguarding and catalyzing economic development**	• **Develop sectoral decarb roadmap** (e.g., from each sectoral Ministry) • **Clarity and setup of regulatory support** (incl. incentives, reporting system)
B **Invest in transversal technologies for all** e.g., individual data digitization, digital infrastructure	• **Develop policy to stimulate domestic investment and innovation in decarbonization technologies and efforts** e.g., grid modernization, long duration energy storage, direct air capture, and sustainable aviation fuel
C **Accelerate talent capabilities** through e.g., education and training programs	• **Provide reskilling for new skills needed in green economy** e.g., sustainable farming, engineers for new technology like carbon capture
D **Improve infrastructure across the nation**	• **Build interconnections** to manage supply-demand mismatches by facilitating energy transfers between regions, e.g., between Java-Sumatera • **Invest in energy storage systems** to manage intermittent generation by balancing the grid and regulation frequency • **Develop and provide hardware, software and services for utilities to modernize and digitize grids**
E **Develop leaders and unlock partnerships** to realize the "Gotong Royong" spirit and foster diversity of thought	• **Ramp up green finance ecosystem** e.g., partner with banks to provide green grants/ bonds/ investments, and attract green FDI through tailored incentives and 'one-stop shop' service

In fact, one of the most important enablers is the regulatory support. In most countries, a national climate office is set up by the country's head (Prime Minister or President) to help execute on the sustainability agenda.

Typically led by the Ministry of Climate Change / Environment, the national climate office brings together relevant stakeholders to form the watch tower and help execute on the sustainability agenda. It ensures working groups are formed on sub-topics as needed to have technical discussions to make informed recommendations and then summarizes the recommendations from the watch tower and working groups back to the Prime Minister / President's Office. The climate office also represents the country's position as climate leader and international partner and manages international negotiations. S

6

KEY ENABLERS

Future-ready human capital

Context and challenges

Human capital is one of the biggest levers that can drive the economy across all sectors and across all types of businesses. Today, Indonesia's workforce face double challenges of low productivity and inadequate supply of skilled workers. It can be traced to Three gaps across the education and labor lifecycle: accessibility of education, quality of education and relevancy of workforce skills (Exhibit 155).

Whilst there has been great progress, accessibility remains a challenge to conquer going forward. There remain low enrolment rates (pre-primary school gross enrolment ratio is 62%), driven by financial and cultural barriers (e.g., 50% of dropouts say lack funds, 25% of female dropouts due to perception of women do not need schooling).

In addition to improving accessibility, Indonesia will need to continue to improve quality of education, from early childhood until higher education:

- Stunting has long-term effect in children's development. Almost a quarter of Indonesian children suffer from stunting. Indonesia could benefit from more integrated approach between health and education interventions, e.g., improving parents and health workers training with early childhood development knowledge/skills
- Low quality of K-12 educations, i.e., Indonesia ranks 70 out of 77 in PISA score results (2018). Disparity of teachers and principal quality across Indonesia contribute to this outcome.
- Lack of quality universities, exacerbated by minimal practical experience embedded in higher education. Beyond the low enrolment rate (i.e., 36% locally), only three of Indonesia's universities are in top 250 QS rankings from quality of research, teachers, infrastructure and governance

Beyond access and quality, there is also a need to improve the relevancy of workforce skills for productive livelihood:

- Mismatch between skills developed through vocational education and skills needs, in addition to either lower quality or perception of lower quality for vocational schools. This results in ~25% of unemployment comes from vocational graduates, without adequate training / practical experience
- Need for large scale skills transition given the mismatch between supply and forward-looking demand. In spite of automation, given the growing economy and strong growth of consuming class, Indonesia will actually experience net job gain (i.e., estimated to be about 23M net job gain). However, close to 10 million jobs will be new (e.g., IT architect, UI/UX designer) and up to 36M will be created in different sectors. Indonesia will need to transition about 23M jobs that is likely to be lost due to automation.
- Geographical mismatch of talent availability and talent needs. Given the different speed of economic development and availability of resources, there is also a need to solve for mismatch between location of supply and demand.
- Beyond the above, it will also be important to address the need to support disadvantaged citizen to gain productive livelihood (e.g., disabled population, women in rural areas.

Exhibit 155:
Human Capital Challenges Across the Education and Workforce Life Cycle

Deep dives follow | Covered in vulnerable population section

Education and workforce lifecycle

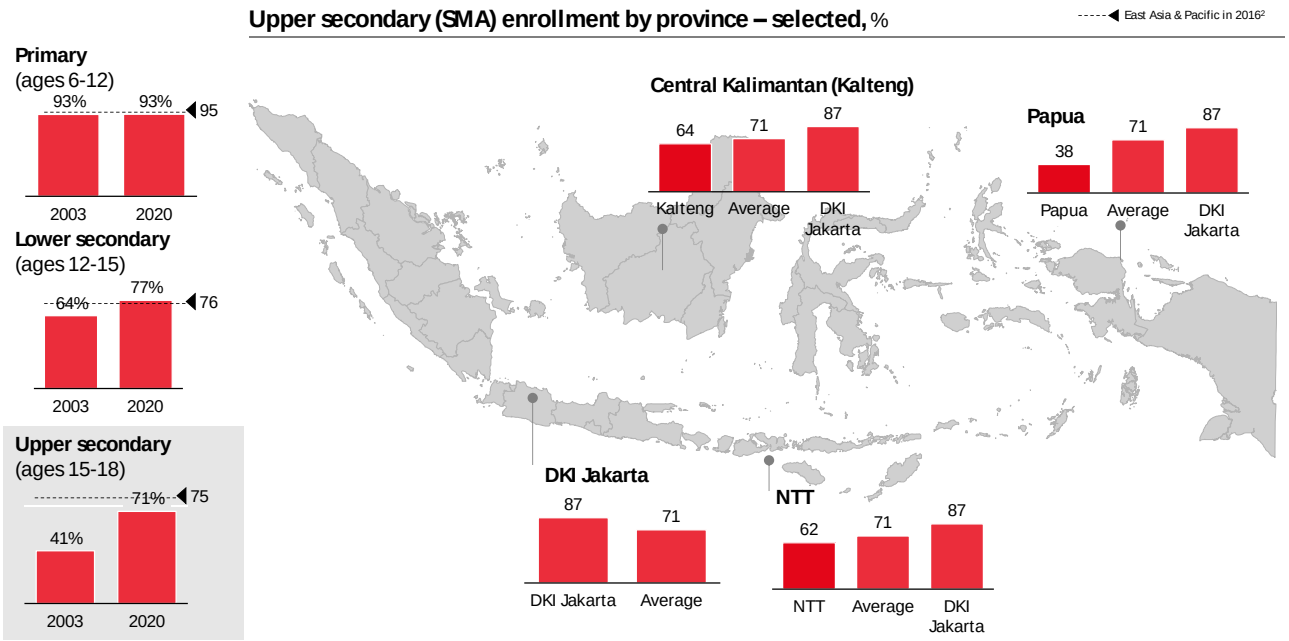
Early childhood	Primary and secondary school	University	Technical & vocational education	Job market	Non-active workforce
A. Accessibility of education					
1. Low enrolment rates: 62% pre-primary school gross enrolment ratio	**2. Low enrolment rates:** Upper secondary enrollment is behind Asia average and regional disparities persist				
B. Quality of education			**C. Relevancy of workforce**		
1. Stunting: ~1/4 of Indonesian children are stunted	**3. Lower quality of education:** Indonesia ranks 70 out of 77 in PISA (2018) results	**5. Low quality and quantity of tertiary education:** 36% tertiary education gross enrollment ratio; only three Indonesian universities are included in QS World University Rankings 2021	**1. Poor vocational education and employment opportunities:** ~25% of unemployment comes from vocational graduates, who also have inadequate training and practical experience	**2, Low labor productivity:** low average output per hour worked compared to peers ($14/ hour vs $31 in Malaysia and $67 in Singapore)	**5. Lack of accessibility:** e.g., public spaces **and educational support** (e.g., special needs education programs) **for disadvantaged populations** (e.g., women and disabled population
2, Lower quality and duration of preschool and home learning environment: Indonesia scored 64.6% and 69.9% on literacy-numeracy and social-emotional indicators of UNICEF's Early Childhood Development Index (ECDI), which scores varying across region	**4. Poor integration of ICT in curriculum with Covid-19 expected to accelerate trend of digital education**	**6. Lack of practical experience opportunities:** Indonesian graduates do not feel ready for the workforce		**3. Talent disproportionately distributed across the archipelago**	
				4. Skills mismatch: e.g., up to 50% of staff in Indonesia are under skilled and 16% of all work activities (23mn jobs) are repetitive	

Below are some deep dives on the challenges mentioned above.

A. Accessibility of Education

Indonesia's upper secondary enrolment is still below the average for Asia with significant disparities by province, especially in Eastern regions (Exhibit 156).[145]

Exhibit 156:
School Enrolment Nationally and in Selected Provinces

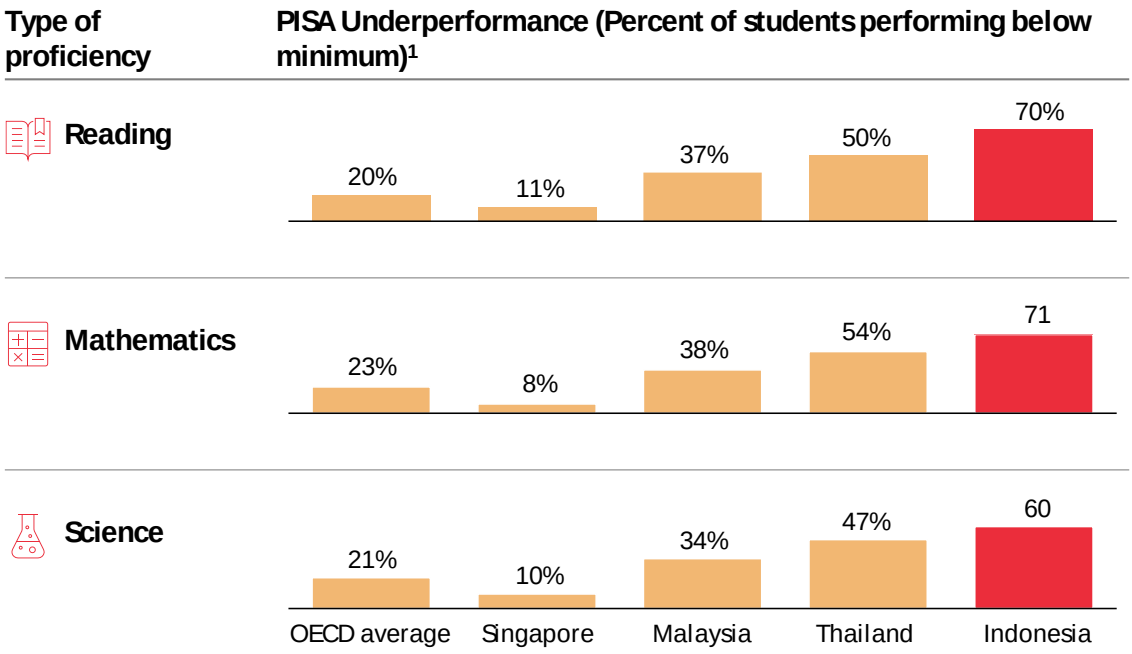


[145] Ministry of Education (2020).

B. Quality of Education

Indonesian secondary students are underperforming in key metrics such as the Programme for International Student Assessment (PISA), a worldwide study by the Organization for Economic Co-operation and Development that measures 15-year-old school pupils' scholastic performance in mathematics, science, and reading (Exhibit 157).[146] For example, in terms of reading, 70% of Indonesian students perform below the minimum, versus 20% of students in the OECD average.

Exhibit 157:
PISA Underperformance



1. There are 6 levels for math and science and 5 for reading; below minimum means below level 2 – data for Indonesia from PISA 2018 and 2016 for others

Moreover, a third of upper-secondary Indonesian schools lack access to computers. Yet, due to strategies for remote learning undertaken during the COVID-19 pandemic, digital education is expected to play a bigger part in the future. Looking ahead, online learning format holds potential to complement the learning experience. As schools reopen in the aftermath of the pandemic, online learning such as virtual classrooms continue to play an important role in the overall education experience.[147]

C. Relevancy of Education

A comparison of salaries shows that Indonesian vocational education graduates are the lowest paid compared to the minimum wage in other peer countries in ASEAN (Exhibit 158).

In terms of the unemployment rate, Indonesian vocational education graduates contribute to 25% of the total unemployment rate with 21% coming from SMK[148] graduates – a higher rate compared to Thailand (20%) and Vietnam (16%).[149]

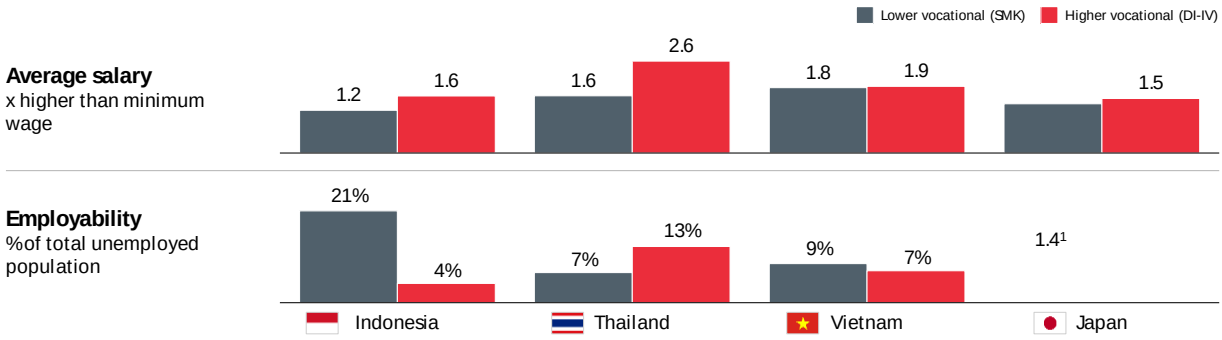
[146] Data for Indonesia from PISA 2018 and 2016 for others. PISA 2018, 2015, 2009.

[147] Pearson Global Learner Survey 2020. Survey results based on poll from June 8-14, 2020; respondents are learners aged between 16-70; 1,000 respondents per country representative of population.

[148] Sekolah Menengah Kejuruan (Vocational High School)

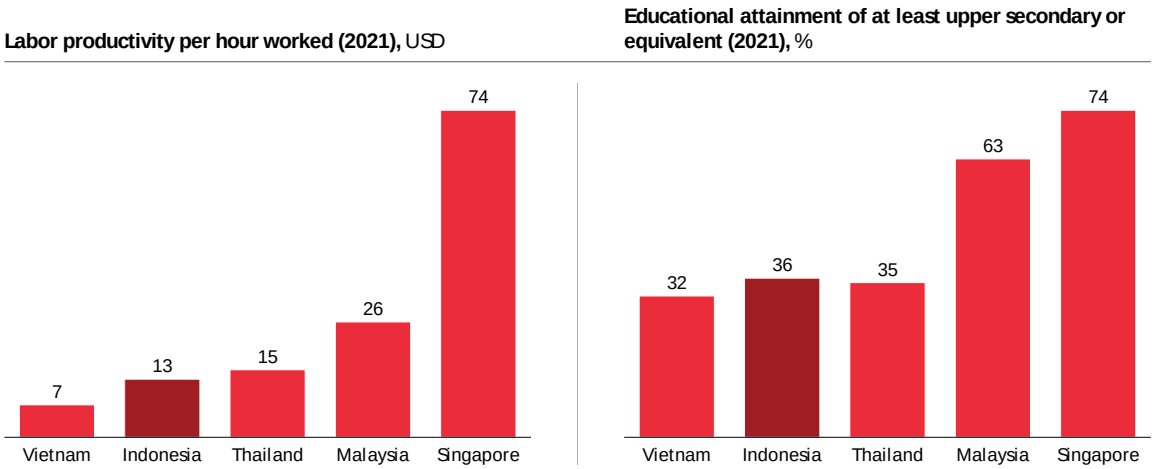
[149] Average starting salary for new graduates (monthly)/ (average minimum wages for hours worked in a month). Press search, General Statistics Office Vietnam Q2 Labor Force Survey, National Statistics Office Thailand Q2 Labor Force Survey, BPS Indonesia, Bank of Thailand Ministry of Health, Labor, and Welfare – Japan.

Exhibit 158:
Indonesia's Vocational Education Graduates



Indonesia has one of the lowest productivity rates in the region as the majority of workers are low skilled (Exhibit 159).[150]

Exhibit 159:
Indonesia's Labor Productivity



Moreover, skilled talent is unevenly distributed across the country and is lowest in the eastern regions.[151]

Indonesia could have a net gain of jobs by 2030 (Exhibit 160). We identified seven catalysts of labor demand globally: rising incomes, healthcare spending, investment in technology, buildings, infrastructure, and energy, and the marketization of unpaid work.

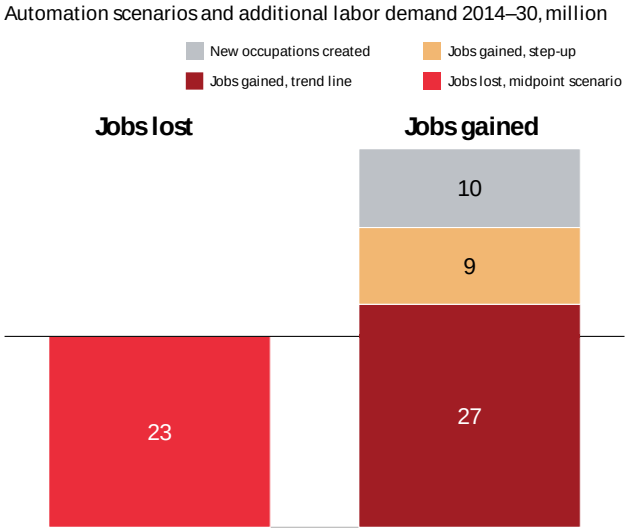
We compared the number of jobs to be replaced by automation with the number of jobs created by our seven catalysts as well as change in labor force between 2014 and 2030. In addition, a study has shown that on average 0.5 percent of the workforce has been working in new jobs every year.[152]

[150] World Bank, ILOSTAT.

[151] Education Statistics of Indonesia (Knoema).

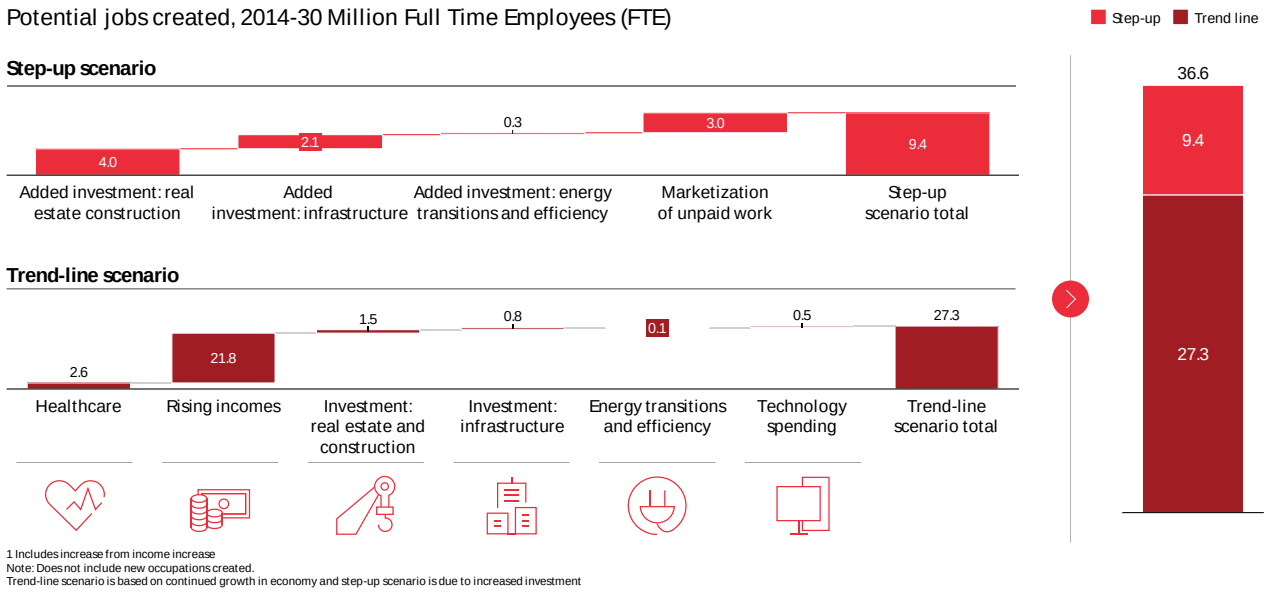
[152] Lin, "Technological adaptation, cities, and new work," The Review of Economics and Statistics, 2011. MGI Automation Model, March 2018; Jobs lost, jobs gained, December 2017; McKinsey Global Institute.

Exhibit 160:
Potential Net Gain of Jobs by 2030



Significantly, rising consumer incomes and infrastructure spending are expected to be the largest sources of job creation (Exhibit 161).[153]

Exhibit 161:
Potential Jobs Created



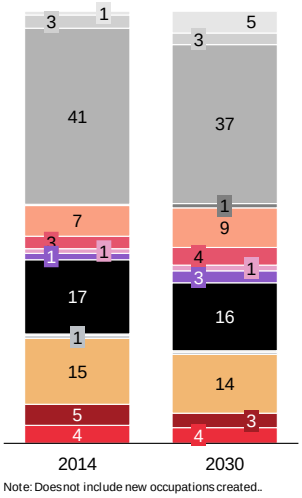
1 Includes increase from income increase
Note: Does not include new occupations created.
Trend-line scenario is based on continued growth in economy and step-up scenario is due to increased investment

Jobs will be created across sectors, but the mix is expected to shift toward services and away from agriculture (Exhibit 162).[154]

[153] Does not include new occupations created. Trend-line scenario is based on continued growth in economy and step-up scenario is due to increased investment. MGI Automation Model, March 2018; Jobs lost, jobs gained, December 2017; McKinsey Global Institute.

[154] Table does not include new occupations created. Midpoint of earliest and latest automation adoption in the "step-up" scenario (i.e., high job growth).

Exhibit 162:
Impact of Automation and 7 Catalyst Drivers by Sector



Note: Does not include new occupations created..

Increase in sector contribution Decrease in sector contribution

	Net additions Million	Employment 2030, Million	Change in percentage p.p.
Accommodation and food service	6.81	7.8	4
Government	0.65	4.2	0
Agriculture	9.69	57.0	(4)
Arts	1.21	1.5	1
Construction	6.01	14.2	2
Education	2.94	6.3	1
Finance	0.80	2.0	0
Healthcare	2.58	4.3	1
Manufacturing	4.48	24.4	(1)
Professional services	0.09	0.5	0
Real estate	0.03	0.7	0
Retail and wholesale trade	3.40	21.1	(2)
Transportation	-0.44	5.2	(2)
Other	0.76	5.6	(1)

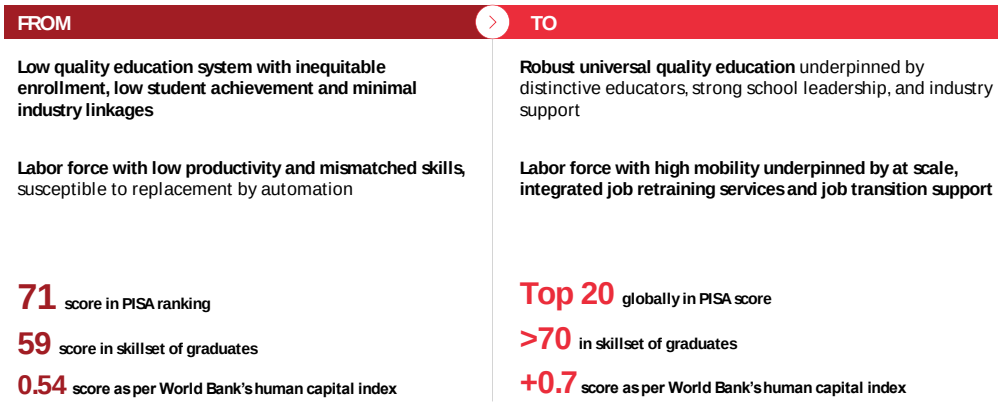
Furthermore, studies have demonstrated that repetitive activities are most susceptible for displacement from automation.[155]

Given the above facts, to prepare for the jobs of the future, people must develop skills that give them advantages over machines. As automation comes to the fore, more jobs will require tertiary degrees and involve application of expertise, interaction, and management.[156]

To stay competitive, the workforce must adapt to evolving meta, soft and hard skills that the market demands, such as self-direction, critical thinking and problem solving, as well as specific skills e.g. software development, big data analytics, etc.

By addressing these challenges, Indonesia can aspire to accelerate talent capabilities to meet economic goals and promote work quality and social cohesion (Exhibit 163).

Exhibit 163:
Aspirations for Talent Capabilities



[155] McKinsey Global Institute.

[156] Table does not include new occupations created. Figures may not sum to 100%, because of rounding. Midpoint of earliest and latest automation adoption in the "step-up" scenario (i.e., high job growth). O*NET skill classification; US Bureau of Labor Statistics; MGI Automation Model, March 2018; Jobs lost, jobs gained, December 2017; McKinsey Global Institute.

Bold moves

There are eight bold moves that will help improve the development of core skills and competencies in the Indonesian workforce (Exhibit 164).

Exhibit 164:
Talent Capabilities Bold Moves

		Bold moves
Accessibility of education		1 **Improve targeting, timing and delivery (DBT) of conditional cash transfer programs to push enrollment** e.g., in Morocco, a labelled cash transfer program in which funds were given without regard to school attendance resulted in a 76%fall in drop-out rates compared with schools not in the program
Quality of education	Early childhood	2 **Appoint local champions and formalize the training to volunteers to provide better support to children and parents** This entails combining existing ECD initiatives and bringing together all stakeholders from the relevant ministries (e.g., of Health and Education), and the private sector (incl. international organizations)
	Primary & secondary school	3 **Building lighthouse school as center of excellence across the nation, to also serve as leadership training center for principals** Consequently, this can enable top-down driven improvements in quality of teaching, curriculum, and (physical and digital) infrastructure for all students (incl. those who have special needs); and in enforcing the merit-based approach to enrollment
	University, technical and vocational training	4 **Build distinctive, innovative offerings for top 2-3 priority skills needed** in Indonesia; aiming to be (at least) the regional best for these skill sets
		5 **Encourage diverse strategic partnership with world class universities and private sector players**
Relevancy of workforce		6 **Stimulate more structured public/ private partnership to collectively offer practical experiences and apprenticeship** as part of the curriculum, building on Kampus Merdeka approach – also including faculty or teachers
	Reskilling and upskilling	7 **Incentivize private sector to invest in retraining/ upskilling programs, including building retraining/ upskilling centers** These would help companies create programs for their employees, or help employees outside e.g., from micro and SME organizations
	Industry placements	8 **Invest in developing National Talent Roadmap with input from private sectors; linking the roadmap into a national talent matching platform** This would enable graduates to see job vacancies and receive training needed to fill the desired job and provide income and transition support

Bold Move One – Improve Targeting, Timing and Delivery of Conditional Cash Transfer Programs

Existing cash transfer programs such as Bantuan Siswa Miskin and Program Keluarga Harapan can be improved with improved targeting and timing of benefit delivery by shifting to labeled cash transfer schemes. In a labeled cash transfer program, eligible households receive funds regardless of the child's enrollment. School salience is encouraged through other reinforcing methods such as setting up registration points only in local school buildings and through local school principals.

For instance, Morocco's Tayssir program, a labelled cash transfer program for poor communities, resulted in jaw-dropping reduced dropout rate by 76% among students enrolled at baseline, increased by 82% the number of children who went back to school after having dropped out before the program started, and cut the share of never-schooled by 31%.

