DIGITAL INTEGRATION
The Key to Growth

TEAM PSYDUCK:

Oscar Ling Fang Jack
Quah Chun Meng

UNIVERSITI TEKNOLOGI MALAYSIA

ASEAN
DATA SCIENCE
EXPLORERS

4 QUALITY EDUCATION

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

The world is turning digital

The largest companies today own . . .

NO Content   **NO** Real Estate   **NO** Cinemas   **NO** Inventory   **NO** Cars

Digitalization has made **convenience** the main currency today . . .

Mobile Internet   +   **Mobile Access**   +   **Everyday Needs**   =   **Economic Growth**

There's still plenty of **untapped potential** in **ASEAN's digital economy**

ASEAN's digital economy

7%
of GDP

🇺🇸 **35%**

🇪🇺 **27%**

🇨🇳 **16%**

Source: Bain & Company 2018

$1trillion

Estimated **GDP uplift by digitalization by 2025**

Source: Bain & Company 2018

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In July 2016, UN declared access to Internet
to be a **human right**

Digitalising helped businesses survive during Covid-19
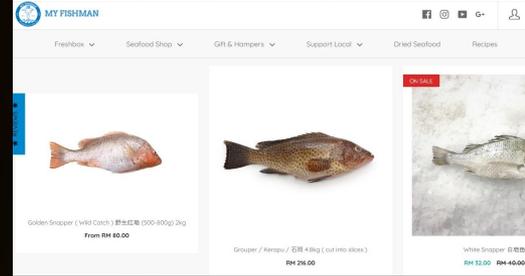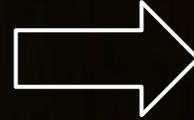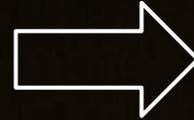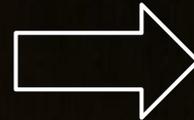
But,
most businesses
in ASEAN are
**not making the
digital shift**

Figure 1: Digital Adoption Index across ASEAN, 2017
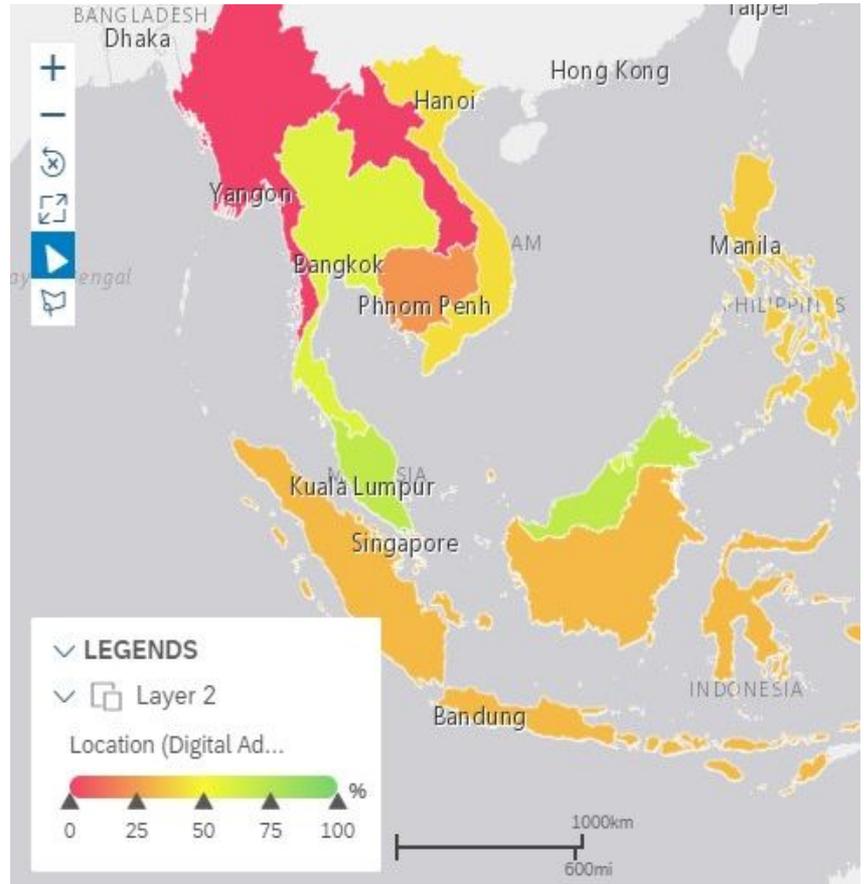
Source: World Bank, 2017

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Finding 2: Current Facilities in ASEAN

Developed nations have **better Internet** than **developing** nations.

Figure 2: Global Connectivity Index Broadband Scores across ASEAN & selected countries, 2019

Country	Score
Singapore	102.00
Korea	96.00
United States	96.00
China	84.00
Malaysia	69.00
Thailand	57.00
Indonesia	45.00
Vietnam	45.00