Following the success of the pilot program, the Government of Morocco expanded the program to include additional grades, so that the Tayssir program now reaches 690,000 students in 434 rural communities.

In addition, leveraging digital Direct Benefit Transfer (DBT) mechanism, a labeled cash transfer can achieve a wide target reach without compromising accuracy and security.[157] A success story of this can be seen in India (refer to 'Empowering the vulnerable population': Bold Move One – Enhance the Efficiency of Delivering Social Services).

[157] DBT website, press search.

Bold Move Two - Appoint Local Champions and Formalize Integrated Training for Early Childhood Development

Numerous early childhood education and development (ECD) initiatives exist today but face challenges in the quality of support provided by volunteers to the parents and children. Instead of creating a new initiative in an area that is already in focus across many public and private players, existing ECD initiatives can be combined.

This would bring together all stakeholders from the relevant ministries (e.g., of Health and Education), and the private sector (including international organizations). Additionally, the training given to the volunteers could be formalized. This includes creation of tools to introduce mothers to early childhood education and offers mothers materials such as books and building blocks.

In doing so, along with bold move 1, current challenges can be addressed. Some of these challenges are:

- Diverging community support by region
- Inadequate supply and quality of teachers and community health workers
- Lack of lesson plans and other learning environment equipment
- Varying enrolment rate by wealth quintile
- Issues with quality assurance standards

As a form of incentive and a way to lead by example, star performers can be appointed as local champions. They would help to role model best-in-class support to parents and children.

Bold Move Three – Build Lighthouse Schools

Some of the challenges in today's primary and secondary education are with quality of teaching, curriculum, and (physical and digital) infrastructure; and with enforcing merit-based approach to enrollment. Addressing these challenges in a top-down manner would ensure that teachers receive the right support and training, and students receive an education fit to prepare them for the rapidly evolving workforce.

Thus, the recommendation is to build lighthouse schools, with private sector support, to also serve as center of excellence for teachers and principals development. Specifically for principals, the training should include both hard skills and leadership skills such as problem solving, decision making, coaching, feedback, and communications. Overtime, high performing alums of this center of excellence could form a community of role models who can also serve as coaches and faculty in training programs for teacher and principals.

Bold Move Four - Build distinctive, innovative offerings for top 2-3 priority skill needs

Given the size of the demand for quality workforce in Indonesia, there is opportunity to build distinctive offerings for universities around the most needed skillsets. For example, in a survey launched by KADIN in May 2023 involving 220 business leaders, several specific skills are cited as important for future organization development, e.g., critical thinking and decision making, leadership and managing others, creativity, and advanced IT skills and programming.[158] Higher education institutions can explore building a unique learning program that involves working together with private sector or State-Owned Enterprises to not only build those skills but allow for apprenticeship opportunities.

For instance, leading institutions have adapted their curriculum as needed to build distinctive offerings. Harvard launched FIELD (Filed Immersion Experiences for Leadership Development) for small groups of students to work hands-on with an outside organization through partnerships with organizations that range from small start-ups to Fortune 100 companies.

Wharton overhauled their curriculum massively over the 2011-13 academic years to provide tuition-free

[158] The survey is representative of organizations of various sizes and sectors and of experienced leaders across Indonesia.

executive education for alumni every seven years, create new vice-dean positions for innovation, international business, and social impact, provide ethics courses, emphasize oral and written communication skills and strengthen teaching of analytics.

Second, beyond offering academic internships, Kampus Merdeka can also provide other work placement opportunities for course credit. Kampus Merdeka is part of the Freedom to Learn policy by the Ministry of Education, Culture, Research and Technology (Kemendikbudristek), which gives students the opportunity to hone their abilities according to their talents and interests by going directly into the workforce as a career preparation step. See Exhibit 165 below for examples of offerings that can be provided.

Exhibit 165:
Examples of Work Placement Opportunities in Other Countries

	Examples	Description	Impact
Co-ops		• A typical cooperative education (co-op) program plan is for students to **alternate terms of full-time classroom study with terms of full-time employment** coupled with summer • Most co-op positions are paid and majority involve some form of academic credit	• **Extensive training** in their field of study • Usually leads to **full-time employment**
Apprenticeships		• A program that consists of a combination of both classroom and on the job training the where **employee, or apprentice, learns a highly skilled occupation**	• Similar to co-ops but more **focused skills** are acquired
Externships/ Job shadowing		• Shorter unpaid with no academic credit version of internships, usually only a few days or a **couple weeks and involves job shadowing** rather than hands-on experiences and usually through Alumni	• **Insights into a specific field** to help in career decision making process
On campus work and volunteering		• Paid work experience opportunities allow students to take up **open positions within the university** • It includes positions such as assistant teaching jobs, administrative roles, etc.	• Instills a **sense of responsibility** within students and helps building their **soft skills**

Bold Move Five - Encourage diverse strategic partnership with world class universities and private sector players

Improvements in the quality and quantity of tertiary level programs (teaching and curriculum), research and employability can be enabled through diverse partnerships with global universities. These partnerships can be classified into teaching, research, cross-cutting, and revenue-based collaborations.

There are a currently a few examples of partnerships with international universities that can serve as models moving forward (Exhibit 166).

Exhibit 166:
Examples of Current Partnerships with Indonesian Universities

Institution	Details	Core elements
University of Melbourne	• In 2019, **launched "Engaging with Indonesia 2020-24" strategy** to build closer partnerships in Indonesia and increase joint research with the aspiration of being one of the top destinations for best Indonesia students and pre-eminent source of Indonesia expertise • **Identified 3 key areas for research collaboration** (i.e., health, sustainability, public policy) • Currently **attracts 1/3 of all degree-seeking international students from Indonesia** with dedicated Assistant Deputy Vice Chancellor of Indonesia • Established **flagship programs in Indonesia** through collaboration with government, local institutions, and private sector partners (e.g., Indonesia Post-Doctoral program, Professional Education Center, One-Health Network research center) • Collaborates with local institutions to **offer joint degree programs** (e.g., Bachelor of Medical Science with Universitas Indonesia) • Expanding **University office in Indonesia** to support prospective students, travelling researchers, and alumni	• Comprehensive strategy • Dedicated leadership • Tri-sector partnerships
Monash University	• In 2020, announced approval from Indonesian Government to establish the **first foreign university campus in Indonesia** • Plans to establish a **postgraduate campus**, offering Master, PhD, executive programs, and micro-credentials • Currently offers **flexible pathway into Monash** through partnership with Jakarta International College, where students take Monash courses in their 1st year at JIC before transferring	• Branch campus • Flexible pathway to admissions
University of Arizona	• **Partners with Sampoerna University**, an Indonesian university offering accredited U.S. degrees • Offers **bachelor's degrees** in Business or Engineering from University of Arizona and Sampoerna University, **completed entirely in Jakarta**	• Partnering to offer U.S. accredited degrees

An attractive element could be to provide double degrees complementing a single degree offering.

In addition, there could be opportunity to build more diverse partnerships with industry to tailor course offerings to match industry demands. American Universities is a case example of this where to close the gap of skilled healthcare workers, employers and universities formed partnerships to create training programs across the United States (Exhibit 167).

Exhibit 167:
Examples of Partnerships Between Employers and Universities

Jan 2019

Dignity Health and Global University Systems create a jointed venture that provides online academic degrees as well as professional, executive, and leadership training to clinical and non-clinical health industry professionals

June 2019

Cleveland Clinic and Case Western open up the Health Education Campus bringing together school of medicine, nursing school, dental school, and PA programs to educate future medical, nursing, dental medicine and physician assistants together

2020

Kaiser Permanente launch their own medical school in 2020 to train future physicians and next generation leaders

April 2021

Nashville State Community College, TriStar Health, HCA Healthcare Foundation, and Metro Nashville Public Schools (MNPS) team up to create a three-week program aimed to attract entry level workers

May 2021

HCA commits $10M to HBCUs and Hispanic Serving Institutions (HSIs) in 2021 to help create a more diverse pipeline of healthcare professionals

May 2021

Ochsner commits $20M to partner with with Delgado Community College to expand Delgado's nursing and allied health program and train next generation nurses and allied health professionals

Bold Move Six - Stimulate more structured public/private partnership to collectively offer practical experiences and apprenticeship

Given the need for large scale skill transition and the continuous disruption in industries, it is important to embed practical experiences and apprenticeship more collectively, both in vocational education and in higher education curriculum. Kampus Merdeka paved the way to do this – going forward Indonesia should seek for more structured way to continue the implementation and even bring more structure and supporting infrastructure to strengthen this linkage. Meister Vocational Schools in South Korea could be considered as a reference for this type of structured arrangements, e.g., commitment to hire high quality graduates upfront, curriculum development is done jointly with surrounding industries.[159]

Case Study: Meister vocational schools, South Korea

In South Korea, through strong private-public collaborations, increased autonomy, employment of a competency-based approach and government facilitation, the Meister vocational school has experienced great results (Exhibit 168).

There has been an increase in graduate employment rates, in some cases such as in Busan Meister School – from ~55% to 80% upon first batch of graduation. In addition, commitments from public and private sector industry organizations to hire graduates from Meister schools have been secured.

Exhibit 168:
Key Differentiating Factors of Meister Vocational Schools in South Korea

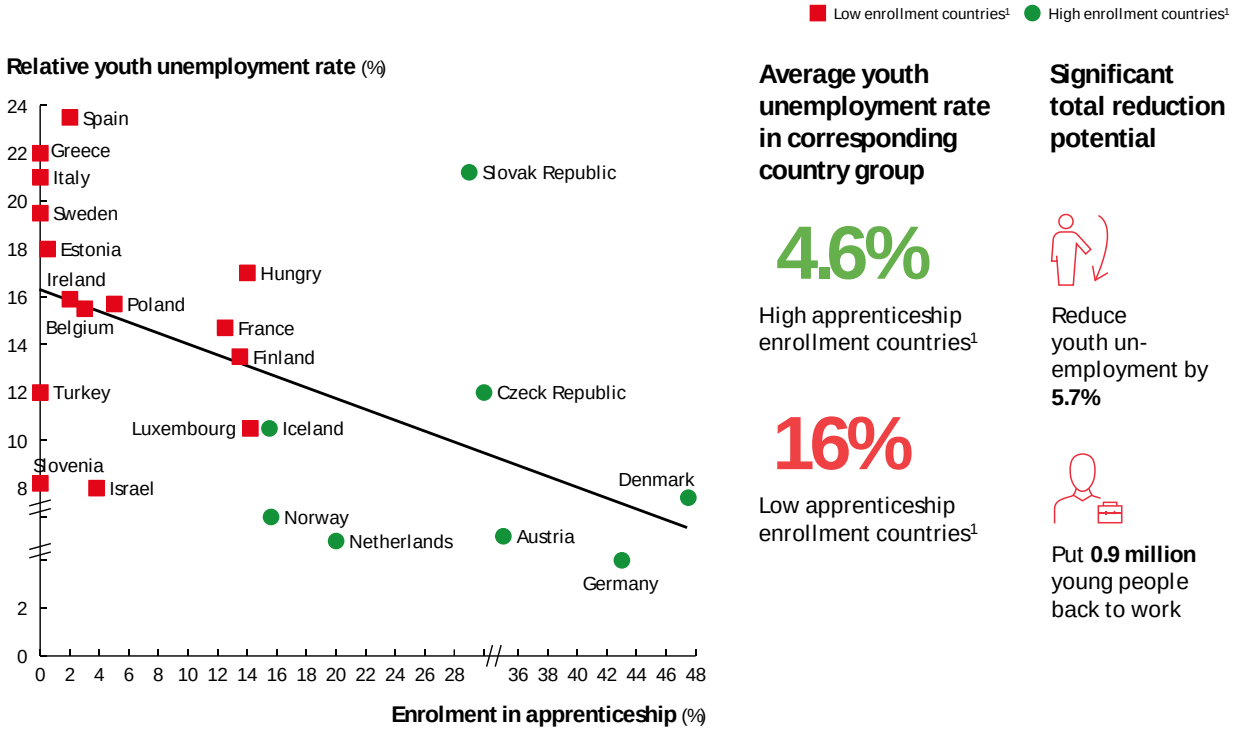
Objective	Key differentiating factors	
Launched in 2010 **to address skills shortage and mismatch** Focused on **highly specialized, high-value industrial and technical** skills To encourage youths to work in **high skilled manufacturing jobs** and other fields To encourage a **higher sense of status** for such positions through the German "Meister" branding	**Strong public-private collaboration:** • Industry provides equipment, facilities, scholarships, **apprenticeships** as well as jobs • Faculty members also receive industry training • Schools require an agreement between the local government, the local school board and companies.	**Autonomy:** • Meister schools are allowed to develop their own materials—a level of autonomy that other schools do not have • Schools work directly with local industry officials to develop a curriculum responsive to current needs • Materials are compiled to a national database so other schools can leverage them
Results		
Increased graduate employment rates, in some cases such as in Busan Meister School - from ~55%to ~80%upon first batch graduation Secured **commitments from public and private sector industry organizations** to hire graduates from Meister schools	**Competency based approach:** • Curricula and methods of teaching and learning incorporated a competency-based approach • Focused on basics (computer literacy, foreign language), industry exposure and specialization as well as "soft skills"	**Government facilitation:** • Government played a strong role in the success of Meister high schools • High visibility and encouragement for teachers and students from government leaders • Several ministries worked together to pursue joint policies (for e.g. education and labor ministry)

Studies have shown that countries with industry collaboration for vocational programs have lower youth unemployment rates. Apprenticeship has been shown to reduce the difference between youth and adult unemployment by almost six percentage points (Exhibit 169).[160]

[159] Press search, WEF reports.

[160] OECD, ILO, team analysis.

Exhibit 169:
Benchmark of Relationship between Apprenticeship and Youth Unemployment Rate



1. Enrollment in apprenticeship programs: High enrollment > 15%, low enrollment < 15%

In addition to the industry linkages for students, below are some additional ways to be considered to improve vocational programs:

- Begin student placement discussions with industry before the program begins, enabling schools to adjust curriculum based on industry needs
- Shorter vocational programs (2-3 months) can be effective if designed carefully
- Create a two-way relationship with industry in which vocational teachers get exposure by working in the industry, while industry practitioners act as visiting lecturers in schools
- Accelerate the Kampus Merdeka program to advocate and escalate apprenticeship in all universities

Another best-in-class vocational program is that from the German Chamber of Commerce and Industry (DIHK).

Case Study: German Chamber of Commerce and Industry

The German Chamber of Commerce and Industry (DIHK) offers dual vocational education and training abroad to help train skilled workers. In partnership with Delegations and Representations of German Industry and Commerce (AHKs) and IHKs, DIHK offers dual vocational education and training abroad to support companies in training skilled workers abroad based on the German model. Through the program, great success has been achieved:

- +45 AHKs with training services
- 2000+ companies through AHK
- 8,200 AHK-supported apprentices
- 10,000 AHK certifications per year

including building retraining/upskilling centres

As discussed in the context of this chapter, there is a need for large scale retraining given the mismatch between future skills needs and availability of skills today. Government will need private sector involvement to support upskilling/retraining, and at times, private sector could also benefit from this as this could be a more effective way to get the skills that they need. A Indonesia could take inspiration from global organizations. For instance, Walmart has invested $4bn in up-skilling initiatives over four years, building the "Walmart Academy" and the "dollar per day college" (Exhibit 170).

Bold Move Seven – Incentivize private sector to invest in retraining/upskilling programs,

Exhibit 170:
Examples of Upskilling Lighthouses in Other Countries

Walmart

Invested $4B in up-skilling initiatives over four years, building the **"Walmart Academy"** and the "**dollar per day college.**"

BOSCH

Runs **apprenticeship program** to recruit and train workers from nontraditional backgrounds to work in the automotive industry

BARCLAYS

Launched "**Barclays Bolder Apprenticeship**" to create jobs for older workers through retraining and build a multigenerational workforce

IBM

Focuses on hiring the **right mix of in-demand skills** rather than workers with a traditional degrees through the **"New Collar" certificate program**

JPMorganChase

Launched efforts to **cross-train employees** for new skills needed, and reallocate within the organization, **based on changes in demand** for services

Talent Exchange powered by eightfold.ai

Created a **platform that uses AI to match workers** in arenas hit hard by the pandemic, such as travel and leisure and on-site customer interaction, to roles in companies that are expanding

workday.

Developed an **AI system** that gathers data on skills and **matches workers to roles** or suggests new training opportunities

Uber

Launched **"Work Hub"**, a platform to **help employees find alternative work opportunities** while the demand for rideshare was low, whether internally, or at other companies (such as CareGuide, Domino's, and Shipt) that are hiring during the pandemic

Additionally, public private partnerships could be formed to build these upskilling/retraining centres across sectors and regions, to support nationwide reskilling objectives.

Bold Move Eight – Invest in developing a National Talent Roadmap with a link to a national talent matching platform

Accompanying Indonesia 2045 roadmap, there is a need to develop the national talent 2045 roadmap. This talent roadmap could provide deeper guideline on key skills needs, and also the strategy to build those skills (e.g., whether through higher education, certification, vocational education, industry apprenticeship). Input

from various existing digital talent matching platform could serve as a baseline, however, it will also need to incorporate future trends and disruptions (e.g., Generative AI, emphasis on ESG, transversal technology adoption).

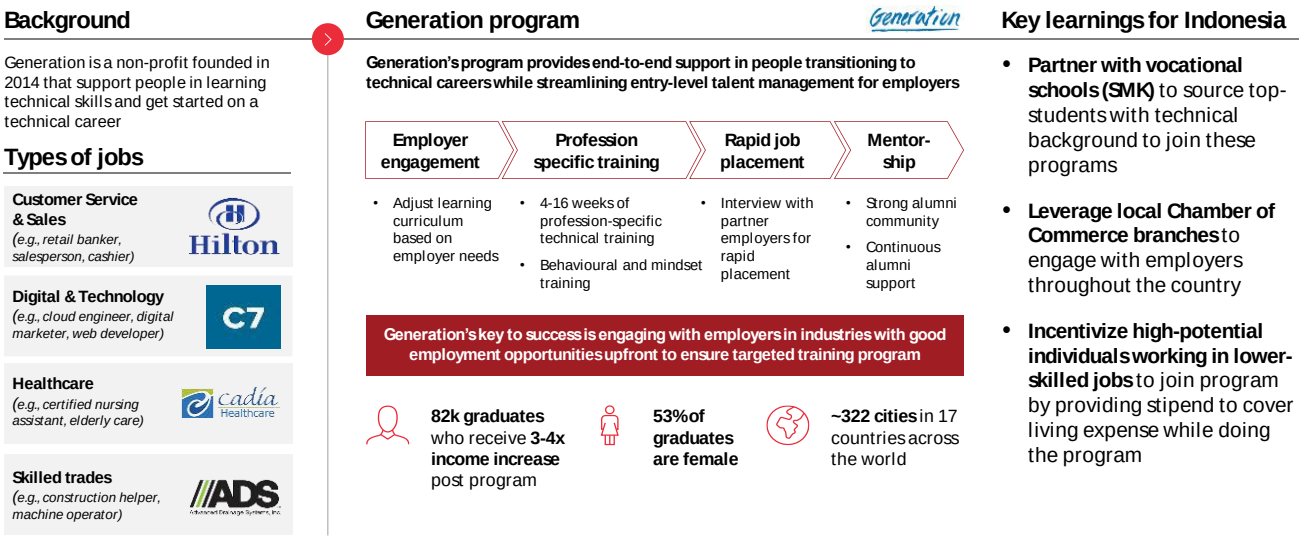
In addition, this national talent roadmap could be link to a national talent matching platform, to monitor the development and fulfilment of the roadmap. The national talent matching platform should have link to jobs in any entities beyond just corporations (e.g., NGO, government, special projects), to retraining/upskilling centres, and also to career support system (e.g., coach, advisors, or even personal support like child or elderly care). Models of similar portals can be found around the world.

The platform could also aim to provide B2B support, e.g., background checks of candidates, recruitment assistance, project management and talent management tools, payment tools and functionalities, payrolling services and talent capability building.

Below are inspiration from some global case examples:

- **Paris' online portal for job seekers and employers:** When job seekers upload their CVs into the portal, it matches them with job positions based on their skills and professional experience. Machine learning is harnessed to maximize job matching effectiveness, and their website increases the likelihood of finding a job by 20x compared to other job portals
- **Abu Dhabi's dynamic e-career portal:** Public, semi-government, and federal entities have a digital channel of reaching top talent. Over 838,000 professionals and over 1,700 employers are on the program
- **New York City's Workforce1 Career Centre:** New York budgets ~$2.5 million annually for the Workforce1 Career Centres, which provide job placement assistance. By registering with Workforce1, citizens can apply at the online career portal
- **Generation, an international non-profit:** Provides end-to-end support for people transitioning to technical careers while streamlining entry-level talent management for employers. Generation's key to success is engaging with employers in industries with good employment opportunities upfront to ensure targeted training program (Exhibit 171).

Exhibit 171:
Generation Program and Key Learnings for Indonesia



Key learnings for Indonesia from these case examples are to:

- Partner with vocational schools (SMK) to source top-students with technical background to join these programs

- Leverage local Chamber of Commerce branches to engage with employers throughout the country
- Incentivize high-potential individuals working in lower-skilled jobs to join program by providing stipend to cover living expense while doing the program

Roadmap

To recap, there are 8 key unlocks that will help improve the development of core skills and competencies. below. It also includes how MSMEs can contribute (Exhibit 172).

Exhibit 172:
Role of MSMEs in Building Future-ready Human Capital

		Bold moves	What MSMEs can do
Accessibility of education		1 **Improve targeting, timing and delivery (DBT) of conditional cash transfer programs to push enrollment**	Possibility to help with e.g., program management, data collection, cash distribution of transfer programs
Quality of education	Early childhood	2 **Appoint local champions and formalize the training to volunteers to provide better support to children and parents**	Collaborate with efforts to combine existing ECD initiatives Help in training the trainers for the volunteers and local champions
	Primary & secondary	3 **Building lighthouse school as center of excellence across the nation, to also serve as leadership training center for principals**	Participate in the build of the lighthouse schools, e.g., construction
Relevancy of workforce	University, technical and vocational training	4 **Build distinctive, innovative offerings for top 2-3 priority skills needed**	Participate in surveys / focus groups, if asked, to help identify core skillsets
		5 **Encourage diverse strategic partnership with world class universities and private sector players**	NA
		6 **Stimulate more structured public/ private partnership to collectively offer practical experiences and apprenticeship**	Participate in the program, offering meaningful practical experience opportunities, e.g., internships, externships, job shadowing, campus placements
	Reskilling & upskilling	7 **Incentivize private sector to invest in retraining/ upskilling programs, including building retraining/ upskilling centers**	Build partnerships with larger organizations to provide upskilling to employees
	Industry placements	8 **Invest in developing National Talent Roadmap with input from private sectors; linking the roadmap into a national talent matching platform**	Participate through using the platform to post openings in the required format

In addition, it can be implemented through sub initiatives until 2045 (Exhibit 173).

Exhibit 173:
Roadmap for Building Future-ready Human Capital

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders[1]
1 **Improve targeting, timing and delivery (DBT) of cash transfer programs to push enrollment**	**Leverage schools in underprivileged areas as registration points** for better targeting of cash transfer **Build analytics/ AI/ Gen AI to improve targeting**; digitize cash transfer, collaborate with the effort to support vulnerable population	**Monitor program effectiveness and intervene as needed**			• Kemensos • Kemendikbud • Kemenkeu
2 **Appoint Local Champions and Formalize Integrated Training for Early Childhood Development**	**Integrate existing ECD initiatives through a common orchestration mechanism**, e.g. joint Steerco between NGO, Ministries **Collaborate with NGOs and private sectors to define local champions** (or local sponsors), start with areas with bigger challenges	**Monitor programs' effectiveness and intervene as needed**			• KemenPP&PA • Kemenkes • Kemendikbud
3 **Building lighthouse school as center of excellence across the nation**, to also serve as leadership training center for principals	**Identify potential strategic partners for at least top 50 areas with biggest needs** **Build/ leverage high quality schools to serve as center of excellence** (e.g., secondment, on the job training) **targeting 200-300 principals** for the first batch; refine program design to include both hard skills and soft skills (e.g., coaching, problem solving **Refine KPIs and monitoring mechanisms to observe school outcomes;** leverage technology and digital when possible; pilot principal awards	**Refine archetype of strategic partners and target next 200-300 areas with hub and spoke approach**; leverage digital to ensure efficiency of approach and high performing principals to be part of the delivery team **Formalize national awards for Principals based on student experience and outcome**		**Scale up to cover all areas in Indonesia**	• Kemendikbud • Kemenag

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders[1]
4 **Build distinctive, innovative offerings for top 2-3 priority skill needs**	**Deeper identification of core skillsets for each type of job category per sector**	**Yearly evaluation to ensure suitability of prioritized skillsets**			• Kemendikbud • Kemenaker • Bappenas
	Refine curriculum with inputs from employers and continue to innovate Kampus Merdeka, e.g., experiential learning, problem solving, and decision making	**Continue to test and learn key design choices and intervene as needed**			
	Setup world-class program for the top 2-3 priority skill needs; define strategic collaborators to ensure quality and distinctiveness of offering	**Track progress and intervene as needed to ensure at least 2 Indonesian schools to be globally established** (e.g., become top 100 in QS rankings)			
	Define success metrics and setup a joint effort with employers to monitor outcome and define next horizon of actions				
5 **Encourage diverse strategic partnership with world class universities and private sector players**	**Build lighthouse(s) for teaching, research, cross-cutting and revenue-based partnerships with global universities** (incl., dual degrees)	**Scale the partnerships, monitor effectiveness and relevancy and intervene whenever needed**			• Kemendikbud
6 **Stimulate more structured public/ private partnership to collectively offer practical experiences and apprenticeship**	**Redesign vocational programs**, focusing on cultivation of highly specialized, high-value industrial and technical skills (incl. dual vocational degrees, foreign exchange programs, experiential learning, competency-based approach, soft and hard skills training,				• Kemenaker • Kemendikbud
	Partner with industry to provide equipment, facilities, scholarships, apprenticeships as well as jobs for students and industry training for faculty				
7 **Incentivize private sector to invest in retraining/ upskilling programs**, including building retraining/ upskilling centers	**Define framework and mechanisms to stimulate investments** in retraining/ upskilling by employers	**Monitor effectiveness of program and refine incentive/ stimulation framework/ mechanisms accordingly**			• Kemenaker • Kemenkeu • Kemenperin • KemenkopUKM
	Target to build at least 5 large scale lighthouse retraining and upskilling centers through public-private partnerships, start with most disrupted sectors (e.g., telco, retail, banking); should also include upskilling for entrepreneurship	**Target broader adoption of retraining/ upskilling programs;** leveraging the lighthouses as inspiration and leverage technology to setup more satellites			
		Leverage learning from retraining/ upskilling to refine/ redefine vocational education and higher education priorities and approaches			
8 **Invest in developing National Talent Roadmap with input from private sectors; link the roadmap into a national talent matching platform**	**Define National Talent Roadmap as part of 2045 Masterplan**, with input from employers and broader stakeholders	**Joint leadership to monitor progress towards National Talent Roadmp 2045;** ensure quality delivery and debottleneck stakeholders align ment when needed			• Bappenas • Coordinating Ministries • Kemenaker
	Build a national talent portal, leveraging existing portals; leverage the portal to monitor progress and open more opportunities	**Link talent portal to broader ecosystem,** e.g., Retraining/ upskilling centers, entrepreneurs community, access to advisory support			

Key metrics

Progress of these efforts can be tracked through three key metrics (Exhibit 174).

Exhibit 174:
Key Metrics of Talent Capabilities

	FROM	TO					Benchmarks									
Key metrics		2025	2030	2035	2040	2045										
Score in PISA ranking, 2018	71	Top 70	Top 60	Top 50	Top 30	Top 20	1	19	N/A	6	7	48	56	2	60	25
Score in skillset of graduates, 2019	59	>60	>63	>65	>67	>70	59	68	46	58	59	68	51	73	50	71
Score as per World Bank's human capital index, 2020	0.54	>0.55	>0.58	>0.6	>0.65	>0.7	0.65	0.75	0.49	0.80	0.80	0.61	0.61	0.88	0.61	0.7

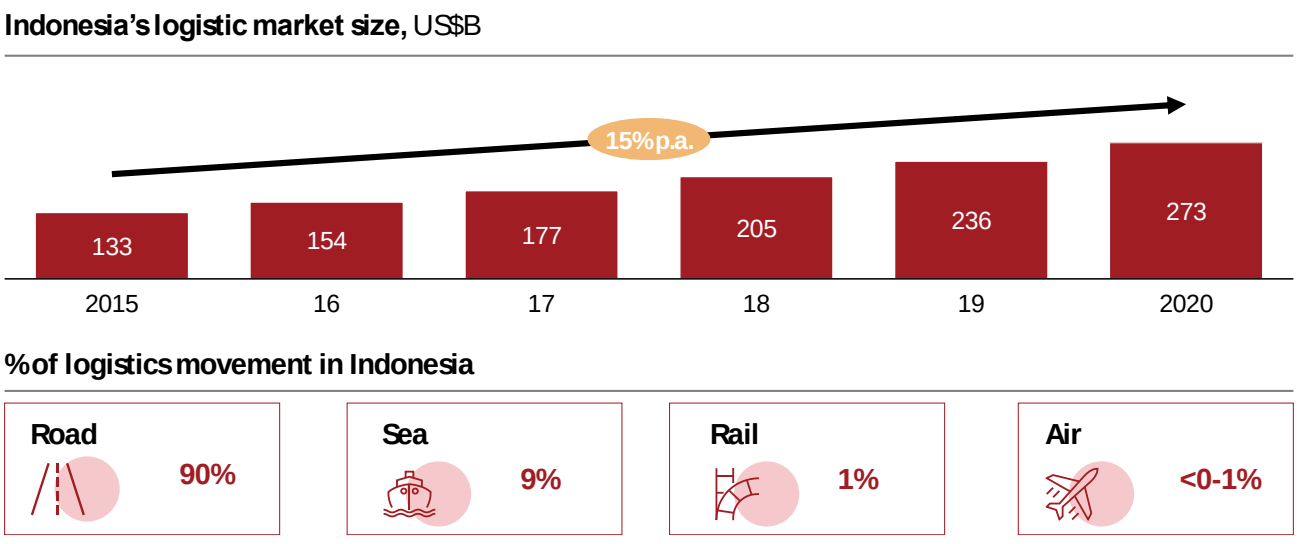
Integrated, accessible, and affordable infrastructure

1. Improve logistics infrastructure

Context and challenges

In recent years, Indonesia's logistics sector has experienced significant growth, fuelled by improvement in logistics infrastructure and a fast-growing demand in the industry due to the surge of e-commerce. Historically, the logistics sector in Indonesia has grown at 15% per annum, with up to 90% of this growth driven by road movements (Exhibit 175). While sea, rail, and air contribute to less than 10% of logistics movements in Indonesia.[185]

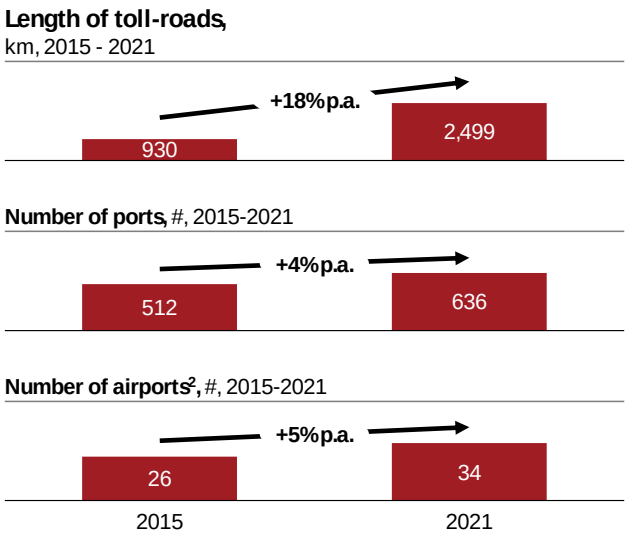
Exhibit 175:
Indonesia's Logistic Market Size



This significant growth was pushed by the increase in the annual state budget for infrastructure, with a total of six percent increase from 2015 to 2021 from IDR 290 trillion to IDR 418 trillion. The considerable rise in Indonesia's annual state budget for infrastructure, despite the 2019 COVID-19 pandemic, indicates the nation's focus on infrastructure development and demonstrable improvements in infrastructure have been made, including the expansion of toll roads, ports and aviation capacity (Exhibit 176).

[185] Frost & Sullivan, ACV report.

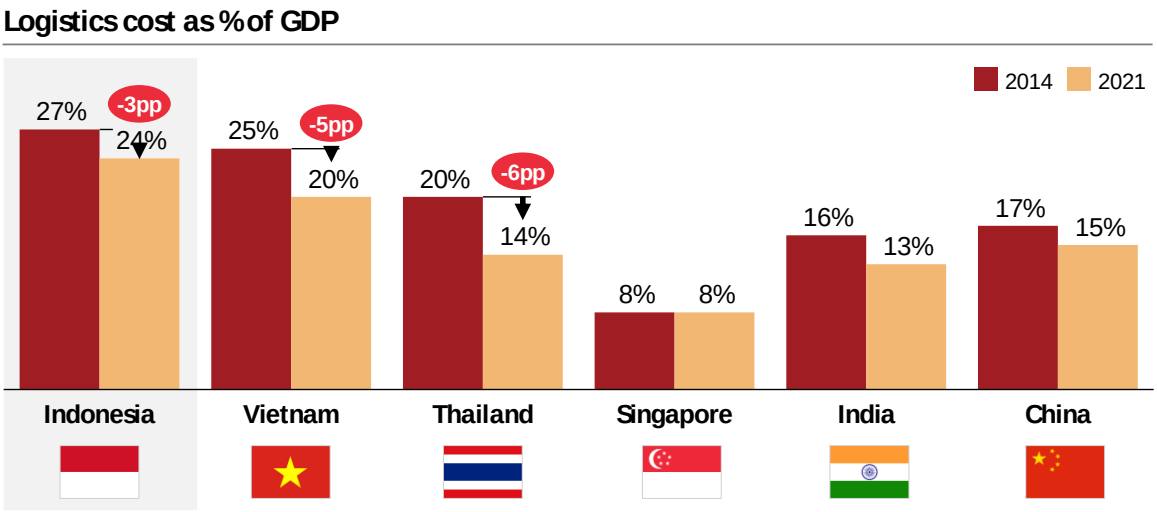
Exhibit 176:
Infrastructure Improvements in Indonesia



1. Latest available data
2. Airports managed by AP1 and AP2

However, Indonesia's Logistic Performance Index (LPI) ranking still lags compared to its ASEAN neighbors. Indonesia's overall LPI performance improved from 2014 to 2018, but has since underperformed, and thus falling behind peers. The suboptimal performance was mainly driven by deficiencies in tracking and tracing, international shipments, and logistics competence and quality[186]

Exhibit 177:
Benchmark of Logistic Cost as % of GDP



On top of that, Indonesia's logistics costs are considerably high. At 24% of GDP, it exceeds other emerging markets. The cost of logistics in Indonesia has improved by three percentage points in the past seven years (Exhibit 177). However, this still lags other ASEAN peers, such as Vietnam and Thailand which reduced costs by five and six percentage points respectively during the same period.[187]

A major obstacle to reducing costs and improving logistics performance is that Indonesia faces high congestion levels at an average of 23 minutes for 10km, due to vehicle growth outpacing road growth.[188]

To improve the quality of Indonesia's logistics, Indonesia needs to overcome challenges in not only land, but also

[186] World Bank – Logistic Performance Index.
[187] Statista, MoF, press search.
[188] TomTom Traffic Index 2022, BPS, press search.

sea and air infrastructure that are retarding significant economic potential in the country. Indonesia faces a multifaceted challenge across the three modes of logistics (Exhibit 178)

Exhibit 178:
Challenges Across Land, Sea, Air Logistics Infrastructure

A: Low connectivity and quality infrastructure has hindered multi-modal logistics planning

- A1 **Limited inter-land connectivity** – 1.2km road and 31km rail / 1000m2 arable land
- A2 **Low-quality infrastructure** – Indonesia ranks 68th out of 137 in overall infrastructure quality

B: High dwelling time, long time spent at ports, and suboptimal choice of route due to poor port infrastructure

- B1 **Low port performance at Indonesia ports vs peers –** CPP index <41 vs 74 for TH
- B2 **Inadequate quality and poorly located warehouses** - >50% warehouses located in flood prone area with poor land connectivity

C: Poor infrastructure and process planning leading to low cargo throughput and transshipment volume

- C1 **Lack of automated and efficient cargo handling capabilities leading to high dwelling time** 2.6 days vs 1.6 in SG
- C2 **Low international transshipment volume handled by CGK** <2% of total int'l shipment volume in ID vs >10% in BKK

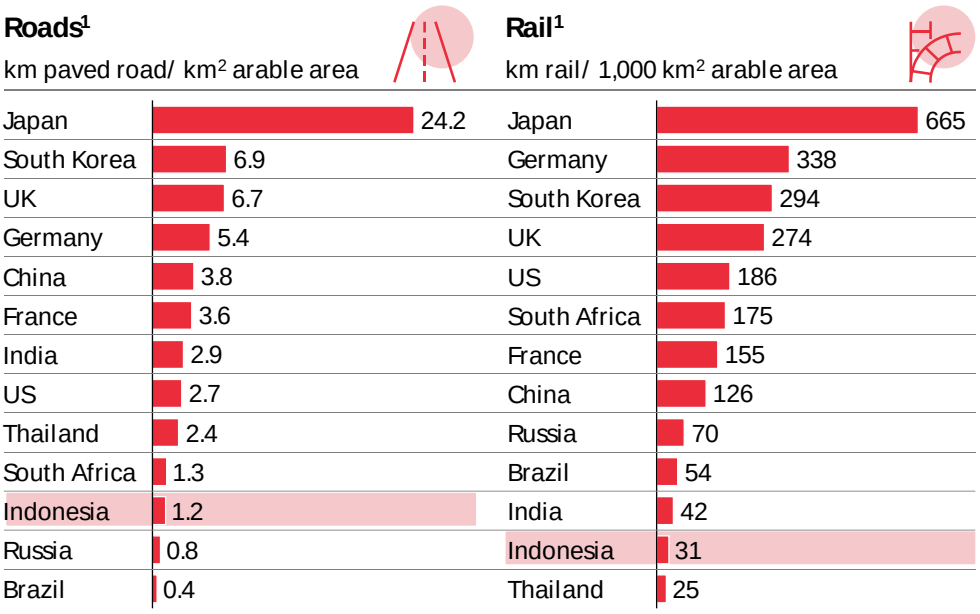
D: Low backhaul containerization
(~50% vs ~20% in US) due to trade flow imbalance with economic activities largely concentrated in Java

A1. Limited inter-land connectivity

Today, Indonesia's road and rail infrastructure coverage lags regional peers, which has led to widespread traffic congestion, especially in cities. Road length increased by less than one percent per year in Indonesia while the total of commercial vehicles, such as trucks and buses, has increased by four percent per year between 2017 and 2022.[189]

Beyond the unbalanced vehicle growth and road growth, the road and rail coverage in Indonesia is still considerably low (Exhibit 179).

Exhibit 179:
Benchmark of Roads and Rail Infrastructure



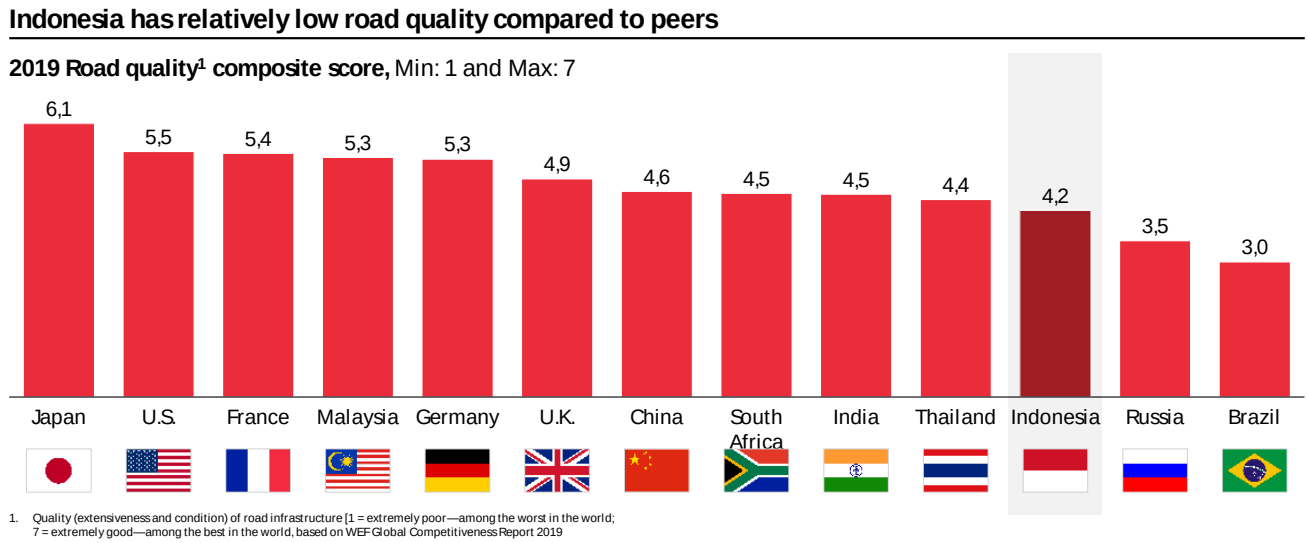
1. Based on latest available data from the CIA Fact Book (ranging from 2011-2022) and National statistics (2021)
2. Trucks and buses

[189] World Bank, CIA, ASEAN stats, national statistics.

A2. Low infrastructure quality in Indonesia

Beyond the coverage, Indonesia also has a relatively low Road Quality composite score compared to global peers.[190] (Exhibit 180)

Exhibit 180:
Benchmark of Road Quality Score



B1. Container port performance

Despite being ranked among the world's largest ports, dwelling time in Indonesian ports remain high compared to the global median time, resulting in a low Container Port Performance Index (CPPI) ranking.[191]

The median time in port for container ships in the top 20 countries in terms of the number of ship arrivals globally was 20.1 hours. The highest performing country, Norway, had ships in port for an average of only 8.3 hours, while the lowest ranked country was Canada with an average turnaround time in port of 47.5 hours. Indonesia clocks an average of 24.9 hours, slightly higher than the global median.

B2. Shortage of up-to-standard warehouses

Another key challenge in Indonesia's logistics sector, is the lack of quality storage space. Many warehouses available at major Indonesian ports are below standard, which leads to players' tendency to leave cargo at ports. Common issues include:

- Lack of security
- Poor connectivity with port and industrial areas
- Lack of facilities
- Old supporting infrastructure, e.g., buildings and equipment
- Location in flood-prone areas

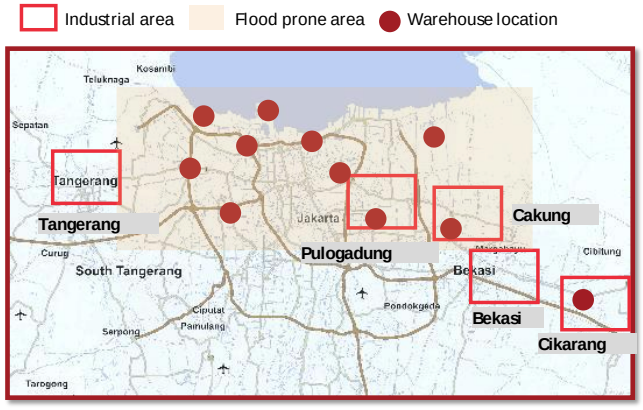
Even in Jakarta, most warehouses are in flood prone areas often located far from final cargo destinations resulting in choke points.[192] (Exhibit 181)

[190] Quality (extensiveness and condition) of road infrastructure is ranked as 1 = extremely poor—among the worst in the world; 7 = extremely good—among the best in the world, in the World Economic Forum Global Competitiveness Report 2019.

[191] World bank report, UNCTAD review of maritime transport 2022.

[192] Press search, expert interviews.

Exhibit 181:
Example of Warehouse Locations in Jakarta



C1. Underperforming cargo terminals at Indonesian airports

Indonesia is also facing a challenge in air logistics. The cargo terminals at Indonesian airports often underperform due to poor infrastructure and cargo handling capabilities resulting in long aviation median import dwell times compared to other Asian countries. The median aviation import dwell time in Indonesia in 2021 was 2.6 days compared to 1.6 days in Singapore and 1.1 days in Malaysia.[193] Example of key issues seen in Soekarno-Hatta airport are spread across 2 areas:

1. Terminal operator, which includes:

Infrastructure & process planning:

— Poor layout with insufficient staging, queuing, processing area

— Poor goods flow handling, e.g., unclear segregation between domestic & international

— Lack of dedicated processing lane for perishables

— Lack of digitization & highly manual clearance process (*relating to reg. agent*), especially for e-commerce

Capability:

— Limited special handling capability for large cargo

— Lack of reliable cold chain solutions that meet good distribution pharma standards

2. Ground handling which includes:

Infrastructure & process planning:

— Old infrastructure & limited automation involved in the process (e.g., logistic management system)

— Poor handling of goods especially for special goods

— Substandard goods flow management due to poor layout of parking area & capability of personnel

This results in negative airport performance, such as high terminal handling time, with more than 50% higher handling time compared to expected minimum time, only 1 terminal meets good distribution practice for pharma, and 2 airlines were sanctioned for poor ground handling in 2016.

C2. Underperforming transhipment volume at CGK

Indonesia's underperforming airports have significantly held back its shipment volume potential, especially for international transhipments. For example, In CGK Airport, transhipment volume is 6 thousand tons (<2% of Indonesia's international volume). Meanwhile KUL handles 86 thousand tons of volume, accounting for 14% of the country's international volume.

Increasing airport performance through investment in airport infrastructure and process planning, and development of special cargo handling capabilities could unlock significant international shipment volume in Indonesia's airports.[194] (In order to overcome Indonesia's logistics challenges and unlock its economic potential, Indonesia should aim to transform its logistics performance (Exhibit 182).

[193] Expert interviews, press sources, academic transportation journals, LPI 2023 report.

[194] Expert interview, ACI.

Exhibit 182:
Aspirations for the Logistics Sector

FROM	TO
Low connectivity and quality infrastructure due to low coverage of road and rail coverage	**High coverage and quality of road and land transport infrastructure** across Indonesia
High dwelling time spent at ports and suboptimal choice of routes due to low quality port infrastructure	**World class seaport infrastructure established in key trade lanes** with highly automated and efficient operations
Low air cargo throughput and transshipment volume due to poor infrastructure and capabilities of airports	**Multiple world class cargo villages built as regional transshipment hub** with capability to handle large and special cargo
3.0	**>4.0**
in Logistics Performance Index[1]	**in Logistics Performance Index**[1]

1. 1 = Low, 5 = High

Bold moves

To improve the logistics infrastructure and achieve the aspiration within the logistics sector, Indonesia could focus on 5 bold moves that has been mapped across different modes of transport, e.g., land, sea, air (Exhibit 183)

Exhibit 183:
Bold Moves for the Logistics Sector

	Land	Sea	Air
1 **Strengthen multimodal infrastructure planning** through investing in roll-on/roll-off model, debottlenecking transshipment points, increase the quantity and quality of interland infrastructure to enable seamless and efficient cargo movement	✓	✓	
2 **Establish a digital cargo database platform** to foster data transparency across all commodities to optimize shipment route and mode, support tracking and coordination between logistics players and customs	✓	✓	✓
3 **Establish Port 4.0** to improve efficiency, safety, sustainability, and service quality		✓	
4 **Build an extensive cargo village and develop advanced cargo handling capabilities to be an international-domestic superhub** increasing cargo traction for the country			✓
5 **Spur local economies at destination ports through One Village One Product movement** to mitigate low backhaul container challenges	✓	✓	

Bold Move One – Strengthen multimodal infrastructure planning

To fully capitalize Indonesia's potential, it is imperative to prioritize and strengthen multimodal infrastructure planning. By investing in the roll on roll off (Ro-Ro) model, debottlenecking transhipment points, and enhancing the quality and quantity of interland infrastructure, Indonesia can pave the way for seamless and efficient cargo movement. This approach holds paramount importance as it not only bolsters the country's logistics sector, but also catalyzes economic growth, improves connectivity, and fosters regional integration. With strategic emphasis on multimodal infrastructure, Indonesia can unlock new opportunities, attract investments, and position itself as a key player in the global supply chain network.

Bold Move Two – Establish a digital cargo database platform

In Indonesia, an archipelagic nation with a rapidly growing economy, the establishment of a digital cargo database platform takes on immense significance. Fostering data transparency across all commodities through digital cargo database platform can play a pivotal role in optimizing shipment processes, enhancing logistics efficiency, and driving economic progress. With a vast and diverse range of goods flowing through Indonesia's ports and transport networks, Indonesia stands to benefit greatly from a centralized digital platform that provides real-time visibility and traceability of cargo.

Case study: National Single Window System, Singapore

Global leaders around the world have a digital cargo database as a key enabler in enhancing and boosting their logistics sector. One example is Singapore, with the launch of National Single Window System (NSW), a comprehensive trade and shipping facilitation platform that streamlines trade processes, enhances coordination among stakeholder, and improves supply chain connectivity. It serves as a centralized digital platform and data centre for trade and shipment in Singapore.

The establishment of NSW has successfully boosted Singapore logistics sector, including reduction in cargo clearance wait time by 50%, reduction in transaction cost per shipment by 15%, improvement in supply chain predictability by 25%, and enhancement in stakeholders collaboration.

Establishing a digital cargo database at the commodity level is key in unlocking Indonesia's true potential. This heightened transparency through cargo database would not only facilitate effective decision-making, but also promotes collaboration, reduce operational costs and delay, and enhance route optimization, unleashing Indonesia's trade competitiveness.

Bold Move Three – Establish Port 4.0

With rapidly evolving technologies and increasing demands, traditional port operations need to be transformed to improve efficiency, safety, sustainability, and service quality. Additionally, Indonesia's rich maritime heritage and pivotal position in global trade makes the establishment of Port 4.0 to hold immense importance.

The establishment of Port 4.0 would enable Indonesia to unlock various potential through different features, such as predictive maintenance for key assets, automated yar planning, real-time berth planning, demand planning at gate.

These features would be widely powered by artificial intelligence and advanced analytics-driven optimization and dynamic scheduling to increase efficiency and safety, unlocking the full economic potential of Indonesia's port infrastructure. (Exhibit 184)

Exhibit 184:
Potential Features of Port 4.0

	Predictive maintenance for key assets	Automated yard planning	Real-time berth planning	Demand planning at gate
Port features				
Unlocked potential	Predictive & remote crane and vehicle maintenance **can lead to a 30-50% reduction of total machine downtime**, increasing availability of critical port assets such as STS and RTG cranes	Advanced analytics and modelling allows for **swapping assets, rerouting containers dynamically, and adjust routing and speed in real-time**	Berthing slots and labor can be better used **by forecasting ship ETAs** more accurately, resulting in **up to 8 %pts of EBITDA** potential for terminals	**More accurate consumer behavior (and production behavior) predictions** can help terminals better estimate demand for gate arrivals
Technology adoptions	**IOT:** allows devices to connect and communicate with each other to collect and transmit data	**Automation:** allows for autonomous operation of equipment and processes	**Renewable energy:** to reduce dependence on fossil fuels and decrease their carbon footprint	**Drones:** to monitor and control port operations and security **AR/ VR:** to improve the training and safety of port workers
	Blockchain: to improve the security and transparency of commercial transactions	**Cloud computing:** to store and process big data for better cargo loading and unloading management and planning	**AI:** to improve the efficiency of port processes and decision-making	**Robotics:** to perform tasks that require precision and strength, such as container handling

Indonesia could start investing in the development of Port 4.0 by:

- Initiating the adoption of IOT applications to collect and transmit necessary data.
- Enhancing automation in ports, e.g., automated equipment, equipment-control systems, terminal control towers.
- Adopting drones and AR/VR technology to increase safety for workers.
- Sourcing renewable power options for port operations.

Case Study: Port of Rotterdam, Netherlands

An example of a successful establishment of Port 4.0 is at Port of Rotterdam in Netherland. The Port of Rotterdam is the largest port in Europe, handling more than 461 million tons of cargo and 140 thousand vessels every year.

Since 2018, the Port of Rotterdam has launched several digital initiatives, with the ambition to have fully autonomous navigation within the port. There are 4 key features:

- Internet of Things (e.g., sensors, data analysis, and artificial intelligence) to recognize anomalies and convert them into useful information for the next step in the process
- Smart bollard to measure force on the mooring lines to monitor the load in real time and use the data to determine availability of quays for the assignment of berthing vessel
- Digital twin to create a digital representation of the port, including all infrastructure, ship movements, weather conditions and hydro information as the important step toward autonomous navigation
- Satellites to survey the entire port every 11 to 22 days ensuring the displacements of quay walls can be seen faster and more accurately

The enhancements have already garnered tangible improvements, including being the first in the world to have successfully developed an unmanned automated terminal and crane quay. The port has achieved lower costs for shipping companies by a whopping $80,000 by reducing berthing time up to one hour which in turn results in a 20% decrease in port waiting time.[195]

Adopting and establishing Port 4.0 can unlock a myriad of benefits for Indonesia, including optimized cargo handling, reduction in operation cost, enhanced safety measure. This approach would not only position Indonesia as a leader in port innovation, but also attract investment, foster economic growth, and facilitate seamless trade connections.

Bold Move Four - Build an Extensive Cargo Village

In order to expand the quality and capacity of air cargo in the country and propel Indonesia's logistics sector to new height, Indonesia should develop cargo villages in major cities such as Jakarta and Medan. These cargo villages would utilize increased digitization and automation across processes and operations, which will attract more traffic and cargo partners.

[195] UNESCAP, press search.

Case Study: Beijing's Airport City Logistic Park, China

The Airport City Logistic Park was developed by Airport City Development Co., Ltd. (ACL), with an extensive logistic infrastructure. Key logistic infrastructure includes:

- Custom Supervision Area for storage & distribution service of imported freight – where assembly, loading, cargo collection, security inspection activities are done
- International Express Center is a comprehensive express sorting center; filled with domestic & international express companies, custom, inspection, quarantine, and banks for one-stop declaration services
- Bonded Functional Zone is China's first airport-based bonded functional area providing import & export trade to manufacturing enterprises which require the time-sensitive, high-security, high-value-added logistics services
- Non-Bonded Functional Zone is dedicated for customers with non-bonded logistics and warehousing facilities, providing a more convenient platform of the circulation for goods

Since the first functional zone development, Beijing Airport has seen a significant improvement in cargo volume from 1.2 million tons in 2007 to two million tons in 2019. Beijing Airport houses more than 200 clients from the cargo ecosystem. The heart of Beijing Airport Core Economic Zone has made a significant contribution to China's e-commerce logistics and supply chain and was named as "Excellent service provider of China's e-commerce logistics and supply chain" in 2019 and "China's Top 100 Valuable Logistics Brands" in 2020.[196]

Indonesia could learn from China and expand the quality and capacity of air cargo in the country. Indonesia could start from:

- Investing in and developing cargo villages starting from major cities e.g., Jakarta, Medan
- Constructing well-designed functional and custom supervision area to allow efficient flow of goods

Indonesia could also further develop a cargo village into aa International-domestic logistics super hub by:

- Attracting national logistics players to set up sorting hub at site e.g., JNE, J&T, Lion Parcel
- Enhance capabilities in handling special cargo e.g., large cargo, pharmaceuticals
- Increasing digitization and automation across processes and operations

Bold Move Five - Spur Local Economies through the One Village One Product (OVOP) Movement

Addressing the challenge of low backhaul container utilization presents an opportunity to spur local economies destination ports through the "One Village One Product" (OVOP) movement. By focusing on the development and promotion of unique local products in each village, Indonesia can create a sustainable and diversified economy while mitigating the backhaul container challenge (refer to 'Building world-class ecotourism & infrastructure, and unleash global creative players in selected sub-sectors': Bold Move Three – Foster a One Village One Product movement in Indonesia)

However, Indonesia faces many challenges in adopting OVOP, such as high overlap in product selection across villages, lack of digitization for its marketing, lack of business skills, etc.

[196] Company websites, press sources, Aerotropolis.

To ensure the success of its OVOP movement, Indonesia should enhance training and technical support to help locals to build necessary business skills such as marketing. The government should ensure the timeliness of program funding and educate local leaders to motivate residents to be independent and advance their local potential. With its geological and cultural diversity, Indonesia is well-positioned to unlock its economic potential through the OVOP movement, boosting exports and increasing trade flow both domestically and internationally thus mitigating low backhaul in an expanded nationwide logistic infrastructure.

Roadmap

To accelerate the implementation of these bold moves, MSME can play a role through collaborations. (Exhibit 183)

Exhibit 185:
Role of MSMEs in Logistic Sectors

Bold moves	What MSMEs can do
1. Strengthen multimodal infrastructure planning	• **Actively participate in leveraging multimodal platform** in doing logistics
2. Establish a digital cargo database platform	• **Proactively contribute to the collection and analysis of data** by sharing their own logistics and transportation experiences (e.g., number of cargo per day)
3. Establish Port 4.0	• **Employ containerization practice as much as possible** to increase productivity at ports • **Comply to all safety procedures in packaging, registering, and delivering goods to port**
4. Build an extensive cargo village	• **Collaborate and actively opt for domestic airport as transshipment port** e.g., CGK
5. Spur local economies at destination ports through One Village One Product (OVOP) movement	• **Participate in capability building program available** to enhance local product quality to enable OVOP movement (e.g., to enhance quality of Batik Yogyakarta to open channel for export)

These bold moves will be executed across different phases in the next 22 years. Initiatives within each bold move include: (Exhibit 186)

Exhibit 186:
Roadmap for Logistics Sector

	2023-2030	2031-2035	2036-2040	2041-2045	Relevant stakeholders
1. Strengthen multimodal infrastructure planning **2. Establish a digital cargo database platform**	**Conduct assessment of existing transhipment points and interland infrastructure to understand gaps and priority for debottlenecking** **Secure funding and partnerships to improve road and railways access and infrastructure, and enhance connectivity and interoperability between modes of transport** **Establish a digital multimodal platform** to support tracking and coordination between logistics players, and customs	**Continuous identification and improvement of bottlenecks and areas of improvement** **Adopt smart tech to enhance operation efficiency (e.g., smart sensors** to enhance logistics tracking)	**Expand improvement of road and rail infrastructure** to the rest of uncharted area with high economic potential **Scale up adoption of smart tech and sensors** to augment tracking coverage and enable smart mobility		• Ministry of Transportation • Logistics and transportation operators, companies, and associations
3. Establish Port 4.0	**Establish a comprehensive master plan to understand needs and gaps** **Upgrade port infrastructure and Invest in smart, semi-automation technologies** e.g., remote operations to streamline operations and increase productivity, to improve efficiency Foster **collaboration and partnership between private and public sectors** **Invest in highly experienced digital talent for seaport operations and provide capability building program** to foster and enhance skills	**Engage with international partners** to explore opportunity and improve efficiency **Expand adoption of smart, automation technologies, including AI, to enable full automation for all transfer**, yard, and quay cranes operations at major ports **Strengthen port security and safety measures** through advanced technologies		**Scale-up automated operating models** to ports across the country **Establish integration and interconnectivity** across all ports in Indonesia and international	• Ministry of Transportation • Port authorities • Private and public shipping and logistics companies • Ministry of Education, Culture, Research, and Technology

	2023-2030	2031-2035	2036-2040	2041-2045	Relevant stakeholders
4. Build an extensive cargo village and develop advanced cargo handling capabilities to be an international-domestic superhub	**Develop cargo village strategic planning and design** to identify demand, infrastructure requirement, potential partnership **Forge partnerships with private and public companies** to enhance collaboration and ensure best-in-class operating procedures **Construct first phase of essential infrastructure development** close to Jakarta city **with special cargo handling capabilities** **Invest in talents and equip facilities with advanced digital tech and automation system** e.g., RFID system, real-time runway sensors	**Continuous improvement and innovation of cargo village** through handling capacity, operation, service, infrastructure, talent, and tech upgrade **Expand partnership and collaboration to international networks** **Invest further in future technologies and establish digital integration and data management** (e.g., multimodal platform) **and strive for operational excellence** in cargo handling capabilities		**Build and expand cargo village to different regions** as domestic hub	• Ministry of Transportation • Airport authorities and operators • Private and public shipping and logistics companies • Logistics and transportation Industry associations
5. Spur local economies at destination ports through One Village One Product (OVOP) movement	**Relaunch OVOP initiatives and communicate effectively to village leaders** across rural regions in the country **Identify and map local villages and establish matchmaking platform between stakeholders** **Launch a capability building program to local communities to** enhance their skills in product development, marketing, entrepreneurship **Facilitate the development of unique product or services in each village**	**Establish collaboration between OVOP, private, and public sectors** to secure supply chains and market access, and **develop a comprehensive marketing strategy** **Improve local infrastructure and logistics support** for product distribution **Leverage digital technologies and e-platform** to boost market access **Continuous improvement and support in OVOP product expansion and** explore **potential international expansion** (e.g., export)			• Ministry of Transportation • Ministry of Cooperation and SME • Ministry of Tourism and Creative Economy • Local governments • Local village workers • E-commerce • Private and public shipping and logistics companies

Key metrics

The criteria of the aspirations provide the key milestones of success. (Exhibit 187)

Exhibit 187:
Logistics Sector Key Metrics

	Key metrics	Source	Current	2030	2035	2040	2045	Notes
Land	**Paved road coverage,** *km paved road/km² arable area*	National statistics *(2021)*	1.2	2.6	4	5.5	6.9	2045 targets based on South Korea today
	Rail coverage, *km rail/1000 km² arable area*	National statistics *(2021)*	31	96	162	227	294	2045 targets based on South Korea today
	Road quality score, #	WEF*(2020)*	4.2	4.6	5.1	5.6	6.1	2045 targets based on Japan today
Maritime	**Container Port Performance Index,** *#*	World Bank *(2021)*	30-40	63	92	121	150	2045 targets based on Vietnam today
	Median time in port for container ships, *hours*	UNCTAD *(2021)*	24.9	21	17	13	9	2045 targets based on Japan today
Air	**Aviation median import dwell time,** *days*	LPI *(2023)*	2.6	2.3	2.0	1.8	1.6	2045 targets based on Singapore today
Overall	**Logistics performance index score, #**	LPI *(2023)*	3.0	3.4	3.7	4.0	4.3	2045 targets based on Singapore today

2. Build livable cities

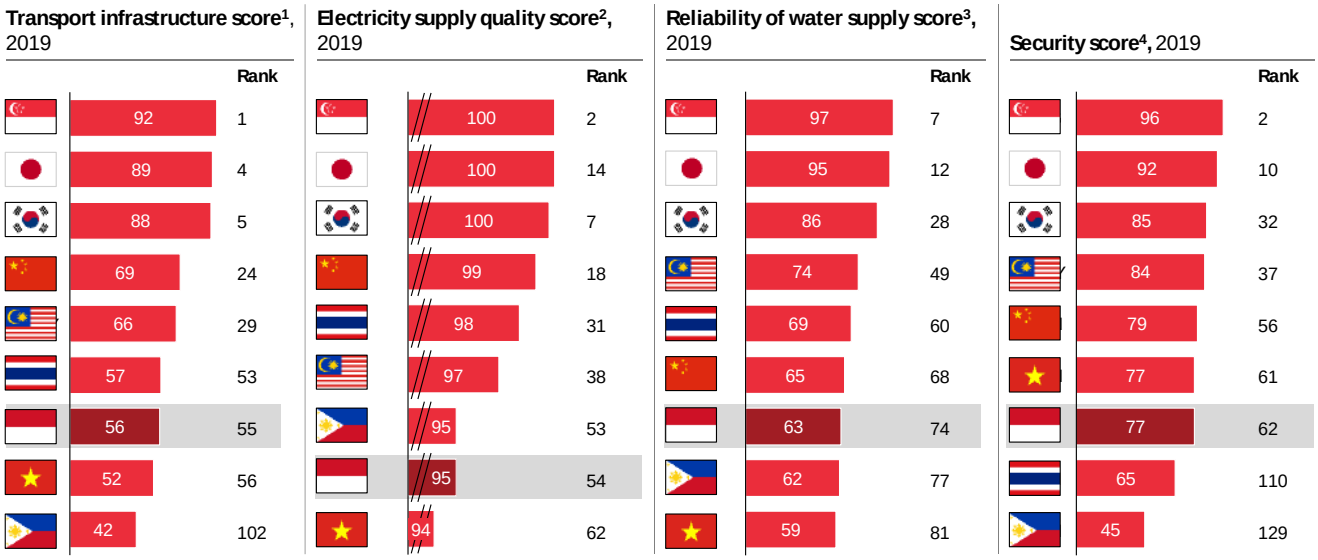
Contexts and Challenges

As Indonesia marches forward, significant demographic shifts and urbanization trends are expected. With a projected population of ~290 million citizens by 2030, including an influx of 21 million working-age individuals, the nation's potential for economic growth and societal progress is immense.

However, the rapid population growth also brings forth challenges, particularly in urban areas, as an estimated 70 million people will be added to urban areas, accounting to ~70% of the total population in Indonesia.

Yet, in the face of these trends, Indonesia is underperforming in the development of critical infrastructure and security, such as transport infrastructure, electricity supply quality, reliability of water supply, to support the liveability of its cities, according to the 2019 WEF Global Competitiveness Report. (Exhibit 188)

Exhibit 188:
Benchmark Score of Infrastructure



1. Maturity score of transportation infrastructure, considering air travel, water travel, and land travel [1-100]; 2. Electric power transmission and distribution losses as a percentage of domestic supply; 3.Response to the survey question "In your country, how reliable is the water supply (lack of interruptions and flow fluctuations)?" [1 = extremely unreliable; 7 = extremely reliable]; 4. Level of safety within the country, considering crime rate, terrorism incidence, reliability of police services, and homicide rate [0-100]

Looking at the full picture, Indonesia faces issues across five dimensions of livability: 1) inadequate housing infrastructure, 2) poor sanitation access and quality, 3) low urban mobility, 4) low sustainability and safety, 5) limited financing.[197] (Exhibit 189)

[197] World Bank, TOM , BPS, EIU, McKinsey Global Institute, press search.

Exhibit 189:
Livability Challenges in Indonesia

Deep dive next

1

Inadequate housing infrastructure

Affordability challenges – **only top 20% of the upper population can afford housing**

Supply constraints – ~**400,000 affordable housing deficit/ year** – 13.2 mn housing backlog as of 2017

Poor housing quality – 40% houses are self-built and are substandard

2

Poor sanitation access and quality

Inadequate access to sanitation…

- **30% population don't have access to basic sanitation** – major concern for COVID-19 mitigation; lowest among ASEAN-5[1] for wastewater treatment benchmark
- Only 6 out of 34 provinces indicate "good performance" for sanitation

..Leading to high health hazards

- **Highest mortality rate from unsafe sanitation among ASEAN-5 and 8th in the world**

3

Low urban mobility

One of the most congested city in the world in 2022 – **2nd in ASEAN**

Low public transport usage of 32%, while government target is 60% to reduce congestion

Overloaded street capacity – growth in # of vehicles (5% from 2017-22) higher than growth in length of roads (0.3%)

4

Low sustainability and safety

Poor air quality – Jakarta's air ranked as **5th most polluted in the world**, **Indonesia overall ranks 6th** – PM2.5 level at 73.5 µg/ m³ (WHO goal is 10 µg/ m³)

Lack of green space – Jakarta only has **11.7% green space** (compared to **Singapore's 46.5%**)

High flooding risks beyond Jakarta (e.g., 2021 floods in South Kalimantan, Bekasi, Subang, Semarang)

High crime rate – Jakarta ranks 53rd out of 60 (EIU's Safe Cities Index)

5 **Limited financing**

Low government spending on infrastructure – housing (2nd lowest in ASEAN at 0.4% of GDP) , sanitation (0.23% of GDP vs. average of 0.35% in ASEAN peers), and public transportation (0.13% of GDP for railway sector, lowest compared to India, Malaysia and China)

Coordination issues persist among different agencies – up to 26 projects in public-private-partnerships pipelines are stagnated or halted in 2018

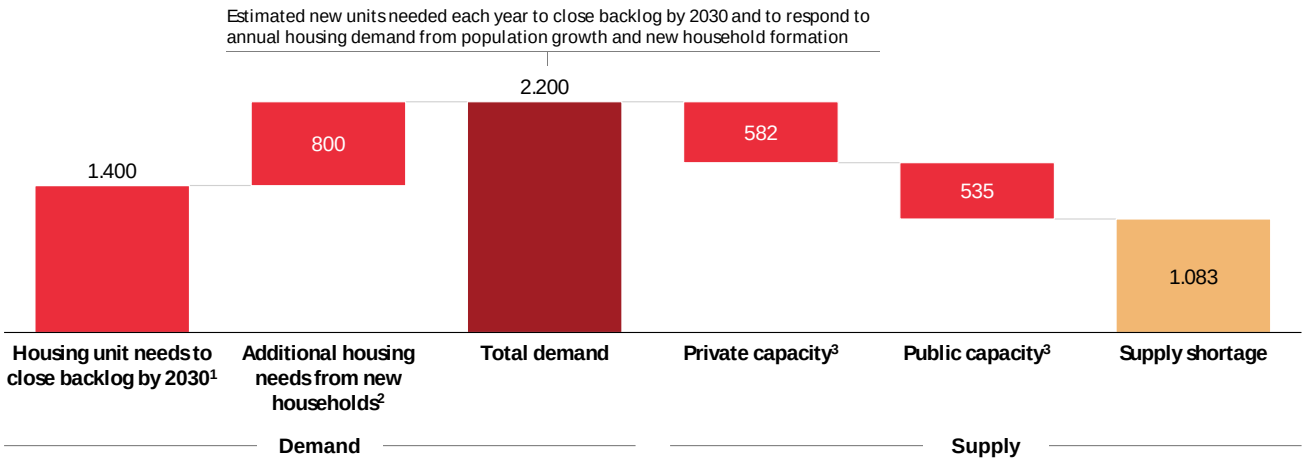
1. Singapore, Malaysia, Thailand, Phillippines, Indonesia

1) Inadequate housing infrastructure

Indonesia has a pressing housing supply shortage that is exacerbated by the escalating wave of urbanization. As the nation experiences rapid population growth and increasing urban migration, the demand for housing in urban areas has surged, surpassing the available supply. In 2020, the housing supply shortage was estimated to reach more than 1 million units[198] (Exhibit 190). This challenge is particularly acute in major cities.

Exhibit 190:
Estimated Housing Demand vs Supply in Indonesia

Estimated housing demand vs supply (2022), 000 units



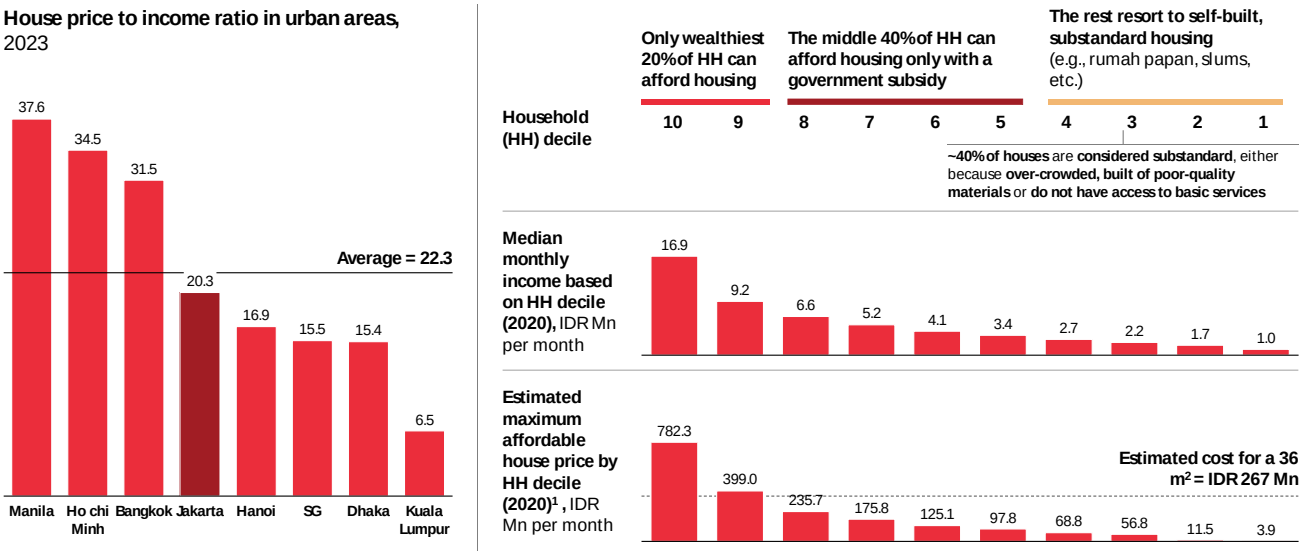
1 Assuming backlog of 12.7 Mn households to be closed by 2030
2 Estimation from growth of household per year
3 Using 2022 capacity, as quoted by PUPR

198 BPS, PUPR.

In addition to the housing supply shortage, Indonesia is faced with significant affordability issues, posing a challenge for a substantial portion of its population. With only 20% of Indonesian households having the means to afford basic housing, 40% of the population is compelled to resort to self-built housing solutions. [199]

The high cost of formal housing, coupled with low income and limited access to affordable financing options, leaves a considerable segment of the society struggling to secure decent and secure shelter. (Exhibit 191)

Exhibit 191:
Housing Demand Overview in Indonesia



1.Estimated by taking monthly payment capacity (ranges between 17% to 40% depending on HH decile) and estimated affordable home loan (Deciles 3 - 10 with commercial bank rates of 12% at 15 year loan term, deciles 1 - 2 with MFI bank rates of 24% are 3 to 5 year loan term

2) Poor sanitation access and quality

Indonesia finds itself falling behind its regional peers in terms of sanitation infrastructure, an issue that has significant consequences for public health and well-being. Only 74% of the total population in Indonesia has access to basic sanitation, which falls below ASEAN average at 82%.

Majority of Indonesian cities falls under the third quartile when compared to global sanitation ranking measured by % of houses with proper sanitation.

As a result of the country's inadequate sanitation services, Indonesia is ranked to have the highest mortality rates in the region due to preventable diseases caused by poor sanitation at 7.1 per 100,000 population, versus 4.2 in the Philippines and 3.5 in Thailand.

The UN Suitability Development Goals (SDGs) report in 2019 classified Indonesia as having major challenges in achieving clean water and sanitation, and with current progress Indonesia is insufficient to reach 2030 SDG targets.

3) Low urban mobility

Indonesia faces high congestion levels due to vehicle growth outpacing road growth and low use of public transportation. This challenge is particularly pronounced in Jakarta, which was ranked the 29th most congested city globally in 2022. [200] The ever-increasing number of private vehicles at a growth rate of 5% p.a. is significantly outpacing the growth rate of road length at only 0.3% p.a., resulting in high traffic congestion that adversely impact productivity, air quality, and overall urban livability.

5) Limited financing

Accessing finances for infrastructure development in Indonesia presents a formidable challenge. As a result,

[199] Numbeo, World Bank, BPS, PUPR, team analysis.

[200] TomTom Traffic Index 2022, BPS, press search.

Indonesia falls behind some of its regional counterparts in terms of infrastructure investment. Today, Indonesia is the 2nd lowest spender in ASEAN on housing at 0.4%. Indonesia also has significantly lower spending and budget on water and sanitation, as well as railway sector compared to peer countries at only 0.23% and 0.13% of GDP respectively. [201]

In addition to limited budget and spending, the environment for Public-private Partnerships (PPPs) in Indonesia is not as mature or developed as other ASEAN peers. Indonesia PPP environment is ranked as "emerging" at #11 compared to other Asian countries. While Indonesia fares relatively well for Regulation and Investment, it has not reached best in class or "mature" ranking for Institutions, Maturity (experience), and Financing.[202]

To address these challenges, Indonesia should strive to elevate the quality of life and aspire to be recognized as a country with the world's most livable cities, transforming from a nation with low quality of life due to subpar housing, sanitation, urban mobility, sustainability and safety to a nation with great quality of life supported by adequate housing, integrated urban mobility planning, streamlined project planning, financing and execution. (Exhibit 192)

Exhibit 192:
Aspirations for Livable Cities

FROM: Low quality of life due to subpar housing, sanitation, urban mobility, sustainability and safety	**TO:** Better quality of life supported by adequate housing, integrated urban mobility planning, streamlined project planning, financing and execution
Poor housing infrastructure, with low housing affordability rate	**Better housing provision** through segment-specific solutions and closing the affordable housing deficit
Inadequate quality and access to sanitation, leading to high health hazards and mortality rate	**World class sanitation infrastructure** to improve access and quality both in urban and rural areas
One of the most congested city in the world, with low public transport quality and usage and overloaded street capacity	**Integrated modes of urban transport into a single system** to systemically alleviate congestion in urban areas
Low environmental safety (e.g., high pollution rate, high flooding risks) and **social safety** (e.g., high crime rate)	**Sustainability role model for fellow ASEAN countries** with high environmental and social safety
Limited financing with immature PPP environment and suboptimal execution	**Strong and matured financing for infrastructure and PPP environment**
51 **(out of 100) overall EIU global liveability index score** considering Indonesia's living condition, e.g., housing affordability, sanitation infrastructure	**95** **(out of 100) overall EIU global liveability index score** considering Indonesia's living condition, e.g., housing affordability, sanitation infrastructure

Bold Moves

Indonesia holds the potential to revolutionize the livability of its cities by embarking on six transformative initiatives, fortified by robust regulations aimed at incentivizing the realization of affordable housing, sustainable living infrastructure, and active private sector participation. (Exhibit 193)

[201] KPPIP, press search.

[202] EIU Infrascope.

Exhibit 193:
Bold Moves for Livable Cities

Across major cities

1. **Strengthen Indonesia's mobility**
   - 1A **Invest in the development of physical infrastructure for public transportation**
   - 2A **Establish an extensive and interconnected urban public transport** by improving coverage, extensiveness, and interconnectedness of MRT, LRT, commuter, and bus network, starting from the major cities in Indonesia
2. **Build more affordable housing using:**
   - 2A **Transit-oriented development (TOD) model in major cities in Indonesia,** allowing people to live near transit modes and reduce their reliance on private motor transport
   - 2B **Mandatory housing affordability zoning legislation**
3. **Leverage technologies to enable better city planning and enhance safety and sustainability** of Indonesian cities (e.g., smart sensor, earthquake prediction)

Across all cities

4. **Build and strengthen cities across Indonesia through a demand-led approach, e.g., SEZ development, and leveraging** IKN as a role model
5. **Ensure availability and quality of sustainable water and sanitation for all**
6. **Enhance private sector involvement in infrastructure development in Indonesia**
   - 6A Improve PPP[1] for infrastructure development by applying a more robust multi-criteria analysis for investment decisions and planning
   - 6B Ensure private sector is incentivized to contribute to infrastructure development

Supported by regulations to push and incentivize the implementation of affordable housing, development of living infrastructure, and private sector involvement

Bold Move One – Strengthen Indonesia mobility

In recent years, Indonesia has experienced rapid urbanization, with millions of people migrating to major cities in search of better opportunities. However, among the most pressing concerns is the need to enhance urban mobility, to support the burgeoning population and ensure sustainable growth.

In many of Indonesia's major cities, the current state of transportation infrastructure falls short of accommodating the ever-increasing demand. Traffic congestion, air pollution, and prolonged commute times have become all too familiar aspects of urban life. Such limitations not only impede economic productivity and hinder social connectivity but also contribute to a decline in the overall quality of life.

To address these challenges, it is imperative for Indonesia to make strategic and substantial investments in the development of physical infrastructure for public transportation. In addition, Indonesia must also prioritize the development of an interconnected urban public transportation system.

1A: Invest in the development of physical infrastructure for public transportation

Investing in the development of physical infrastructure for public transportation is a cornerstone of enhancing mobility. This approach involves the creation and improvement of various elements within the public transportation system to ensure its efficiency, accessibility, safety, and attractiveness to the public. Indonesia can learn from Asian peers in ways to construct public transport infrastructure to improve urban mobility.

Case study: Japan, Singapore, Hong Kong

Japan, Singapore, and Hong Kong have an extensive and well-developed public transportation that connects every part of the city. These cities have been aggressively expanding and improving the infrastructure of their public transport (Exhibit 194).

These aggressive moves have resulted in massive growth of the public transport usage: an average of 5% annual growth rate in passengers of Tokyo Metro, an average of 30% annual growth in MRT and LRT rides in Singapore, and a record-breaking number of public transport usage, where 90% of total passenger journeys are made on public transport system in Hong Kong[203].

Exhibit 194:
Benchmark of Transportation Infrastructure

Transportation infrastructure building have been one of the main focuses for developed cities in Asia…

Tokyo, Japan

Development of railway road

- **3000+ km of the railroad network,** including **822 railway station and 2179 metro stations**
- **12 Mn average daily number of passengers** carried via subway system

Singapore, SG

Expansion of rail network

- **USD 43.5Bn investment** to expand its rail network by 2030
- **360km of MRT rail network** by 2030
- **1.2Bn annual ridership** of MRT

HongKong, HK

Extensive public transport facility

- **10k buses, 2.3k rail cars, and 74 ferries** available for public transportation
- **11Mn average daily number of passenger** journeys on public transport

Learning from these cities, there are three key things Indonesia could do to attract more public transportation usage and improve urban mobility:

- Accelerate the expansion of MRT/LRT railway networks and accessibility to provide routes across all areas in Jakarta
- Improve the quality and safety of public transport facilities (e.g., cleanliness of Transjakarta station, increase safety measures in railway stations) to increase the comfort of public transportation
- Increase the number of TransJakarta buses and MRT/LRT trains and schedule availability, particularly during peak hours, to accommodate increased demand

1B: Establish an extensive and interconnected urban public transport by improving coverage, extensiveness, and interconnectedness

Another cornerstone in enhancing mobility and promoting sustainable urban development in Indonesia is establishing an interconnected urban public transport system.

[203] Press search, China Daily

Case study: Seoul

Seoul, the capital city of South Korea, has emerged as a global exemplar of a smart transportation system, showcasing world-class integrated urban transport solutions. Seoul has successfully established an extensive and well-connected public transportation network, which includes an intricate web of subway, buses, commuter trains, car sharing, bike sharing, and sidewalks. This integration is supported by strong public transportation infrastructure and facilities, e.g., availability of 7400 buses that operates on 356 routes and well established sidewalks with a minimum of 2m width, as well as 3 key enablers:

- **Big data analysis system:** Seoul's smart transportation initiatives extend beyond public transit to traffic management. The city analyzes a wide range of transport related data, that enables them to employ intelligent traffic signal control systems that optimize traffic flow based on real-time traffic conditions.
- **Center platform**: The city provides real-time information about public transportation through digital displays and mobile apps. Passengers can access up-to-date arrival times, service disruptions, and alternative routes, empowering them to make informed travel decisions.
- **Transit smart card:** Seoul's adoption of a smart fare collection system has revolutionized the way people pay for public transportation. The T-money card, a contactless smart card, allows commuters to pay for fares across different modes of transport with a single card. [204]

This advancement has brought positive impacts for Seoul including: 150k increase in the average daily public transportation passenger per year, 60% reduction on fatal accidents, 19Mn kg of annual GHG reduction per 10km of road covered with ITS, over USD $10Bn worth of social benefits per year, 15% increase of travel speed.

Indonesia could integrate the public transport in its major cities, starting from Jakarta, into a single transportation network plan. This integration would unlock 4 significant benefits for Indonesia, including:

- **Improve usage of public transport:** Smooth and easy transport system and better services of public transportation eventually leads to more people using public transport due to better scheduling short walking distance, and integrated ticketing system
- **Ensure balance between demand and supply:** Integration of different modes of public transports into one single system would enable better demand and supply calculation; leading to better decision-making vis-à-vis public transportation
- **More stable income for operators:** With multiple modes of public transportation operating as a system, the first-mile and last-mile transport providers will have more stable income due to stability of demand
- **Higher road density:** Integration and improvement of public transports, supported with ToD development, will promote a shift from a heavy private car usage to higher public transport usage, resulting in reduced road demand and higher road density

There are 3 key things Indonesia could do to build the urban transport infrastructure of the future:

- Establish big data analytics in each transport system and ensure the interoperability of the data generated to deliver optimum experience to the user
- Set up a unified payment system across all public transport to ensure smooth transit experience for users
- Ensure interconnectivity of various modes of public transport to enable multimodal urban mobility when constructing transport infrastructures

The integration of various transit modes will enable passengers to seamlessly transfer between different

[204] LUTP, World Bank, KOTI

lines, facilitating convenient and hassle-free travel throughout the city, enhancing the urban mobility in Indonesia.

Bold Move Two – Build more affordable housing

As Indonesia stands at the crossroads of rapid urbanization and demographic shifts, the need for affordable housing has also become increasingly urgent. A burgeoning population has intensified the demand for accessible and cost-effective housing solutions.

In response to this pressing challenge, Indonesia must prioritize the development of affordable housing using innovative models such as Transit-Oriented Development (TOD) and enact critical legislation like mandatory housing affordability zoning.

2A: Transit-Oriented Development (TOD)

Transit-Oriented Development (TOD) has emerged as a model that holds the potential to reshape the way people live and commute in urban areas and pave the way for a more sustainable future. TOD prioritizes the creation of vibrant, sustainable neighborhoods that addresses urban transportation issues by combining urban land use (residential, commercial land) together with transport system.

Developing TOD in major cities in Indonesia and encouraging people to live near transit modes would enhance public transport accessibility and reduce the reliance on private transportation significantly. This integration of transportation and land use planning would also ease traffic congestion and reduces greenhouse gas emissions.

Today, there are multiple cities, including Tokyo, Portland, and Hong Kong that has successfully set up TOD and reaped the positive impacts. (Exhibit 195)

Exhibit 195:
Examples of TODs

Tokyo

Development of areas around metro stations

- The development of income from real estate allows to reduce subsidies
- **80% of Tokyo residents consider the subway, walking and cycling to be the main transport**

Hong Kong SAR

Integration of transit zones and real estate

- Passenger traffic at stations after **renovation increases by 50%**
- **50% of development investments** are financed from **real estate income**

Portland, USA

Effective partnership between the city and developers

- **Attracting $3.5 billion in** private investment for transport infrastructure development

2B: Mandatory housing affordability zoning legislation

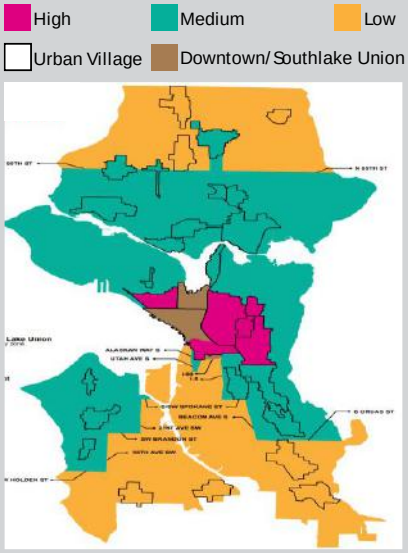
The pursuit of affordable housing takes a decisive step forward with the implementation of mandatory housing affordability zoning legislation. This progressive approach compels real estate developers to allocate a portion of their projects to affordable housing units, mitigating the disparity between increasing property prices and the limited financial means of the population.

By embedding affordability requirements into zoning laws, Indonesia can slowly close the affordability and demand-supply gap of housing and dismantle barriers that hinder access to decent housing options, particularly for low and middle-income families. The legislation lays the foundation for an inclusive society, where residents from diverse socio-economic backgrounds can thrive, fostering a sense of belonging and community cohesion. This approach has adopted in other cities and is proven to bring positive impacts.

Case study: Seattle

Mandatory housing affordability (MHA) was first implemented in 6 Seattle neighbourhoods in 2017, which was expanded to city-wide implementation in 2019. MHA applies affordability requirements to all multifamily and commercial zone and aims to increase housing choices in Seattle. (Exhibit 196)

Exhibit 196:
Seattle's Mandatory Housing Affordability Areas



MHA requirements in Seattle are dependent on neighbourhood and are updated annually using a consumer price index adjustment method. Under the MHA, developers have two options:

- **The "performance" option:** 5-11% of new units in multi-family residential buildings to be reserved for low-income households
- **The "payment" option:** developers to contribute between $5 and $32.75 per square foot to the Seattle Office of Housing fund, which will be used for producing affordable housing and support programs for low-income families

By 2025, Seattle aims to create 50,000 new homes of which 20,000 are affordable homes and over 6,000 are rent-restricted, income-restricted homes for low-income people[205].

Acknowledging the positive impacts housing affordability zoning legislation could bring, Indonesia has tried implementing dedicated zones for affordable housing, e.g., in Bintaro and BSD. However, it was not enough to maintain housing affordability. Hence, it is important to have full government support in its implementation. There are two approaches that Indonesia could implement:

- Fee based: establish a strict tax or fee policy for developers that are incompliant to affordable housing quota requirement
- Incentive based: provide an incentive (e.g., housing capacity allowance) to developers that agreed on creating certain quota for affordable units

Bold Move Three - Leverage technologies to enable better city planning and enhance safety and sustainability of Indonesian cities

Internet of Things (IoT) presents an opportunity to revolutionize city planning and management in Indonesia. By harnessing the power of IoT, Indonesian cities can make data-driven decisions, optimize resource allocation, and enhance the overall quality of life. From improving traffic management to reducing energy consumption, and from ensuring public safety to optimizing infrastructure and better city planning, IoT can unlock many opportunities.

Many developed cities across the globe have successfully leveraged IoT to improve the decision making and living qualities of their cities. For example, Tokyo has developed and adopted advanced earthquake technology and early warning system (EEW) that enable proactive actions and mitigations, as well as better city planning and regulation. This adoption impacted Tokyo in 3 key areas:

- **Building and infrastructure design:** Adoption of advanced seismic engineering techniques into the design and construction of buildings and infrastructure, e.g., skyscrapers
- **Building codes and regulations:** Ratification of building codes and regulations to ensure structures

[205] Curbed Seattle

are more resilient to seismic events in earthquake prone areas

- **Public transportation system:** Integration of predictive technology into public transportation networks, allowing trains and subway systems to automatically slow down or stop when there is a warning

Another example of successful IoT adoption is in San Francisco, where smart sensor is applied to mitigate waste overflow and optimize trash collection, which resulted in 80% drop of overflowing waste bins, as well as in Seoul, where IoT based smart plug program and robot companion are launched to protect and support elderly population.

Indonesia could also leverage IOT technologies to improve 3 key areas:

- City planning and design: develop a more resilient building infrastructure and public transport network based on geographical mapping
- Sustainability: increase public awareness through the display of key environmental metrics
- Safety: share information regarding areas prone to select incidents, using analytics

Bold Move Four - Build and strengthen cities across Indonesia through a demand-led approach

Indonesia must also focus on strategically developing and strengthening its cities through a demand-led approach. This approach entails identifying the needs and requirements of the population, businesses, and industries and tailoring urban development accordingly.

One of the essential strategies in this pursuit is the development of Special Economic Zones (SEZs), using the new Ibu Kota Negara Indonesia (Indonesia's new capital city) as a role model. This is key in developing regions outside Java. By establishing SEZs, the Indonesian government can foster economic activities and trigger surrounding cities development.

Case study: Shenzhen, China

Shenzhen, China, is an exemplar of Special Economic Zone (SEZ) success, it was one of the first four SEZs established in 1979 to experiment with new economic approaches in China. (Exhibit 197)

Exhibit 197:
Map of SEZs in China

This approach has successfully attracted investors from all around the world and enabled massive economic growth, such as:

- An average of 35% population annual growth in the early years of SEZ launch
- 10%+ CAGR in foreign direct investment from 1979 to 2015 (from $28M to $6.5B)
- Rapid infrastructure development and investment in the SEZ cities (e.g., 9 seaports 1 airport, 3,200km length of railway, and 1,600km length of road)
- 8% CAGR in total employment from 1980 to 2015 (vs. 1% in CN and HK).

SEZs attract strong demand pull and encourage domestic and international companies to establish their operations, thereby driving the city infrastructure development, improving livability parity across all cities in Indonesia.

Bold Move Five - Ensure availability and quality of sustainable water and sanitation for all

With water resources facing increasing pressures from population growth, urbanization, and climate change, it becomes imperative for Indonesia to address these challenges.

By prioritizing the equitable distribution of clean water, promoting efficient water management practices, and enhancing sanitation infrastructure, Indonesia can pave the way forward. Therefore, Indonesia should set water and sanitation development across the nation as top priority.

Case study: India

India's efforts to enhance accessibility and quality of water and sanitation have been commendable. With a vast and diverse population, India faced significant challenges in ensuring equitable access to clean water and proper sanitation facilities for all its citizens.

However, through bold initiatives and strategic planning, the country has made substantial progress in addressing these critical issues. The government of India has launched 3 key initiatives:

- Jal Jeevan: Aim to provide piped water supply to all rural households in India by 2045 and ensure safe, adequate, and reliable drinking water supply, with a total of US$ 50Bn budget allocation.
- AMRUT 2.0: Aim to improve the infrastructure and service delivery in urban areas of India, focusing on providing basic services, like water to households, with a total of US$ 37Bn budget allocation.
- Jal Sakthi: Aim to streamlined water-related policies, programs, and institutions, and enhance the integrated management of water resources and supply, with a total of US$ 90Bn budget allocation.

The 3 initiatives were supported by both financial and non-financial enablers such as establishment of strong regulatory framework, launching of incentives to boost private sector involvement, and increasing government budget and spending on water and sanitation, accounting to 2.2% of GDP in 2021.

Through these initiatives, India has experienced notable impacts including establishment of over 60Mn of new tap water connection, provision of tap water connection to over 45mn rural household, and improvement of access to clean water to over 125,000 villages.[206]

Learning from India, there are three key things that Indonesia could implement to set water and sanitation development as top priority:

- Deploy and increase budget allocation for water and sanitation development
- Accelerate regulatory progress to support the development water and sanitation infrastructure development
- Launch incentives for private sector involvement, e.g., tax benefits, to boost Private-Public Partnerships in the water and sanitation sectors

Bold Move Six – Enhance private sector involvement in infrastructure development in Indonesia

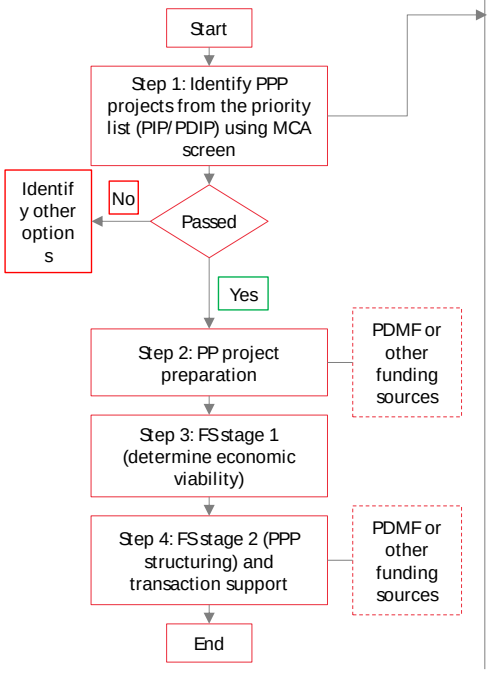
Enhancing private sector involvement in infrastructure development through improved Public-Private Partnership (PPP) practices can unlock vast potential for innovation, efficiency, and accelerated progress.

To bolster this collaboration, it is essential to apply a more rigorous multi-criteria analysis for investment decisions and planning, ensuring optimal allocation of resources. Multi-criteria analysis can help to ensure credible project lists that have relatively higher potential to be procured using PPP schemes.

As a case study on PPP projects from the Philippines shows (Exhibit 198), Indonesia could apply robust multi-criteria analysis to enhance its selection process for high potential PPP projects.

[206] Press search, World Bank report, "Running Water in India's Cities: A Review of Five Recent Public-Private Partnership Initiatives."

Exhibit 198:
Example of PPP Project Life Cycle in Philippines



PPP Project Lifecycle

Drivers	Evaluation criteria (variables)
1. Market acceptability	Existence of likely strong market interest for the project; and Existence of a strong debt funding market locally and/ or availability of international funding for local projects
2. Manageable life cycle costs	Land acquisition/ site or right-of-way issues identified appears to be manageable; and Manageable social safeguard concerns (i.e., environment, health and safety, gender, resettlement or other vulnerable person issues)
3. Appropriate risk sharing	Acceptability of appropriate risk sharing mechanism
4. Institutional readiness of the Implementing Agency (IA)	Existence of PP unit and Project Management Office; if none, the IA commits to establish an organic technical working group (TWG) to undertake PPP Has implemented successful PPP projects in the past; if none, IA has the capability to do PPP or willingness to undergo training on PPP and… IA is willing to abide by the PPP best practices
Overall total score	
(Passing score: **2 and above** of the Total Project Score)	

Each drivers are weighted and scored 1, 2, or 3 (3 being the highest and 1 being the lowest

Passing score is 2 and above

Failure to pass the MCA does not mean project is not viable or worthy of pursuing

Implementing Agency can conduct further analysis to determine feasibility for other financing options

Moreover, incentivizing the private sector to actively contribute to infrastructure development through attractive and viable partnerships will not only expedite project delivery but also alleviate the financial burden on the government.

Case Study: Bangkok Mass Transit System.

In 1990, the government developed a 30-year Built-Operate-Transfer (BOT) scheme for an elevated rail transit system, now known as Bangkok Mass Transit System, to tackle the heavy traffic congestion.

The 30 years project was a joint partnership between private sector (Bangkok Transit System corporation), public sector (Bangkok Metropolitan Administration), and financiers (IFC, KFW, Siam Commercial Bank), with a clear role and responsibility division for each player.

This PPP scheme has successfully enabled Bangkok to enhance its public transportation significantly to having around 70km length of railway and 60 stations established in 2023.

Indonesia could apply PPP schemes that incentivize private players to get involved in the development of key infrastructure like the government of Thailand granted BTSC the right of revenue retention for 30 years.

To accelerate the implementation of these bold moves, MSME can play a role in (Exhibit 199)

Exhibit 199:
Role of MSMEs in Building Livable Cities

Bold moves	What MSMEs can do
1 **Strengthen Indonesia's mobility**	**Collaborate with government public transportation providers or operators** (e.g., TransJakarta and Angkot) to enable public transportation integration
2 **Build more affordable housing**	**Establish small scale retail outlets, restaurants, service-oriented businesses near transit nodes**
3 **Leverage technologies to enable better city planning and enhance safety and sustainability** of Indonesian cities (e.g., smart sensor, earthquake prediction)	**Leverage IoT to improve building safety in shops,** e.g., smart surveillance system
4 **Build and strengthen cities across Indonesia through a demand-led approach**	**Develop local products or services (e.g., Batik Yogyakarta)** to support SEZ development for selected city
5 **Ensure availability and quality of sustainable water and sanitation for all**	-
6 **Enhance private sector involvement in infrastructure development in Indonesia**	**Actively seek partnerships with both public and private sector entities** involved in infrastructure devleopment in Indonesia

Roadmap

These bold moves will be executed across different phases in the next 22 years. Initiatives within each bold move include (Exhibit 200):

Exhibit 200:
Livable Cities Roadmap

	2023-2030	2031-2035	2036-2040	2041-2045	Relevant stakeholder
1. Strengthen Indonesia's mobility A. Invest in the development of physical infrastructure for public transportation B. Establish an extensive and interconnected urban public transport	**Develop a strategic plan that outlines the goals and KPI for enhancing public transportation**	**Continuous improvement in public transport integration and development**			• Ministry of Transportation • Private and public transportation companies and operators • Private and public Infrastructure companies
	Prioritize and invest in public transportation infrastructure development (e.g., MRT expansion) **Foster collaboration between stakeholders to enhance existing public transport network**	**Engage selected public transport operators** to pilot integration program	**Introduce transit smart card,** valid for all public transportation	**Expand integration across** all modes of transportation	
	Develop integrated system to connect public transportation in Indonesia	**Raise awareness** to promote public transport usage	**Tap into & strengthen other underexposed public transport infrastructure**	**Scale up program to other cities**	
2. Build more affordable housing A. Transit-oriented development (TOD) model in the major cities B. Mandatory housing affordability zoning legislation	**Formulate a housing policy and incentives for** TOD and mandatory housing affordability zoning regulation (MHAZ)	**Complete development** of TOD and affordable housing in selected cities	**Adopt technology to automate and improve optimization**	**Scale and replicate TOD and MHAZ** to wider range of areas and cities	• Ministry of Transportation • Ministry of National Development Planning • Ministry of Home Affairs • Ministry of Public Works and Housing • Real estate developers
	Identify sites and develop roadmap for TOD and affordable housing initiatives	**Open initiative for public**	**Continue to enhance TOD and housing infrastructure**	**Regularly review and update housing policy**	
	Foster public-private collaboration to pilot affordable housing initiative in selected areas	**Enforce mechanism to ensure compliance**			

	2023-2030	2031-2035	2036-2040	2041-2045	Relevant stakeholders
3. Leverage technologies to enable better city planning and enhance safety and sustainability of Indonesian cities (e.g., smart sensor, earthquake prediction)	**Invest in and develop IoT infrastructure**, e.g., sensors, connectivity networks **Establish partnership with startups, technology providers, institutions, industry experts** **Identify and plan key pilot projects** in major cities **Establish regulatory frameworks and standards**	**Launch pilot and implementation of IoT** in selected cities **Foster public-private collaboration and research to** enhance IoT development **Evaluate and continuously enhance IoT implementation**	**Consolidate and integrate IoT** ecosystem to ensure sustainability	**Scale up successful IoT implementation to other cities** **Foster international collaboration**	• Ministry of Communication and Information Technology • Ministry of Home Affairs • Ministry of Environment and Forestry • Technology providers • Public safety agencies
4. Build and strengthen cities across Indonesia through a demand-led approach, e.g., SEZ	**Conduct comprehensive assessment of cities and select key cities** for program pilot **Formulate a national strategy for strengthening city** and development plan for each selected city **Foster collaboration** between government, private, public sectors, and investors	**Build capability of locals** to enhance quality of products and services in selected city **Prepare and equip city to be SEZ**	**Create a conducive investment climate** **Promote SEZs to market** to attract investors	**Promote investment in infrastructure in SEZ** **Optimize SEZs development** **Scale up SEZ program to other cities**	• Coordinating ministry of economic affairs • Ministry of National Development Planning • Local government and companies • Investment coordinating board
5. Ensure availability and quality of sustainable water and sanitation for all	**Review and select priority cities** to conduct pilot project in developing the availability and quality of water and sanitation **Invest in and foster public-private partnership** through regulation and incentive **Design pilot program roadmap and design infrastructure blueprint**	**Conduct pilot project on infrastructure building** **Leverage technology and digital solution to boost availability and quality of water and sanitation**		**Expand infrastructure development to other cities in Indonesia**	• Private sector companies • Coordinating ministry of economic affairs • Ministry of Public Works and Housing • Private and pubic infrastructure and financial companies
6. Enhance private sector involvement in infrastructure development in Indonesia	**Review and streamline the legal and regulatory framework** for PPP projects to provide conducive environment and transparency **Identify and prioritize** key infrastructure projects **Design and introduce targeted incentives and fiscal measures** to attract private sectors	**Continuously refine PPP framework, incentive, transparency, and governance** **Actively engage with investors and private sector** to showcase potential PPP projects **Adopt advanced tech** to improve infrastructure development and enable PPP monitoring **Explore and develop innovative financing and incentive to further boost PPP**		**Explore regional partnership** opportunity **Continue to grow project pipeline**	• Private sector companies • Coordinating ministry of economic affairs • Ministry of Public Works and Housing • Private and public infrastructure and financial companies

Key metrics

The success criteria of the aspirations will be the key milestones to track (Exhibit 201)

Exhibit 201:
Key Metrics for Livable Cities

	Key metrics	Source	Current	2030	2035	2040	2045	Note
Overall	**Liveability of major cities index, *score (#)***	EIU*(2022)*	51	62	73	84	95	2045 targets based on Japan today
Infrastructure	**Housing affordability[1], *ratio (#)***	Numbeo (2023)	20.3	19	16	13	12.6	2045 targets based on Japan today
	Quality of road index, *score (#)*	WEF*(2019)*	53	58	65	80	85	2045 targets based on Japan today
	Reliability of water supply index, *score (#)*	WEF*(2019)*	63	71	79	87	95	2045 targets based on Japan today
Security	**Security index, *score (#)***	WEF*(2019)*	77	80	84	88	92	2045 targets based on Japan today
Financing	**PPP index, *score (#)***	EIU*(2020)*	59	69	74	78	80	2045 targets based on Thailand today

Transversal technologies for all

Key enablers

Context and challenges

Indonesia has one of the largest digitally savvy populations globally. It has the fourth highest number of internet users in the world. As of 2023, 213 million, or 77% of the country's 270 million people were active internet users, while an impressive 87% of households used internet in the last three months of 2022(Exhibit 202).[235]

Exhibit 202:
Statistics on Indonesia's Digitally Savvy Population

Ranked **4th** in the world for # of internet users
77%(213Mn) active internet users, as of 2023

Has **76%** smartphone penetration
206+ mn smartphone users, as of 2021

Ranked **2nd - 4th** largest users of top social media platforms
130mn Facebook, 99mn TikTok, and 99mn Instagram active users, as of Aug 2022

Reached **~$77B** in digital economy in 2022 and is on course to reach ~$130B by 2025
Driven primarily by e-commerce sector

With the push from government, Indonesia has narrowed the inequality of internet access across the country, which in 2021 stood at 20% difference between rural and urban areas versus 95% in 2016

In the past years, the government has launched multiple initiatives, such as the Palapa Ring project, where 36,000 km of fiber optic cable were installed to connect the Western and Eastern parts of the archipelago, the 2019 Five Year Plan with an aim of providing 20 Mbps service to 30% of the population, and the most recent initiative launched in 2023, where the government committed to build 300 new base transceiver stations providing access to more than 9,700 locations across the country.[236]

Additionally, Indonesia's current national ID, e-KTP, has achieved higher coverage than other ASEAN nations (>99%) since it was launched in 2011. Nonetheless, the application of the electronic ID remains low due to siloed and non-interoperable digital datasets and the limited scope of the legal framework validating use cases of digital data. However, in October 2022, Indonesia enacted a Personal Data Policy Law that could serve as an enabler for greater application of e-KTP across financial services, medical records, etc.[237]

This digitally savvy population and rapid digital adoption in the country fuels the local tech industry, with seven out of 28 tech unicorns in ASEAN are found in Indonesia, with valuation ranging from USD $1Bn to $20Bn.

However, despite these considerable achievements, advancement in Indonesia's digital economy Indonesia is held back due to inadequacy in five key challenges:

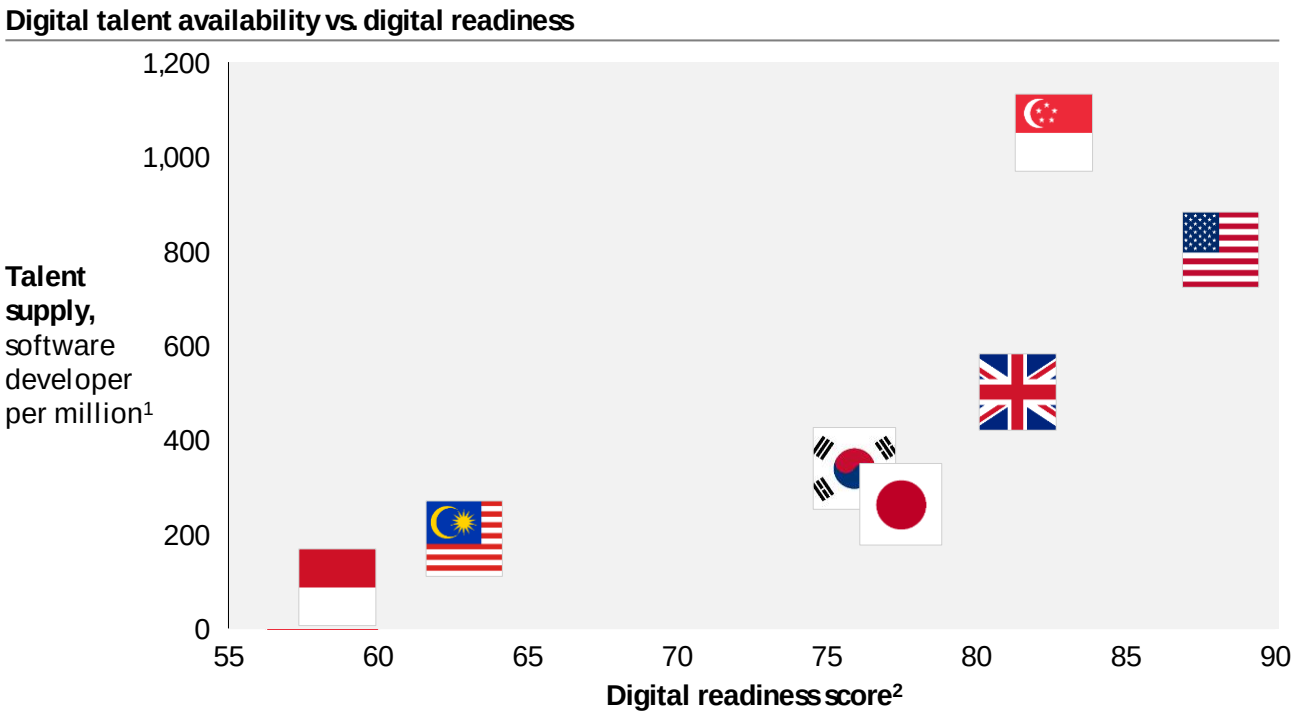
[235] Statista, IMF, Temasek research
[236] International Telecommunications Union, UNICEF, BPS, press search.
[237] World Bank, Kemendagri, press search.

Digital Talent Gap

Indonesia has a significant digital talent gap even when compared to other emerging markets e.g., Malaysia, leading to slow digital adoption (Exhibit 203). This is due to several factors, including:

- Digital adoption has outpaced digital economy infrastructure and resources.
- Higher education has not upgraded programs to keep pace with rapidly changing technology and talent markets.
- Reluctance of companies to develop tech talent.[238]

Exhibit 203:
Benchmark of Digital Talent Availability versus Digital Readiness

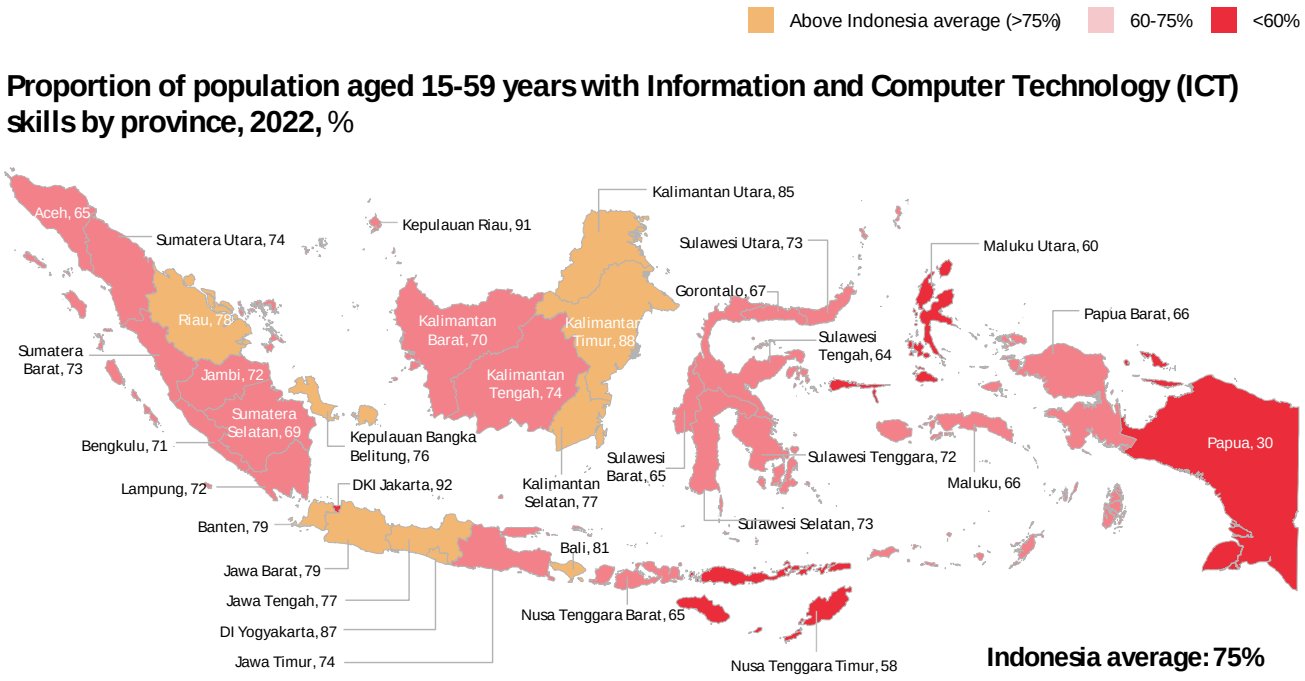


1. Estimated number of Next-gen SW Developers, Developer per million
2. Proxied with AI readiness score, between 1-100, 2021

Skilled ICT talent is mostly concentrated in Java and is unevenly distributed across the country. DKI Jakarta has the highest proportion of the ICT skilled population (92%), far above the average of 75% due to disparities in access to high-speed internet, inequalities in the education system and opportunities to acquire digital skills (Exhibit 204)

[238] HR Asia, Malaysia Digital Economy Corporation, press search.

Exhibit 204:
Distribution of Information and Computer Technology (ICT) Skills by Province



Acknowledging these disparities, the Indonesian government has been trying to reduce the gap, by launching the Digital Talent Scholarship (DTS) initiative to mitigate the national digital talent gap, however further push is needed.[240]

High Costs and Low Penetration of Fixed Broadband

The penetration of fixed broadband internet in Indonesia varies a lot across the archipelago and is significantly lower compared to ASEAN peers at only 12%, e.g., compared to Malaysia at 45% or Singapore at 109%. On top of the low penetration rate, the price is also considerably high at USD $43 for 40 MBPS, e.g., compared to USD $32 for 1 GBPS in Singapore. The high price and low quality of fixed broadband connectivity is mainly due to:

- High capex: 70-80% of cost attributable to passive infrastructure, e.g., ducts, poles, right-of-ways, and civil works.
- Difficulty in right of way permitting: Indonesia's restrictive licensing scheme makes service providers bid for service-specific licenses instead of providing a single uniform license for all services.
- Low return on investment due to the low subscription rate as a result of high prices and low quality connection in comparison to mobile broadband.

Interconnectivity and Interoperability of National Data

Despite the high coverage of Indonesia national ID, Indonesia's existing ID scheme still falls behind truly national digital IDs implemented in other economies in six critical dimensions: effective operating model, system interoperability, regulatory framework for broad usability, high-value use cases, positive user experience, and user trust (Exhibit 205).[241]

[240] Badan Pusat Statistik, press sources.

[241] MGI "Digital identification report", MGI "How governments can deliver promise of digital ID," Kemendagri, UIDIA, Malaysian government, Singaporean government, press search.

Exhibit 205:
Benchmark of National Digital IDs

Low / Not effective High / Effective

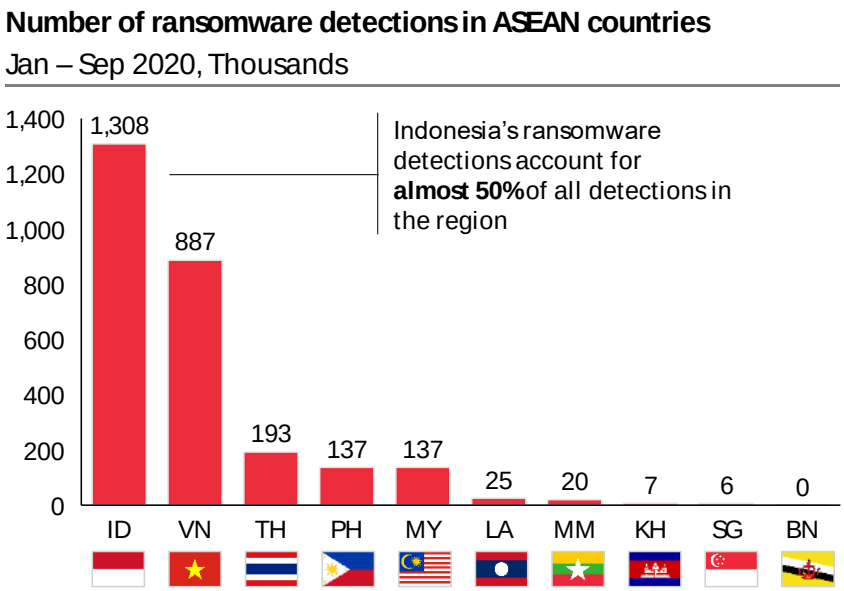
Dimension	*Ideal state*	Indonesia e-KTP	India AADHAAR
1 **Effective operating model**	*Reliable end-to-end operations from user enrollment, authentication to integration of providers*	Easy access to enrollment (e.g., services in Islamic boarding schools, hospitals, rural areas like borders and mountains) Free enrollment No self-service data update portal Frequent logistical issues (e.g., difficulties in receiving physical card)	Easy access to enrollment (e.g., services in bank branches, online pre-registration) Free first enrollment Self-service data update portal
2 **System interoperability**	*High ability to exchange data with other systems, databases, devices, and applications*	Interoperable database but not yet an open infrastructure in the middleware and microservices International biometric standards	Interoperable database, middleware, and microservices– fully open digital infrastructure International biometric standards
3 **Regulatory framework for broad usability**	*Clear legal basis to support a variety of use cases*	Legal basis for e-KTP validity as SIN and mandate as proof of citizenship (UU 24 2013) but not for use cases or data security	Legal basis for the Aadhaar project, use cases and data security (Aadhar Act 2016)
4 **High-value use cases**	*High availability of integrated public and private high value usages*	Verification for public and private institutions As proof of citizenship enabling voter registration	Verification for public and private institutions Access to government services Financial services (e-KYC and agent banking) Shared Healthcare, Education and Agriculture databases Access to G2P transfers Digital document storage, verification and QES[1]
5 **Positive user experience**	*Seamless user experience of the digital ID*	No app nor digital card resulting in usage of e-KTP being fully analog	m-Aadhaar application; DocuSign to store and verify documents Printed version valid Errors have excluded individuals from receiving benefits
6 **User trust**	*Strong data privacy and security causing low instances of data breach*	Data breach in 2022 exposing 279 millions of KTP numbers and personal informations	Data breach in 2019 exposing thousands of Aadhar numbers

1. Qualified Electronic Signature | 2. MyKad for children, needs to be converted to MyKad after turning 12 | 3. Public Key Infrastructure

Cybersecurity capabilities

Fourth, lack of cybersecurity capabilities. Indonesia's rate of cyber threats is one of the highest rates in the region and is continuously increasing at a rate of rate of 231% from 2020-2021 (Exhibit 206).This creates a serious deterrent to users' willingness to share sensitive data online.[242]

Exhibit 206:
Ransomware Detections in ASEAN



[242] BSSN Monitoring Keamanan Siber Laporan Tahunan 2021 – 2018; Interpol ASEAN Cyberthreat Assessment 2021.

Adoption of Advanced Tech

While digital adoption in Indonesia has grown rapidly, the adoption of more advanced digital technologies, e.g. web3, cloud, blockchain, industry 4.0, has been lagging ASEAN peers due to:

- Low accessibility to high-speed internet.
- A shortage of skilled digital talent.
- Unclear regulations and policy application, for example, in the implementation of cloud computing and data management.

Hence, to unlock Indonesia full economic potential, Indonesia should aim to enhance digital innovation and adoption across industries (Exhibit 207)

Exhibit 207:
Aspirations for Technologies Sectors

FROM	TO
Having **limited internet connection in select concentrated areas** in the country	**High coverage of high-speed internet** across the country
High number of digitally savvy and social media users	**Emerging tech and digital innovation hub** fostering the next generation tech entrepreneurs and innovators
Low cybersecurity capabilities in both public and private sectors	**Posses high degree of cyber security capabilities** against cyber threats across public and private sectors
4.5% in Fixed broadband penetration	**38%** in Fixed broadband penetration
74% in Digital literacy index	**92%** in Digital literacy index
60% in Secure servers NRI score	**95%** in Secure servers NRI score

Bold moves

There are three bold moves Indonesia should follow to accelerate the adoption and implementation of transversal technology (Exhibit 208).

Exhibit 208:
Bold Moves for Transversal Technologies

x Deep dive next

1. Build digital infrastructure for the future

1A **Accelerate rollout of high-speed internet connection** across the geography to provide internet for all

1B **Leverage IOT to initiate smart urban ecosystem in major cities** to promote efficiency, sustainability, and improved quality of life

2. Establish a digital government in Indonesia

2A **Establish a truly national ID** that is interoperable with secure data management system with broad application across public and private services

2B **Enhance user/ consumer protection measures across public and private sectors** through clearer guidelines on personal data use and collection

2C **Devise and enact a national cybersecurity strategy** for public and private entities to protect critical infrastructure from cyberthreats

3. Promote digital innovation and adoption

3A **Establish a digital special economic zone as a regional tech and entrepreneurship hub** to foster and radiate tech innovation

3B **Develop a national AI strategy to build a pro-innovation regulatory environment** permitting government, companies, and researchers to realize the positive impact of AI

3C **Invest in and accelerate the adoption of GenAI in Indonesia**, e.g., in education, telecom, and healthcare sectors

Bold Move One - Build Digital Infrastructure for the Future

In a world where digital innovation and technology are rapidly growing, the establishment of a robust digital infrastructure has become paramount for countries striving to keep pace with the rapid technological advancement. There are 2 key actions that Indonesia need to take to build the digital infrastructure for the future:

1. Accelerate rollout of high-speed internet connection

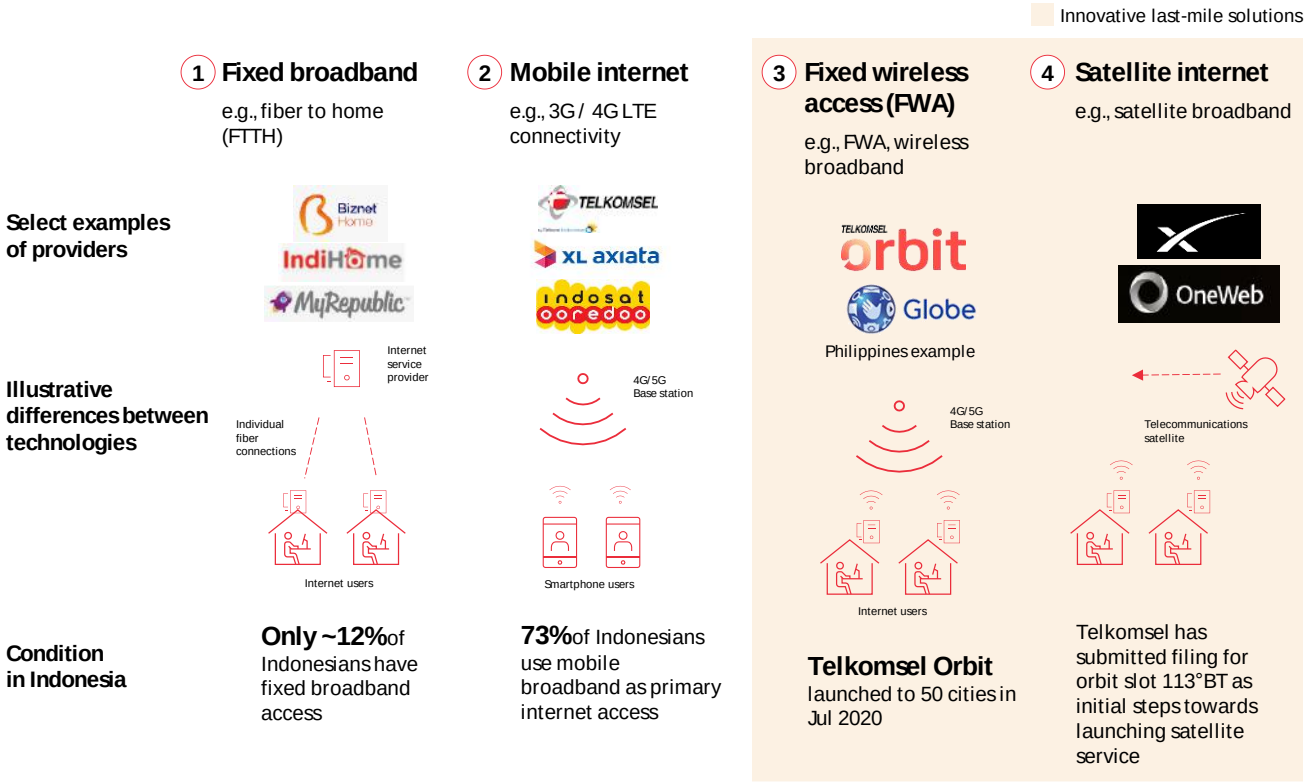
Indonesia can improve digital infrastructure through accelerating rollout, as well as through innovative last-mile solutions to bring the internet into more homes and businesses.

Indonesia could support accelerated rollout of infrastructure to rural areas by improving ease and reducing cost of mobile broadband to encourage lower spending on spectrum and to reduce the overall cost of building network bandwidth, e.g., releasing more spectrum and encouraging the consolidation of players.

Beyond mobile broadband, Indonesia should also improve the ease and reduce the overall cost of fixed broadband infrastructure with simplified permitting processes such as improved right of way regulation and land usage for fiber-optic cable backhaul should be conducted in parallel with the acceleration of mobile broadband access.

In parallel, the government could consider supporting the private sector in unlocking business cases for accelerated rollout of innovative last mile technologies. Support could be generated through incentivizing last-mile digital infrastructure with accessible prices through existing infrastructure, such as leveraging mobile networks with Fixed Wireless Access (FWA) , introducing fixed broadband pricing propositions such as shared fiber-optic cable access, and introducing satellite-based internet (Exhibit 209).

Exhibit 209:
Potential Last-Mile Solutions for Digital Infrastructure



2. Leverage IOT to initiate smart urban ecosystem in major cities

To further strengthen the digital infrastructure, Indonesia could develop capabilities in Internet-of-Things (IOT) technologies. Many cities around the globe have successfully adopted and leveraged technology to improve their efficiency, sustainability, and quality of life, such as:

- Adoption of smart infrastructure, Chicago: Implemented a smart grid to modernize electricity infrastructure, which provides long-term infrastructure for citizens with more sustainable and reliable electric service.
- Adoption of smart sensors for sustainable infrastructure, San Francisco: Applied Nordsense's smart sensors to mitigate waste overflow and optimize trash collection, resulting in an 80% drop in number of overflowing waste bins.
- Adoption of AI for increased access to information and public safety, Singapore: Invested in using big data to improve road safety through digital augmentation of facial recognition systems

Developing a strong IOT capabilities could help Indonesia in realizing the Indonesia 100 Smart City ambition to build smart cities across the nation. To support the development of IoT capabilities, Indonesia could foster the next generation of digital talents specializing in IOT by providing grants and scholarship in related fields and create a favorable environment for IOT hardware companies to set up domestic manufacturing sites.

Bold Move Two - Establish a Digital Government in Indonesia

In an era defined by rapid technological advancement and an increasingly interconnected global community, the establishment of a digital government has emerged as a critical imperative for countries around the world, including Indonesia. To establish a digital government in Indonesia, Indonesia should:

1. Establish a truly national ID

Indonesia should prioritize the establishment of a truly national ID that is interoperable with a secure data management system and has broad applications across both public and private services. This would enable

seamless access to various government services, streamline administrative processes, and foster efficiency for the citizens.

To further understand the benefits of advancing the national ID, we can take a look at the case study in Estonia (refer to 'Leapfrogging growth in financial services': Bold Move Six - Invest in a Data Exchange Platform Based on Single National ID).

Estonia has adopted a data mesh approach called X-Road® that links agencies and private sector organisations. X-Road is an open-source software and interoperable ecosystem[243] solution that provides unified and secure data exchange between organisations such as government agencies. Today, X-road has been applied in multiple sectors, including education, healthcare, and banking.

The success of X-Road demonstrates that data needs to be interoperable to enable a truly national digital ID. Currently in Indonesia, digital datasets are siloed and are not interoperable with other datasets causing limited use cases, while some datasets are yet to be digitized (Exhibit 210).

Exhibit 210:
Indonesia's Current State of Data Digitization

- Digitized and owned by public sector
- Digitized and owned by public (SOE) and private sector
- Partially digitized and owned by public sector
- Partially digitized and owned by public (SOE) and private sector

Type of data	Example dataset	Data digitized?
Population	Name, address, marital status, religion, biometrics, family	Available nationally centralized in Dukcapil
Social benefits	Government insurance, social security, social benefits	Available nationally in separate agencies (e.g., Kemsos website)
Taxation	Tax number, tax documents	Available nationally centralized in Dirjen Pajak (e.g., Pajak online)
Vehicle	Drivers license, vehicle ownership, vehicle tax	Partially available– for tax and drivers license (e.g., SAMSAT)
Land	Land ownership, property ownership	Unavailable
Utilities	Electricity usage, water usage	Available nationally within each utility service (e.g., PLN, PDAM)
Education	Education status, school or university	Partially available but incomplete (e.g., NISN for schools, PDDikti for university)
Employment	Employment status, employment history, employment benefits	Partially available – only BPJS Ketenagakerjaan
Telecom	SIM cards	Available in silo by mobile operators– linked to e-KTP (e.g., Telkomsel)
Financial services	Bank registry, investment accounts, government bonds	Available in silo within each financial service provider– linked to e-KTP (e.g., BCA, BRI, Mandiri)
Health	Medical records, medication history information, health insurance	Available in silo within some health service provider (e.g., Siloam Hospitals, Pertamedika)

To fully unlock the potential of digital government, Indonesia should:

- Establish a centralized data center powered by a data management solution which ensures security and interoperability.

[243] Data able to be used in conjunction with other data for multiple use cases.

- Accelerate data digitization efforts in both the public and private sectors to fully achieve a digital data management ecosystem.
- Launch national initiatives to centralize data storage and standardize dataset formats.

2. Devise and enact a consumer protection measure and national cybersecurity strategy

One major issue with the deployment of truly national ID using X-Road system is that awareness and capability of cybersecurity in Indonesia remains low. Therefore, Indonesia should enhance its user/consumer protection measures across public and private sectors through clearer guidelines on personal data use and collection, as well as enact a national cybersecurity strategy for public and private entities to protect critical infrastructure.

Rapid digital economy growth in Indonesia needs to be closely followed by cybersecurity capability to prevent the emergence of preventable cybercrimes with costly outcomes to the national economy.

Case Study: Israel

Israel has developed a robust ecosystem to enhance its cyber security through the establishment of National Cyber Committee (NCC) to develop national cyber strategy, Israeli National Cyber Bureau (INCB) to provide funding for cyber security solutions, and National Cyber Defense Authority to develop and operate the national Cyber Event Readiness team. INCB has launched multiple programs in cyber skill development and capability building, such as research programs, financial aids and collaborations with companies.

Learning from Israel, Indonesia could do 2 initiatives to fortify national cybersecurity:

- Establish national cybersecurity agencies to drive the development of strategies and initiatives in cybersecurity
- Rollout grants to fund cybersecurity projects and academic grants and scholarships to foster the next generation of cybersecurity talent in the country.

Bold Move Three - Promote Digital Adoption

To realize Indonesia's aspiration and vision in transversal technology sector, Indonesia should fully embrace and promote digital adoption across the nation. There are 3 key steps that Indonesia should take:

1. Establish a digital special economic zone as a regional tech and entrepreneurship hub

With the rapid advancements in technology and the increasingly interconnected global landscape, it has become crucial for Indonesia to create dedicated spaces that foster innovation and entrepreneurial endeavors.

Case Study: United Kingdom

The UK launched tech city initiative to boost tech growth in the "silicon roundabout" with a massive PR campaign, tax incentives, and the "entrepreneur visa".

This initiative was aimed to generate growth of the startup scene in London. There are multiple key initiatives launched as a part of the tech city initiative, such as (Exhibit 211):

So far, this initiative has enabled the establishment of over 2,000 startups, boosted job opportunity in digital tech by 11.2% from 2010-2014, and made UK to be the second fastest growing tech ecosystem in EU.

Exhibit 211:
Key Initiatives of London's "Tech City"

	Key initiatives
Culture	• **Establish private portals** such as **Built In London** and **London Startups List** which helped develop an entrepreneurial spirit in the city
Talent	• **Compensate the sub-optimal local hiring** by hiring 33% of their employees from remote locations (44% above European regional average), or **outsourcing** to nearby countries • **Established the Tech Nation Visa Scheme** to help **attract top tech talent** from outside the EU • **Established capability-building programs** including School for Startups, Bootlaw, East London Small Business Centre, Entrepreneurs Business Academy
Finance	• **Attracts VC funding** through the Seedcamp accelerator • **Rolled out government initiatives** include guarantees of 75% of an SME's bank loan, government-backed VC funds, and income tax and CGT relief for investors • **Launched the Upscale program** to power UK's fastest growing tech companies
Community	• **Ushered new ecosystem partners,** e.g. Centre For Entrepreneurs & StartUp Britain • **Built co-working spaces** for start-ups and enterprises • **Helped 100+ community-organised special events** each year, including **The Europas** Tech Startup Conference & Awards • **Held Future Fifty Programme** to select most promising companies for facilitated networking, assistance on matters such as infrastructure, government connections, private sector partners

Like the UK, Indonesia could centralize their digital talents, programs, accelerators and fundings in a designated hub to build a national tech ecosystem propelling the tech growth in the country. Digital Hubs and National AI initiatives could realize tech-enabled sectoral bold moves to promote digital adoption across companies, such as inventory management for pharmaceuticals and AgTech adoption for food security (Exhibit 212).

Exhibit 212:
Examples of Digitally Enabled Bold Moves

Select sectors	Digitally enabled bold moves
Manufacturing	**Leverage I4.0 and IOT to process materials using sensors** e.g., sensor-based waste control system, integrated grinding system **Leverage I4.0 and IOT to prototype custom designs** e.g., enable digital textiles leading to lesser time to market
Pharmaceuticals	**Establish tech-enabled medical product inventory management** (e.g., remote monitoring, RFID tags) to enable transparent assessment of goods availability
Financial services	**Invest in a data exchange platform, based on single national ID** that enable public and private interoperability of data and better credit underwriting
Food security	**Foster AgTech adoption to increase farmer productivity**; 4 types of AgTech – access to market, process improvement (IoT, predictive analytics, etc.) and biotechnology (e.g., hybrid seeds)

Each bold move is detailed in its respective sectors / pillars

Each of the bold move needs to be supported by enabling technologies, such as edge computing, cloud computing, IoT, digital twin, applied AI, and industrialized ML.

To conclude, by creating a digital special economic zone, Indonesia can harness power of technology to attract tech talents, programs, investors, and startups, creating a vibrant ecosystem that drives collaboration, knowledge exchange, and disruptive innovation. Such hub will not only facilitate the development and scaling

of innovative ideas, but also foster the growth of tech driven businesses, job creation, and economic prosperity, as well as position Indonesia as a frontrunner in the digital economy.

2. Develop a national AI strategy to build a pro-innovation regulatory environment

Beyond digital hubs, national initiatives are necessary for the development of advanced and future emerging technologies in the country, especially talents, infrastructure, funding, and policies. These foundations will subsequently promote digital adoption in companies across the country.

Case Study: China

As an example, China has made AI one of their strategic focuses and as a result has emerged as a major contender in the field of AI development and implementation. The Chinese state council published New Generation AI Development Planning in 2017 aiming to be world leader in AI by 2030 and rolled out three-year AI implementation plan providing financial support, IP protection, talents, and international cooperation to develop its AI industry.

To support the implementation of China national AI strategy, there are 4 key enablers in place: government institutions, data and digital infrastructure, talent development, and research and partnerships (Exhibit 213)

This strategy has been proven to bring positive impact to China, including rapid growth in China's AI market, with a value of $23Bn in 2021, and is projected to reach $61Bn by 2025, production of a third of both AI journal papers and AI citations worldwide in 2021, ranked among the top three countries for global AI vibrancy in Stanford University's AI Index.

Exhibit 213:
China's Approach to AI Strategy

Enablers	Description
Governmental institutions	• **Form National Artificial Intelligence Standardization Group and Expert Advisory Group** to conduct overall coordination of AI efforts throughout China • **Make AI as strategic prioritization at all governmental levels**, ensured by the presidential support
Data and digital Infrastructure	• **Build basic data and security detection platform** e.g., public data resource library, cloud service platform • **Invest in Integrated Circuit industry projects** resulting in world's fastest supercomputer
Talent development	• **Cultivate AI innovative talents** with a five-year AI talent training program • **Establish majors on big data, AI, and robotics** in 2019 and help train science teachers through an online portal
Research and partnerships	• **Enhance cooperation between domestic AI enterprises and leading universities and research institutes** • **Encourage foreign enterprises and research to set up centers** • **Propel the advancement of advanced AI technologies** by assigning giant Chinese AI-oriented firms to develop AI hardware and software systems for other Chinese companies to build upon

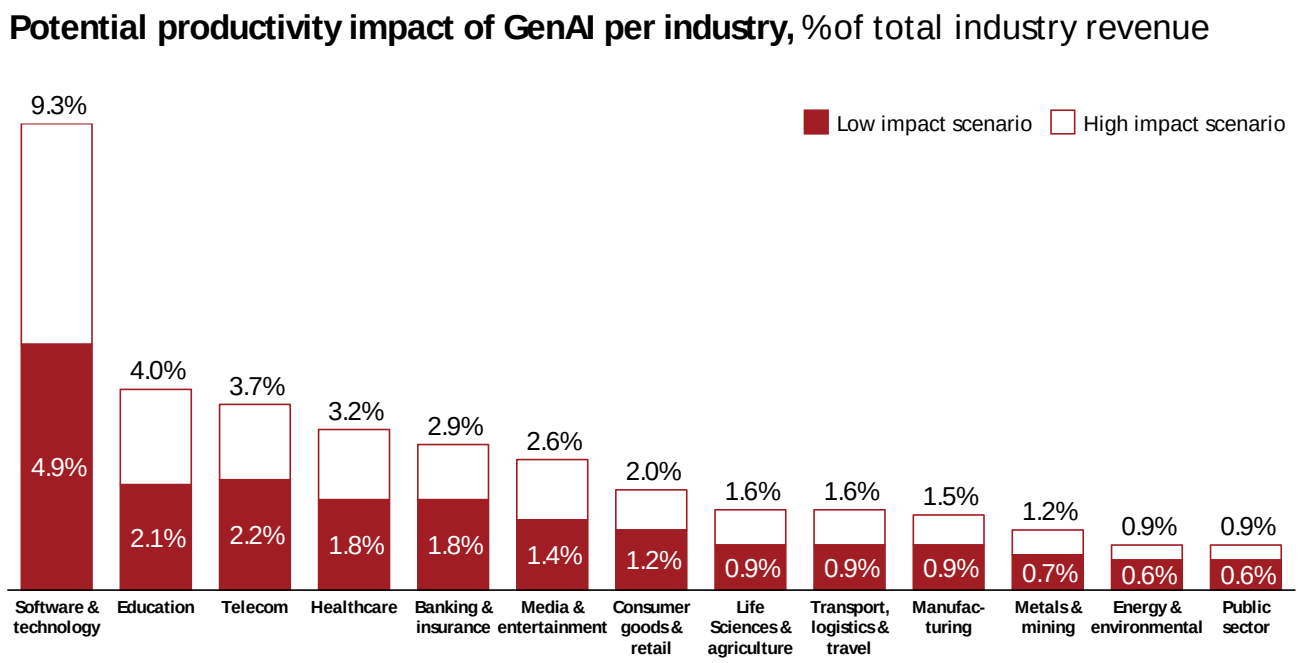
3. Invest in and accelerate the adoption of GenAI in Indonesia

Another groundbreaking frontier that holds immense potential to ensure the success of Indonesia's digital transformation and shape the future of Indonesia's economy is GenAI. GenAI's ability to write text, compose

music, and create digital art has tremendous potential for many stakeholders and sectors[245]

Indonesia can leverage GenAI in improving productivity across all sectors and industries (Exhibit 214).

Exhibit 214:
Potential Productivity Impact of GenAI per Industry



Source: The economic potential of generative AI: The next productivity frontier, McKinsey Global Institute, published June 14th, 202; McKinsey Global Institute Analysis

Indonesia could invest in and leverage GenAI to improve the operation efficiency, increase productivity, and boost economic outlook across all sectors in Indonesia, through:

1. Identifying potential business optimization, including cost reduction and productivity improvement
2. Formin partnership with global tech players to develop GenAI model across different sectors
3. Upskilling workforce to accelerate GenAI adoption
4. Reviewing and ratifying regulations in Indonesia to support and accommodate the adoption of GenAI

Roadmap

To accelerate the implementation of these bold moves, MSME can play a role in (Exhibit 215).

[245] "the Economic Potential of Generative AI: The Next Productivity Frontier", McKinsey Global Institute, 2022

Exhibit 215:
Role of MSMEs in Building Transversal Technologies

Bold moves	What MSMEs can do
1 **Build digital infrastructure for the future**	**Collaborate with telecommunication companies** to identify areas of mutual interest and bridge the last-mile connectivity gap (e.g., cable installment) to expand internet coverage to rural areas **Adopt IOT and technology** to increase efficacy and efficiency in operation
2 **Establish a digital government in Indonesia**	**Cooperate with the government in supporting the establishment of national ID** by providing data **Establish and communicate company's privacy policies** to all users and customers and **implement data security** to protect customers personal data **Regularly review and update company privacy policy** **Provide capability building for employees** in data protection principles and in managing cyberthreats
3 **Promote digital innovation and adoption**	**Actively participate in AI conference, seminar, and training programs** to enhance knowledge **Establish partnerships with technology companies** to develop tailored genAI model to fit the needs of the MSME and **conduct AI adoption pilot**

These bold moves will be executed across different phases in the next 22 years (Exhibit 216).

Exhibit 216:
Transversal Technologies Sector Roadmap

		2023-2030	2031-2035	2036-2040	2041-2045	Relevant stakeholders
A Build digital infrastructure for the future	1. Accelerate rollout of high-speed internet connection	**Expand 4G to rural areas** **Expand 5G** to first-tier cities	**Establish nation-wide highway broadband network** to enable future of mobility e.g., autonomous vehicles **Expand 5G** to all cities	**Expand last-mile 5G connection** to sub-urban and rural area		• Ministry of Communication and Informatics • Local governments • Telecom companies
	2. Leverage IOT to initiate smart urban ecosystem in major cities	**Establish smart sensors, connectivity and data collection for select real-time monitoring applications** e.g., public services, energy, environment **in tier-1 cities**	**Expand smart monitoring application** involving private players **Scale up smart monitoring applications** up to 100 cities across Indonesia	**Apply AI to establish reactive smart technology applications** allowing higher degree of automation in urban ecosystem management		
B Establish a digital government in Indonesia	3. Establish a truly national ID	**Formalize and integrate use of NIK (single national ID) for all government and commercial channels** e.g. Regional IDs, bank, telecom carrier, EMR, etc	**Establish a unified data exchange platform** between public and private systems	**Formalize data sharing among entities** for both public and private entities **Establish fully digital self-service government services**		• Ministry of Communication and Informatics • Ministry of Home Affairs • National Cyber and Encryption Agency (BSSN) • Ministry of Education, Culture, Research, and Technology
	4. Enhance user/ consumer protection	**Establish a clear guidelines and policies** on personal data use and collection for private and public company; continuously update guidelines				
	5. Devise and enact a national cybersecurity strategy	**Develop robust national cybersecurity agenda, accelerate enforcement of PDP across all sectors, develop cybersecurity talent enrichment program**	**Move from reactive to proactive cyber threat monitoring and mitigation** **Develop larger pool and continuous supply of domestic talent to enhance cybersecurity in private sectors** through scholarships and partnerships with top institutions globally			
C Promote digital innovation and adoption	6. Establish a digital special economic zone as a regional tech and entrepreneurship hub	**Designate special zone** as a tech hub with provision of incentives for tech ecosystem players setting up operations in it and **build necessary digital infrastructure** **Provide supports for start-ups** to foster local tech companies	**Attract more global tech players to set up operations in the country** by having clear supporting systems and guidelines **Attract top foreign universities to set up campus locally with digital major offering** **Promote the application of AI on public sector,** including SOEs	**Position Indonesia as an emerging hub for digital talent** by setting up exchange program for local talents to conduct research activities abroad		• Ministry of communication and information technology • Ministry of Education, Culture, Research, and Technology • AI companies
	7. Develop a national AI strategy	**Provide data and AI ethics guidelines** **Include AI curriculum in early education** **Provide research funding for AI projects and scholarships**	**Provide funding and scholarship for next generation digital technology and innovation**			
	8. Invest in and accelerate the adoption of GenAI	**Establish a dedicated National GenAI task force** **Foster GenAI education and skill development and create GenAI Centers of Excellence** **Identify priority sector and develop industry specific roadmap and GenAI model**	**Do pilot projects of GenAI adoption** **Strengthen data infrastructure and governance for GenAI**	**Develop National GenAI ecosystem & network** **Foster local and global collaboration between stakeholders to develop GenAI**	**Expand GenAI adoption to non-priority sectors**	

Key Metrics

The success criteria of the aspirations will be the key milestones to track (Exhibit 217).

Exhibit 217:
Transversal Technologies Key Metrics

	Key metrics	Source	Current	2030	2035	2040	2045	Note
Access	**Fixed Broadband Penetration[1],** *%*	ITU[2] *(2021)*	4.5	13	21	29	**38**	2045 targets based on China today
Security	**Global Cybersecurity Index,** *Score*	ITU *(2022)*	94.88	96	98	99	**100**	2045 targets based on US today
	Secure servers, *Score*	NRI[3] *(2022)*	60.15	69	78	86	**95**	2045 targets based on US today
Government	**Digital R&D expenditure,** *Score*	NRI *(2022)*	17.50	28	39	50	**60**	2045 targets based on US today
	E-Government Index score, *Score*	UN[4] *(2022)*	0.72	0.77	0.82	0.87	**0.91**	2045 targets based on US today
	Publication and use of open data, *Score*	NRI *(2022)*	42.65	53	62	71	**82**	2045 targets based on US today
IT Industry	**Patent Application,** *Score*	NRI *(2022)*	0.09	14	28	42	**55**	2045 targets based on US today
	Data centre capacity, *Watt per capita*	IDPRO[5] *(2022)*	0.72	38	77	115	**154**	2045 targets based on Singapore today
Digital Economy	**Digital literacy index,** *Score*	Economist *(2022)*	74.3	79	84	89	**92**	2045 targets based on US today
	Employment in digital intensive sectors, *%*	OECD[7] *(2022)*	5.7	10	15	20	**24**	2045 targets based on US today

1. Fixed broadband penetration per 100 inhabitants 2. International Telecommunication Union 3. Network Readiness Index 4. United Nations 5. Indonesia Data Center Provider Organization 6. Calculated using data from Cushman & Wakefield 7. Organization for Economic Co-operation and Development

Global quality leadership with local wisdom

Context and challenges

To achieve Indonesia Emas 2045 aspirations, Indonesia needs to cultivate the next generation of leaders. The Pancasila values that were written in Indonesia's constitution in 1945 continue to be an important pillar of Indonesian society today. In addition, Indonesians view there are two areas that need more emphasis – values of growth orientation and long-term perspective. This is perhaps triggered by a number of recent disruptions (e.g., digitalization, COVID-19, geopolitics situation) and broader dynamics influencing Indonesia's economy, socioeconomic stability and national ethos.

Navigating these challenging times requires cultivating the next generation of leaders both in societies and workplaces. In the remainder of this subsection, we explore each of these aspects further.

The Pancasila values are a focus today with the addition of leadership values – growth orientation and long-term perspective. The 2020 Nenilai Survey and 2023 KADIN's Skills and Leadership Characteristics survey looks at which values are important in Indonesia across diverse contexts (i.e., personal, society and workplace). They show values Indonesians would like to see maintained and developed going forward. Examples of these top values include fairness, accountability, integrity, human rights, and Gotong Royong (Exhibit 218).

Exhibit 218:
KADIN'S Skills and Leadership Characteristics Survey Result

Current values to keep | Values to drop | Same as desired values | Commonalities between personal and desired society values | Values that need to be further emphasized (as not observed today)

Top 10 observed personal values N=50,452; 2020	Top 10 observed society values N=50,452; 2020	Top 10 desired society values N=50,452; 2020	Top 10 observed leadership values in workplace N=126; 2023	Top 10 desired leadership values in workplace N=126; 2023
Accountability	Gotong royong	Fairness	Enthusiasm	Ethics
Simple/ honesty	Bureaucracy	Social justice	Ethics	Fairness
Trust	Strict moral / religious codes	Human rights	Accountability	Innovation
Fairness	Corruption	Gotong Royong	Innovation	Accountability
Self-discipline	Diversity	Democratic process	Persistence	Long-term perspective
Wholehearted	Democratic process	Long-term perspective	Discipline	Discipline
Humor/ fun	Ethnic / religious / racial discrimination	Accountability	Fairness	Persistence
Integrity	Elitism	Integrity	Entrepreneurial spirit	Hard work
Respecting parents	Short-term focus	Prosperity	Efficiency	Efficiency
Enthusiasm	Human rights	Quality of life	Hard work	Growth orientation

These values can be mapped to the Pancasila values: the belief in one God, just and civilized humanity, Indonesian unity, democracy under the wise guidance of representative consultation and social justice for all the peoples of Indonesia. In addition, the survey shows that Indonesians believes that two areas need more emphasis going forward growth orientation and long-term perspective (Exhibit 219).

Exhibit 219:
Top Values Indonesians Would Like to See in Societies and Workplaces

Values that need to be further emphasized (as not observed today) | Values observed in Indonesia today

		Top values Indonesians would like to see in societies and workplaces going forward[1]			
Pancasila Values The Five Principles that were written in Indonesia's constitution in 1945	**The belief in one God**	**Wholehearted**	**Integrity**	**Ethics**	**Self-discipline**
	Just and civilized humanity	**Respecting parents**	**Prosperity**	**Quality of life**	
	Indonesian unity	**Gotong Royong**	**Trust**	**Diversity**	
	Democracy under the wise guidance of representative consultation	**Democratic process**	**Accountability**		
	Social justice for all the peoples of Indonesia	**Fairness**	**Social justice**	**Human rights**	**Simple/ homely**
Additional values participants would like to see embedded in Indonesia's societies and workplaces	**Leadership**	**Growth orientation**	**Long-term perspective**	**Efficiency**	**Hard work**
		Humor/ fun	**Innovative**	**Persistence**	**Enthusiasm**
		Entrepreneurial spirit			

We believe that in order to deliver growth with long-term perspective, it is important to embed the spirit of Gotong Royong explicitly in the initiatives taken within Indonesia Emas 2045 roadmap. This spirit materialized in a number of diverse partnerships proposed in the other pillars of the Indonesia 2045 vision (Exhibit 220).

Exhibit 220:
Types of Partnerships in Indonesia Emas Roadmap

Government | Large companies | Universities | MSMEs | People

Types of partnerships	Examples		Proposed in EMAS 2045
Big corporations and MSMEs	Walmart	• Walmart launched Project Gigaton, which **aims to help small firms in its supplier network:** – Track their carbon footprint – Set sustainability goals – Access more favourable loan terms • Managed to **reduce GHG by 574 mn tonnes** since 2017	• **MSME strategy:** Provide capability building programs to build skills (through collaboration of big corporations) • **Tourism and creative industries:** Build creative hub help scale up creative industry SMEs through e.g. educational programs, consultancy services, etc.
Public-private-people partnership		• China **increased yield of maize farmers** through: – **Private sector contribute products** e.g. seeds, fertilizers, and equipment, and **offer offtake agreement** – **Researchers from Ministry of Agriculture provide on-site demonstration** of item usage	• **Food security:** Scaling up public private and farmer partnership to boost innovation
		• Spain's **public unemployment agency (IEFP) partnered with an association** of leading companies to **develop and launch reskilling programs** • Government provide access to labor market data, and the private sector provide information on unfilled vacancies	• **Talent capabilities:** Offer (local and international) practical experiences for vocational students, teachers and administrators to get practical experience
Universities and corporates	Imperial College London	• Imperial College fosters **close industry partnership through collaborative research**, funding and flagship industry centers – Eg. 10-year collaboration jointly funded by Shell and Qatar Petroleum for research on efficient and cleaner methods	• **Talent capabilities:** Build and scale diverse partnerships with global universities and leading private sector organizations

We see three changes that are triggered by global dynamics that influences Indonesia's economy, socioeconomic stability and national ethos (Exhibit 221).

Exhibit 221:
Global Dynamics influencing Indonesia's Economy, Socioeconomic Stability and National Ethos

1 Disruptive events as catalysts for change

In the past, periods with similar concentration of globally disruptive events that we are facing today have acted as a catalyst for change

2 Orientation by values vs. quick wins

Gradual shift in mindsets and behaviors towards creating real value (e.g., Indonesians are investing more, and the prevalence of child labor is decreasing)

3 Increased importance of "Doing the Right Thing"

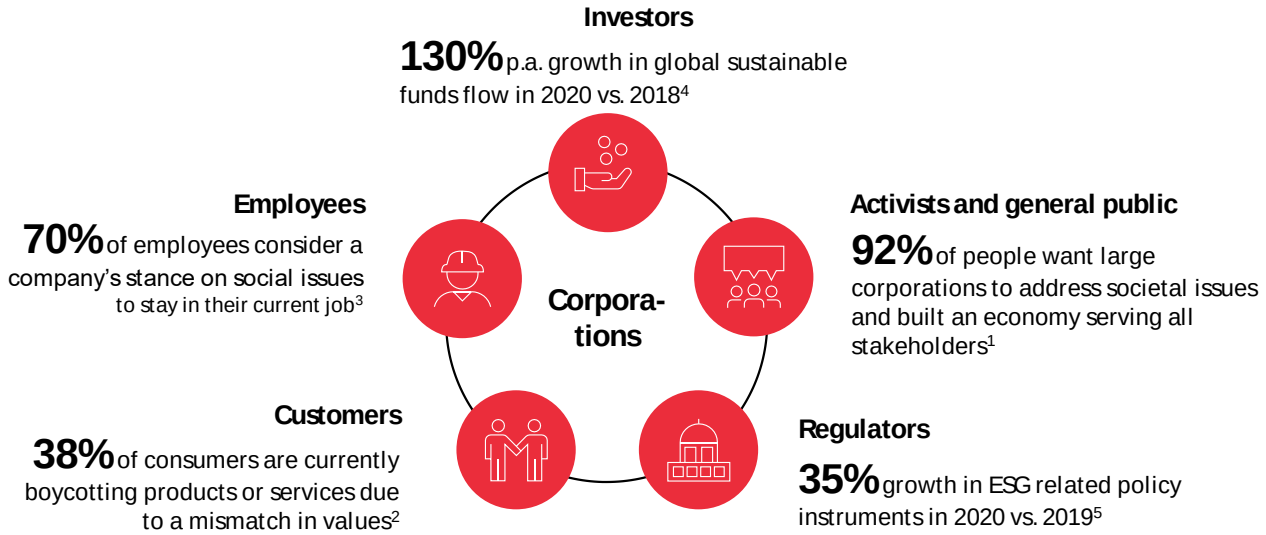
Increased focus initiatives that have positive societal impact e.g., ESG, intergenerational wellbeing, diversity and inclusion

First, disruption acting as catalyst of for change, e.g., adoption of digital payment at scale during COVID-19, changing employee expectation at work as technology allows the ability to work from home more effectively. In recent years, the pace of disruptions have increased significantly. Thus, leaders of tomorrow, will always need to continue to deal with the "new rules of the game". Ability to reorient disruption to catalyst for growth, or broader value creation, becomes important.

Aligned with this shift, the second shift is from focusing on 'quick-wins' to real value creation more sustainably.

Third, there is a trend towards "Doing the Right Thing" – e.g., taking a sustainability lens, protecting intergenerational wellbeing. We see notable changes in expectations across all stakeholders from investors, activists and the general public to regulators, consumers, and employees (Exhibit 222).

Exhibit 222:
Shifting Stakeholder Expectations



1. Just Capital 2020 Roadmap for Stakeholder Capitalism; 2. 2020 Compare Cards survey – 87%of consumers say they would boycott according to a 2017 Cone communications CSR study; 3. 2019 Brunswick Insight survey; 4. Global Sustainable Investment Review, 2018 - Calculated for five major markets (EU, US, Japan, Canada, AU/NZ); 5. According to PRI

In fact, major companies are also making business decisions based on "Doing the Right Thing." For instance, CVS Health, a leading American healthcare company that owns a retail pharmacy chain, and Aetna, a health insurance provider, among many other brands, exited tobacco products in 2014 because it is not aligned with the company's mission of "helping people on their

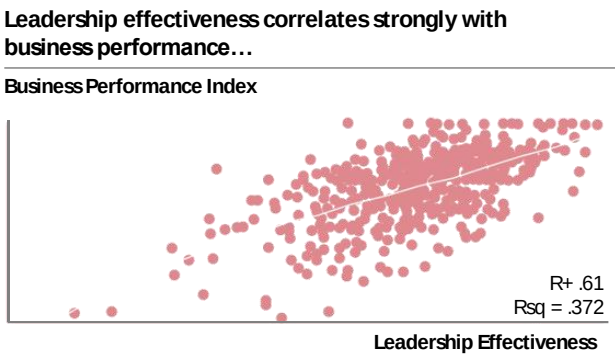
path to better health," a successful venture as represented by US$ 2 billion in annual revenues.

Two years after CVS stopped selling tobacco products, a study found smokers who had previously purchased cigarettes exclusively at CVS stores were 38% less likely to buy cigarettes at other vendors as well, demonstrating the power of a single actor in a crowded arena. CVS also provided meaningful ways for individual stores and their employees to work with communities on anti-smoking initiatives, creating a sense of shared ownership, right down to the store floor.[247]

This increased the expectation for both the existing and the next generation leaders across societies and workplaces. Indonesia will need more high performing leaders - research shows how high performing leaders create more economic value and are becoming more critical in times of uncertainty, disruption, volatility and change (Exhibit 223).[248]

Exhibit 223:
Relationship between Leadership Effectiveness and Business Performance

Leadership effectiveness correlates strongly with business performance…



2X Outperforming on EBIDA for **companies with great leadership**

2.4X Higher likelihood that organizations hit their performance targets when developing leaders during transformations

…and is becoming more critical in times of uncertainty, disruption, volatility and change

Leadership skills required to manage a VI-JCA environment

- **Inspire** with "bounded optimism", appeal to broader purpose and value, **communicate** with strategic clarity
- Increase **decision making** agility — through process (ways of working, role clarity, cycles) and mindset of **empowerment**
- Foster environment of **psychological safety and partnership** to build feedback, learning and growth culture
- Role-model **execution excellence** as one team — transparently communicating and measuring priorities and goals
- Reward and celebrate ownership, **collaboration**, execution, diversity and **entrepreneurial** behaviors and mindsets

2X Increased in transformation success when initiatives focused on **required mindset shifts** built in

5.3X Higher likelihood of transformation success when **leaders role-modeled** behavior changes

Putting it all, together, Indonesia should make a conscious, structured effort to both equip current leaders and cultivate the next generation of leaders, to not only embody Pancasila values and Gotong Royong spirit, but also with the mindset and skills that will enable them to deliver growth with long-term perspective in this world with increasing disruption. Refer to the Exhibit 224 below for the from-to shifts that can be considered going forward.

[247] Press search; American Journal of Public Health.

[248] McKinsey & Company, People and Organizational Performance practice.

Exhibit 224:
Values Aspirations

FROM

Leaders who embody Pancasila values

Unconscious and ad-hoc way of instilling values until K-12

Organizations that only emphasize performance

TO

Leaders who embody Pancasila values with long-term perspective and growth orientation

Conscious effort to instill values orchestrated throughout an individual's life span

Organizations that emphasize both performance and leadership values

Bold moves

Six bold moves can continue to emphasize the Pancasila plus additional values and cultivate the next generation of leaders (Exhibit 225).

Exhibit 225:
Bold Moves for Values

1. **Explicitly embed Indonesia 2045 leadership values in the 2045 Masterplan, and ensure there is long-term planning that includes leadership development**
2. **Embed the 2045 leadership dimension as one of the inputs for evaluations to select leaders for public sector related entities; and encourage private sector to adopt the same**
3. **Build a nationwide leadership academy through partnerships** (e.g., training, Go & Sees) to offer leadership programs by context (e.g., SOE, corporate, NGO, and academic), for instance establishing a KADIN Next Generation Leadership Institute across the nation
4. **Cultivate a national leadership pool e.g. KADIN High Performing Talent Pool**
5. **Create incentives for private organizations to invest in strengthening leadership** (e.g., inclusive closed loop incentives for leadership programs and CSR initiatives, nationwide awards for all ages and contexts)
6. **Establish Indonesia leadership 2045 index to track impact:** Develop an index that comprises of various economic and non-economic metrics that would be impacted through improved leadership and embodiment of values

Bold Move One - Explicitly embed Indonesia 2045 leadership values in the 2045 Masterplan

Indonesia's 2045 leadership values should be explicitly embedded in the official Indonesia 2045 Masterplan. By making the values an explicit priority, it would ensure actions are taken by the key stakeholders.

In addition, it would also set and standardize the expectations for leadership across the nation, across all sectors and organizations, and across any individual's life stages. And in turn, it will enable Indonesia to accelerate healthy and sustainable economic growth going forward.

Bold Move Two - Embed the 2045 leadership dimension as one of the inputs for

evaluations to select leaders for public sector related entities

Public sector leaders play an important role in enabling implementation of the growth pillars of Indonesia Emas 2045. As such, the values expectations could be embedded as one of the inputs for evaluations to select leaders for public sector related entities. Today, public sector officials (including directors, commissioners, and executive officers of Indonesian banks) undergo a "fit and proper" test before being selected and/or registered. The test considers the person's integrity, competence, and financial soundness. However, it does not evaluate a person based on their leadership values and behaviors yet.

Earlier, we established that high performing leaders create more economic value and are becoming more critical in times of uncertainty, disruption, volatility and change. If the fit and proper test does not look at leadership skills, we miss out on a key evaluation component – does the candidate demonstrate the values, mindset, behaviors and skills needed for Indonesia going forward? Would the candidate be able to lead the entity to thrive successfully, even in times of disruption?

Therefore, the 2045 leadership values and behaviors expectation should be embedded as one of the inputs for evaluations to select leaders for public sector related entities. The private sector should be encouraged to amend their evaluation criteria as well.

Bold Move Three - Build nationwide leadership academy through partnerships

Cultivating the next generation of leaders will take time and training. One option is to form a nationwide leadership programs for leaders of all types of organizations, from public sector to corporate to NGO and academic. The build of these programs could be dependent on four building blocks – vision and value proposition, governance and operating models, architecture and program design; and execution.

We see that this is usually done at large organizations with multiple entities, to ensure that there is clarity on leadership expectation in spite of different business/activities focus. See the Exhibit 226 below for best practices along these building blocks.

Exhibit 226:
Leadership Programs

Category	Elements	Selected Best Practices	Selected examples
Vision & value proposition	Objective of institute	• Scope and learning objectives should be **complementary to the short, mid, and long term strategy of the organization**	
	Purpose and Aspiration	• Leadership development should be anchored in a **well-defined philosophy and tailored leadership model, that is broken down into specific competencies**	
Governance & Operating Model	Program ownership	• Institute **should be the sole owner of leadership development and other programs that need to be driven centrally** across all BUs e.g. culture, on-boarding • The **Institute should also play a** supporting **role** on programs **where there are scale benefits**, e.g. cross-unit functional programs	
	Team set-up	• Hiring **a CLO/ Academy dean** with the relevant track record, expertise, and network of HR/ strategic partners to **ensure that offerings address business needs**	
Architecture & program design	Learning Model	• **Programs should rely on a mix of forums and field work that brings tangible benefits to the business**, and must be support by a variety of other tools, such as coaching, go-see visits and events to motivate/ inspire ('experiential learning') • **The academy objectives must be integrated with the related people processes**	ASTRA
	Partnership	• **Careful selection of strategic partners**, who possess: i) An understanding of the organization's context ii) Program design expertise, and iii) High quality facilitators and coaches to help academies quickly design and deliver best-in-class programs • **Public finance academies & institutions rely on strategic partners to boost their programs**	ADGM Academy DIGITAL ACADEMY
Execution	Success Measurement & Improvement	• **Measuring the impact of the academy's offerings across a standard metric, is critical** in assessing the success of the Academy and the adjustments needed • **Consistently update the content and delivery methods**, in line with business needs and latest thinking and approaches	

Taking a closer look at the program design, several types of personalized programs can be offered to instill the Pancasila plus additional values of long-term perspective and growth orientation (Exhibit 227).

KADIN could role model this, for example by setting up a KADIN Next Generation Leadership Institute, to nurture the next generation of leaders. KADIN could create this institute taking inspiration from an existing program called the Young Leaders for Indonesia (YLI).

Founded in 2008, YLI is an intensive leadership development program tailored for outstanding Indonesian students – introducing leadership and proactive problem-solving skills, helping the students in the post-university transition, as well as developing their vision as future leaders in Indonesia. Through the program, YLI has delivered more than 1,000 young leaders who have now been part of a number of leading organizations, local and multinational, public and private sectors alike.

Exhibit 227:
Personalized Leadership Programs

Offerings	**Values Learning journey** Take leaders through an intensive journey to build values and understand how to translate into mindsets and behaviors	**Values Masterclass** Equip leaders with the knowledge and tools to reflect on their behaviors and course correct as needed	**Values Accelerator** Train leaders and their top teams in becoming change changes for embodying the values and inspiring their organizations by example	**Values Digital Module** Build awareness and energize leaders on Values
Enablers	**Learning communications and support** Build momentum around the Leadership programs through internal marketing, pre-reads and homework	**Go & Sees** Develop useful insights on how to achieve a successful organizational transformation from leaders	**Secondment program** Involve participants as 'secondees' to work with the leadership program team and become internal change agents for developing the next generation of leaders	**Soft skills program** Enhance soft skills to further drive transition within the organization

Bold Move Four - Cultivate a national leadership pool

A national talent pool can be created to source future leaders of Indonesia to create a database and ensure availability of quality public sector leaders through a two-pronged approach. This would involve finding ways to identify the potential future leaders of Indonesia from those in the workforce. Second, it would involve crafting a development program to advance their leadership journey, which includes coaching and mentoring for their career opportunities or leadership choices .

It would also be important to ensure there is a structured monitoring and review, to ensure consistency of trajectory for the high performing individuals, and to ensure the quality level of the people in the talent pool.

Bold Move Five - Create incentives for private organizations to invest in strengthening leadership

Private sector has been core to developing Indonesian leaders today. It is important to continue to motivate private sectors to invest in developing leaders that are fit to not only to lead their businesses through disruptions, but also to have a values and mindset attuned to developing Indonesia of the future. If private sector could take a tri-sector leadership approach (i.e. developing leaders who can thrive in business, social, and public sector setting) in developing their leaders, it would be a great contribution to Indonesia Emas 2045. Indonesian government could find ways to incentivize

private sectors to contribute to building the leaders of tomorrow, including leveraging non financial approaches. For instance, there could be a nationwide award for 'Indonesia's leaders of tomorrow', support for ease of doing business for those who invest in developing future leaders, etc.

Bold Move Six - Establish Indonesia leadership 2045 index to track impact

Currently, there is no holistic metrics or index such as the PISA score or Ease of Doing Business index exists to track the impact of successful leadership.

Indonesia could strive to create an index comprised of various economic and non-economic metrics that would be impacted through improved leadership and embodiment of dynamic and Pancasila values. It would the first of its kind index, Indonesia's leadership 2045 index, that includes input indicators (surveys) and outcome indicators. It would measure impact of Pancasila–related values and additional values (e.g., long term perspective and growth orientation).

Illustrative input indicators would include Nenilai Values Survey 2020 and KADIN's Skills and Leadership Characteristics survey 2023. Sample output indicators would include ESG targets e.g., % of net zero target achieved and infrastructure targets e.g., quality of roads) and ease of doing business scores.

An example of a leadership index is the Australia Leadership Index (ALI). It aims to provoke and sustain a national conversation about leadership in Australia. It provides a way to measure how people view the performance of leaders and their institutions, when it comes to their overall leadership, and its drivers (Exhibit 228).

Exhibit 228:
Australia Leadership Index

Why does ALI exist?

Mission
The Australian Leadership Index aims to provoke and sustain a national conversation about leadership in Australia

Action
Track public perception of leadership across the government, public, private, and not for profit sectors

Partnership
ALI is funded through the Graham Foundation and is built in collaboration with technology and data collection partners

What is ALI?

At a glance
ALI is an index that provides a way to measure how people view the performance of leaders and their institutions, when it comes to their overall leadership, and its drivers

Drivers of leadership
Based on their research and statistical modeling, ALI believes there are three distinct leadership factors – integrity, contribution and competence. For each of these, distinct values have been identified

Relevance
A a wide range of institutions across government, public, private, and non-for-profit sectors are measured and tracked over time, providing comprehensive and ongoing picture of the state of leadership in Australia

How does the index work?

Index scores
To calculate the score for each metric, ALI takes the mean from an 11 point scale (0-10) and convert it to a score ranging from 0-100. Scores closer to 100 represent strong performance

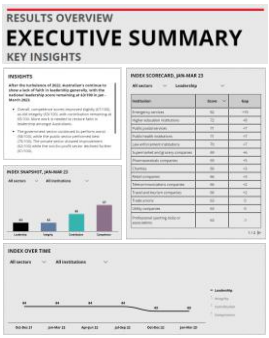
Benchmarks
Institution scores can be compared with sector scores and the national score, helping identify those who are performing or underperforming

Data is publicly available online

Data collection and gathering
4000 Australians are surveyed online every year, representative by age, gender and state

Participants are asked to rate the performance of 4 randomly assigned institutions on leadership and its key drivers

Australian Leadership Index
powered by Swinburne



Three additional examples of indices that track the (economic) impact of values are the:

- **Ibrahim Index of African Governance (IIAG):** IIAG collects the public perception on society and leadership values, while at the same time measures country's performance as perceived by citizens. IIAG covers political, social, economic and environmental indicators which can highlight Africa's citizens' expectation to their government. Utilizing the index, the impact of the values in the society can be measured and aligned with the tangible improvement in the quality of life of African citizens
- **Social Progress Index (SPI):** The 2022 Social Progress Index measure the social and environmental performance of 196 countries using 12 components and 60 indicators. This index evaluates the overall quality of life in a country or region and analyzes the relationship between economic development and social progress. Utilizing the index, the economic and

social development can be associated with the people perception on the nation's values

- **Legatum Prosperity Index (LPI):** The Legatum Prosperity Index is a framework that assesses 167 countries on the promotion of their residents' flourishing, reflecting both economic and social wellbeing. This has resulted in 12 pillars of prosperity split into 67 discrete policy focused elements, and grouped into three domains essential to prosperity: Inclusive Societies, Open Economies, and Empowered People. It used 300 different indicators from over 70 different data sources to construct the Index. By using the Index, it is possible to discover whether a country's prosperity is improving or weakening over time and identify what particular values-related element is driving this trend

In constructing the Indonesia 2045 leadership index, learnings from and/or partnerships with these global case studies can be instrumental.

MSMEs also play a crucial role in deploying the bold move (Exhibit 229).

Exhibit 229:
Role of MSMEs in Building Global Quality Leadership

Bold moves	What MSMEs can do
1 **Explicitly embed Indonesia 2045 leadership values in the 2045 Masterplan, and ensure there is long-term planning that includes leadership development**	• Participate in creating social media campaigns to enable widespread communication and adoption of values
2 **Embed the 2045 leadership dimension as one of the inputs for evaluations to select leaders for public sector related entities; and encourage private sector to adopt the same**	• Actively embrace the values and use it to inform performance evaluation criteria
3 **Build nationwide leadership academy through partnerships** (e.g., training, Go & Sees) to offer leadership programs by context (e.g., SOE, corporate, NGO, and academic)	• Attend the programs offered via the leadership academy
4 **Cultivate a national leadership pool through for instance, establishing a Kadin Next Generation Leadership Institute across the nation**	• Help establish and scale Kadin Next Generation Leadership Institute through e.g., being a mentor/coach, creating opportunities for the participants
5 **Create incentives for private organizations to invest in strengthening leadership** (e.g., inclusive closed loop incentives for leadership programs and CSR initiatives, nationwide awards for all ages and contexts)	• Adopt CSR initiatives • Incentivize staff to take leadership programs (e.g., subsidies, take time programs)
6 **Establish Indonesia leadership 2045 index to track impact:** Develop an index that comprises of various economic and non-economic metrics that would be impacted through improved leadership and embodiment of values	• Help in data collection and monitoring

Once the Indonesia Leadership 2045 index is deployed, it can be employed to track the progress of the initiatives.

Lastly, the bold moves can be implemented through initiatives until 2045 (Exhibit 230).

Exhibit 230:
Values Roadmap

	2023-2030	2031-2035	2036-2040	2041-2045	Key stakeholders[1]
1 **Explicitly embed Indonesia 2045 leadership values and national leadership development plan in the 2045 Masterplan**	**Refine leadership values and behaviors** for Indonesia 2045	**Review index scores** and revise strategy / long-term planning as needed			• Bappenas • Coordinating Ministries
	Define national leadership development program to be part of 2045 masterplan	**Continue to socialize values**, adapting collaterals as needed			
2 **Embed the 2045 leadership dimension as one of the inputs for evaluations to select leaders for public sector related entities;** and encourage private sector to adopt the same	**Embed the leadership dimension as part of criteria** for grooming public sector leaders	**Continue to embed values for each sector**, adapting policy as needed			• Bappenas • KemenPAN RB • Coordinating Ministries
	Define framework and mechanism to encourage adoption/ insertion by private sector				
3 **Build nationwide leadership academy through partnerships**	**Work with 2-3 strategic partners to build National Leadership Academy** (e.g., industry associations, SOE)	**Work with more strategic partners in broader ecosystem** (e.g., NGO, academics) to build hubs for the National Leadership Academy	**Build hubs to ensure coverage across Indonesia;** consider segment-specific academy (e.g., young, women)		• Kemenaker • Kemendikbud • KBUMN
4 **Cultivate a national leadership pool**	**Align on criteria for leadership pool**	**Refine method, refine development program** and define 2031-2035 leadership pool	**Refine method, refine development program** and define 2036-2040 leadership pool	**Refine method, refine development program** and define 2041-2045 leadership pool	• Coordinating Ministries • Kemenaker • Kemendikbud
	Define first batch for 2025-2030 leadership pool; define first version of development program				
5 **Define stimulation program for private organizations to invest in strengthening leadership**	**Define framework and mechanism to stimulate private sector investments in building Indonesia future leaders**	**Continue to refine framework and mechanisms** based on outcome			• Kemenaker • Kemenkeu • Kemenperin
	Launch first version to involve at least top 20-30 largest companies in Indonesia	**Continue implementation** to reach at least top 50 companies in Indonesia	**Continue implementation** to reach at least top 100 companies in Indonesia	**Leverage programs in top 100 companies** to reach broader industry	
6 **Establish Indonesia leadership 2045 index to track impact**	**Define framework and mechanisms** for tracking and stimulating progress	**Continue to adapt / innovate** on the index as needed			• Bappenas • Coordinating Ministries
	Define leadership index for Indonesia, aligning indicators with National Leadership Development Plan 2045				

Appendix

We would like to thank Otorita Ibu Kota Nusantara (OIKN) for generously sharing their pictures of IKN, to be used in our white paper as the cover and chapter divider (Chapter 1: Introduction). We see IKN as a symbol of national pride and sustainable economic growth.

We would also like to thank the following groups who have kindly spared their time for leading, engaging, and challenging our discussions to build this white paper. Without your contribution, this would not have been a truly inclusive roadmap for Indonesia.

Exhibit 231:
List of Stakeholder Groups

Dewan Pengurus KADIN Indonesia 2021-2026

Resiliency: Building unrivalled health resiliency

Inclusivity: Become the role model of end-to-end transformation of healthcare services ecosystem

- Asosiasi Produsen Alat Kesehatan Indonesia (ASPAKI)
- Gabungan Perusahaan Farmasi Indonesia (GP FARMASI)
- Perkumpulan Organisasi Perusahaan Alat-Alat Kesehatan dan Laboratorium Indonesia (Gakeslab)
- International Pharmaceutical Manufacturers Group (IPMG)
- Perkumpulan Asosiasi Perusahaan Alat-alat Kesehatan dan Laboratorium Indonesia (GAKESLAB)
- Asosiasi Genomik Indonesia (AGI)
- Ikatan Laboratorium Kesehatan Indonesia (ILKI)
- Asosiasi Rumah Sakit Swasta Indonesia (ARSSI)
- Asosiasi Instalasi Gas Medis Indonesia (AIGMI)
- Perkumpulan Perbekalan Kesehatan Rumah Tangga Indonesia (PEKERTI)
- Himpunan Pengusaha Alat Kesehatan Indonesia (HIPAKI)

Resiliency: Establishing a self-sustaining food security ecosystem

- Asosiasi Rumput Laut Indonesia (ARLI)
- Asosiasi Demersal Indonesia (ADI)
- Asosiasi Pengusaha Catfish Indonesia (APCI)
- Asosiasi Pengalengan Ikan Indonesia (APIKI)
- Asosiasi Pelaku Usaha Bandeng Indonesia (ASPUBI)
- Asosiasi Perikanan Non Tuna Non Udang (ASPINTU)
- Himpunan Pengusaha Penangkapan Udang Indonesia (HPPI)
- Asosiasi Pengelolaan Rajungan Indonesia (APRI)
- Forum Udang Indonesia (FUI)
- Asosiasi Pengusaha Pindang Ikan Indonesia (APPIKANDO)
- Asosiasi Tuna Longline Indonesia (ATLI)
- Asosiasi Perikanan Pole & Line dan Handline Indonesia (AP2HI)
- Himpunan Pembudidaya Ikan Laut Indonesia (HIPPILINDO)
- Asosiasi Produsen Pengolahan dan Pemasaran Produk Perikanan Indonesia (AP5I)
- Asosiasi Tuna Indonesia (ASTUIN)
- Asosiasi Pengusaha Pindang Ikan Indonesia (APPIKANDO)
- Federasi Asosiasi Perikanan Indonesia (FAPI)
- Shrimp Club Indonesia (SCI)
- Asosiasi Industri Rumput Laut Indonesia (ASTRULI)
- Gabungan Pengusaha Kelapa Sawit Indonesia (GAPKI)
- Asosiasi Kakao Indonesia (ASKINDO)
- Gabungan Perusahaan Makanan & Minuman Seluruh (GAPMMI)
- Asosiasi Industri Pengolahan Daging Indonesia (NAMPA)
- Asosiasi Produsen Tepung Terigu Indonesia (APTINDO)
- Asosiasi Gula Rafinasi Indonesia (AGRI)
- Gabungan Perusahaan Pembibitan Unggas Indonesia (GPPU)
- Himpunan Pengusaha Gula Indonesia (HIPGI)
- Asosiasi Perusahaan Jasa Boga Indonesia (APJI)
- Asosiasi Gula Indonesia (AGI)
- Gabungan Pakan Ternak Indonesia (GPMT)
- Asosiasi Industri Minuman Ringan Indonesia (ASRIM)
- Gabungan Perusahaan Pembibitan Unggas Indonesia (GPPU)
- Gabungan Koperasi Susu Indonesia (GKSI)
- Gabungan Minyak Nabati Indonesia (GIMNI)
- Asosiasi Minyak Makan Indonesia (AIMMI)
- Asosiasi Petani Kelapa Sawit Indonesia (APKASINDO)
- Gabungan Pelaku Usaha Peternakan Sapi Potong Indonesia (GAPUSPINDO)
- Masyarakat Singkong Indonesia (MSI)
- Perhimpunan Insan Perunggasan Rakyat Indonesia PINSAR (Indonesia)
- Gabungan Organisasi Peternak Ayam Nasional (GOPAN)
- Dewan Jagung Indonesia (DJN)
- Dewan Hortikultura Indoneia (DHI)
- Dewan Minyak Sawit Indonesia (DMSI)
- Dewan Beras Indonesia (DBI)
- Dewan Kedelai Indonesia (DKI)
- Dewan Kelapa Indonesia (DEKINDO)
- Pasar Komoditi Nasional Nasional (PASMNAS)

Prosperity: **Unlocking global lighthouses for scaled adoption of I4.0 in strategic manufacturing sectors**

- Federasi Industri Kimia Indonesia (FIKI)
- Asosiasi Industri Kimia Khusus Indonesia (AIKKI)
- Asosiasi Industri Olefin dan Plastik Indonesia (INAPLAS)
- Asosiasi Kaca Lembaran dan Pengaman Indonesia (AKLP)
- Asosiasi Kimia Dasar An-Organik Indonesia (AKIDA)
- Asosiasi Produsen Pupuk Indonesia (APPI)
- Asosiasi Resin Sintetik Indonesia (ARSI)
- Asosisasi Industri Pengguna Garam Indonesia (AIPGI)
- Crop Life Indonesia
- Responsible Care Indonesia (RCI)
- Asosiasi Gas Industri Indonesia (AGII)
- Gabungan Produsen Makanan Minuman Indonesia (GAPMMI)
- Asosiasi Produsen Air Minum Kemasan Nasional (ASPARMINAS)
- Gabungan Industri Kendaraan Bermotor Indonesia (GAIKINDO)
- Gabungan Industri Alat Mobil dan Motor (GIAMM)
- Perusahaan Listrik Negara (PLN)
- Asosiasi Industri Sepeda Motor Listrik Indonesia (AISMOLI)
- Perkumpulan Industri Kendaraan Listrik Indonesia (PERIKLINDO)
- Asosiasi Industri Sepeda Motor Indonesia (AISI)
- Asosiasi Pertekstilan Indonesia (API)
- Asosiasi Persepatuan Indonesia (APRISINDO)
- Asosiasi Produsen Serat dan Benang Filament Indonesia (APSyFI)
- Asosiasi Industri Perangkat Telematika Indonesia (AIPTI)
- Asosiasi Industri Teknologi Informasi Indonesia (AiTI)
- Gabungan Elektronika Indonesia (GABEL)
- Asosiasi Produsen Peralatan Listrik Indonesia (APPI)
- Mediterranean Shipping Company (MSC)
- Alat Mesin Pertanian (Alsintan)
- Perkumpulan Industri Komponen Kapal Indonesia (Pikki)
- Persatuan Istri Karyawan dan Karyawati Kereta Api (Pikka)
- Perkumpulan Industri Kecil dan Menengah Komponen Otomotif (Pikko)
- Asosiasi Pengusaha Engineering Karawang (Apek)
- Asosiasi Industri Mesin Perkakas Indonesia (Asimpi)
- Ikatan Perusahaan Industri Kapal Dan Lepas Pantai Indonesia (IPERINDO)
- Masyarakat Akuakultur Indonesia (MAI)
- Asosiasi Produsen Alat Kesehatan Indonesia (ASPAKI)
- Gabungan Perusahaan Farmasi Indonesia (GP FARMASI)

Prosperity: **Leapfrogging growth in financial services**

- Asosiasi Fintech Pendanaan Bersama Indonesia (AFPI)
- Asosiasi Fintech Syariah Indonesia (AFSI)
- Asosiasi Asuransi Syariah Indonesia (AASI)
- Asosiasi Asuransi Umum Indonesia (AAUI)
- Asosiasi Emiten Indonesia (AEI)
- Asosiasi Perusahaan Pembiayaan Indonesia (APPI)
- Perkumpulan Bank Syariah Indonesia (ASBISINDO)
- Perhimpunan Bank-Bank Umum Nasional Indonesia (PERBANAS)
- Asosiasi Perusahaan Jasa Pengolahan Uang Tunai
- Indonesia (APJATIN)
- Asosiasi Fintech Indonesia (AFTECH)
- Kustodian Sentral Efek Indonesia (KSEI)
- Kliring Penjaminan Efek Indonesia (KPEI)
- Bursa Efek Indonesia (BEI)
- Asosiasi Asuransi Jiwa Indonesia (AAJI)
- Asosiasi Perusahaan Modal Ventura (AMVESINDO)
- Asosiasi Sistem Pembayaran Indonesia (ASPI)
- Perhimpunan Bank Perkreditan Rakyat Indonesia (PERBARINDO)

Prosperity: **Building world-class ecotourism & infrastructure, and unleash global creative players in selected sub-sectors**

- Perhimpunan Hotel dan Restoran Indonesia (PHRI)
- Asosiasi Perusahaan Perjalanan Indonesia (ASITA)
- Gabungan Pengusaha Wisata Bahari Indonesia (GAHAWISRI)
- Indonesia National Air Carrier Association (INACA)
- Asosiasi Kawasan Pariwisata (AKPI)
- Asosaisi Wisata Alam dan Margasatwa (WISATWARI)
- Society of Indonesia Professional Convention Organization (SIPCO)
- Himpunan Pendidikan Tinggi Pariwisata (HILDIKTIPARI)
- Asosiasi Perusahaan Impresariat Indonesia (ASPINDO)
- Jakarta Promotion Board (JAKPROM)
- Asosiasi Pengelola Pusat Belanja Indonesia (APPBI)
- Asosiasi Perusahaan Penyelenggara Pameran dan Kovensi Indonesia (ASPERAPI)
- Indonesia Air Transport and Travel Association
- Asosiasi Perusahaan Agen Penjualan Tiket Penerbangan (ASTINDO)
- Asosiasi SPA Indonesia (ASPI)
- Jakarta Convention Bureau
- Masyarakat Pariwisata Indonesia (MPI)
- Ikatan Ahli Perhotelan Indonesia
- Perhimpunan Perusahaan dan Asosiasi Kosmetika (ASPI)
- Asosiasi Pengusaha Lisensi Indonesia (ASENSI)
- Indonesian Subaquatic Sport Association (POSSI)
- Asosiasi Pemandu Gunung Indonesia (APGI)
- Perhimpunan Usaha Taman Rekreasi Indonesia (PUTRI)
- Komite Sepeda Indonesia (KSI)
- Perhimpunan Kebun Binatang Se-Indonesia (PKBSI)
- Asosiasi Profesi Fotografi Indonesia (APFI)
- Asosiasi Rekreasi Keluarga Indonesia (ARKI)
- Indonesia Creative Cities Network (ICCN)
- Asosiasi Profesi Fotografi Indonesia (APFI)
- Asosiasi Designer Grafis Indonesia (ADGI)
- Persatuan Perusahaan Periklanan Indonesia (PPPI)

Prosperity: **Accelerate MSME growth to mid size, globally competitive companies**

- Mubarokfood
- Asosiasi Pengelola Pusat Belanja
- Best of Indonesia
- IdFood
- Cakap
- Koalisi Ekonomi Membumi
- Sinarmas
- Visa
- US Asean
- Pintar
- Asosiasi Tenun Indonesia
- Kaya.id
- Biznet
- Icc
- LDC Pisagro
- Bukalapak

Inclusivity: **Empowering the vulnerable population**

- Economic Affairs, BAPPENAS
- Tim Nasional Percepatan Penanggulangan Kemiskinan (TNP2K)
- SMERU Institute
- Economic and Social Research (LPEM), FEB UI

Sustainability: **Becoming the world reference in innovative and affordable decarbonization, and world's largest hub of green business build**

- WALHI
- Indonesia
- Perhimpunan TELAPAK
- Econusa
- Sawit Watch
- Jaringan Tambang (JATAM)
- AMAN
- Kaoem TELAPAK
- JPIK
- KOBETA
- Obor Tani
- Bina Swadaya
- Ulayat Bengkulu
- LPMA Banjarmasin
- Asosiasi Pengusaha Hutan Indonesia (APHI)
- Asosiasi Pengusaha Pulp dan Kertas Indonesia (APKI)
- Asosiasi Perdagangan Karbon Indonesia (IDCTA)
- Indonesia Business Council for Sustainable Development (IBCSD)
- Perhimpunan Filantropi Indonesia
- Fairatmos

Key enablers: **Future-ready human capital**

- Badan Nasional Sertifikasi Profesi (BNSP)
- Lembaga Pengelola Dana Pendidikan (LPDP)
- Persatuan Guru Republik Indonesia (PGRI)
- Ikatan Guru Indonesia (IGI)
- Persatuan Guru Nahdlatul Utama (PGNU)
- LPI Maarif Nahdlatul Ulama
- Forum Guru Muhammadiyah (FGM)
- Majelis Dikdasmen PP Muhammadiyah
- Jaringan Sekolah Madrasah
- Majelis Pendidikan Kristen (MPK)
- Forum Rektor Indonesia (FRI)
- Majelis Rektor Perguruan Tinggi Negeri Indonesia (MRPTNI)
- Asosiasi Perguruan Tinggi Swasta Indonesia (APTISI)
- Forum Pendidikan Tinggi Vokasi Indonesia (FPTVI)
- Forum Direktur Politeknik Negeri Se-Indonesia (FDPNI)
- Asosiasi Politeknik dan Industri Indonesia (APII)
- Asosiasi Dosen Indonesia (ADI)
- Asosiasi Dosen Muda Indonesia (ADMI)
- Asosiasi Dosen dan Guru Vokasi Indonesia (ADGVI)
- Asosiasi Lembaga Sertifikasi Indonesia (ALSI)
- Asosiasi Lembaga Pelatihan Kerja Swasta (LPKS)
- Forum Pengelola Lembaga Kursus dan Pelatihan (FP-LKP)
- Pusat Studi Pendidikan dan Kebijakan (PSPK)
- SMERU Research Institute
- Yayasan Cahaya Guru
- Komunitas Salihara
- Gerakan Indonesia Kita

Key enablers: Integrated, accessible, and affordable infrastructure

- Asosiasi Perusahaan Jasa Pengiriman Ekspres Indonesia (ASPERINDO)
- Indonesia National Shipowner Association (I N SA)
- Gabungan Pengusaha Nasional Angkutan Sungai, Danau dan Penyeberangan (GAPASDAP)
- Indonesia National Air Carries Association (INACA)
- Asosiasi Satelit Indonesia (ASSI)
- Asosiasi Penyelenggara Jasa Internet Indonesia (APJII)
- Ikatan Penerbit Indonesia (IKAPI)
- Asosiasi Perusahaan Media Luargriya Indonesia (AMLI)
- Asosiasi Logistik dan Forwarder Indonesia (ALFI/ ILFA)
- Asosiasi Perusahaan Konsultan Telematika Indonesia (ASPEKTI)
- Asosiasi Pengusaha Truk Indonesia (APTRINDO)
- Organisasi Pengusaha Nasional Angkutan Bermotor di Jalan Raya (ORGANDA)
- Asosiasi Industri Perangkat Telematika Indonesia (AIPTI)
- Asosiasi Pengelola Terminal Petikemas Indonesia (APTPI)
- Asosiasi Peranti Lunak Telematika Indonesia (ASPILUKI)
- Asosiasi Perusahaan Pameran Indonesia (ASPERAPI)
- Perhimpunan Hotel & Restoran Indonesia (PHRI)
- Asosiasi Travel Agent Indonesia (ASTINDO)
- Perkumpulan Aliansi Sekumpulan Industri Tur Agensi (ASITA)
- Asosiasi Badan Usaha Pelabuhan Indonesia (ABUPI)
- Asosiasi Logistik Indonesia (ALI)
- Real Estat Indonesia (REI)
- Himpunan Pengembang Permukiman dan Perumahan Rakyat (HIMPERRA)

Key enablers: Transversal technologies for all

- Asosiasi Satelit Indonesia (ASSI)
- Asosiasi Penyelenggara Jasa Internet Indonesia (APJII)
- Ikatan Penerbit Indonesia (IKAPI)
- Asosiasi Perusahaan Media Luargriya Indonesia (AMLI)
- Asosiasi Perusahaan Konsultan Telematika Indonesia (ASPEKTI)
- Asosiasi Industri Perangkat Telematika Indonesia (AIPTI)
- Asosiasi Peranti Lunak Telematika Indonesia (ASPILUKI)
- Asosiasi Katalog Elektronik Indonesia (AKEN)
- Asosiasi Ponsel Indonesia (APSI)
- Asosiasi Blockchain Indonesia (ABI)
- Asosiasi Pengusaha Teknologi Identifikasi Indonesia (APTISI)
- Asosiasi Fintech Indonesia (AFTECH)
- Persatuan Perusahaan Periklanan Indonesia (PPPI)
- Persatuan Radio Siaran Swasta Nasional Indonesia (PRSSNI)
- Indonesia Digital Association (IDA)
- Asosiasi Pedagang Aset Kripto Indonesia (ASPAKRINDO)

Key enablers: Global quality leadership with local wisdom

- Nahdlatul Ulama (NU)
- Muhammadiyah
- Korps Alumni Himpunan Mahasiswa Islam (KAHMI)
- Perhimpunan Mahasiswa Katolik Republik Indonesia (PMKRI)
- Pemuda Katolik
- GMKI (Gerakan Mahasiswa Kristen Indonesia)
- Yayasan Tzu Chi
- Parisadha Hindu Dharma (PHDI)
- Pemuda Konghucu
- GAMKI

Table of Exhibits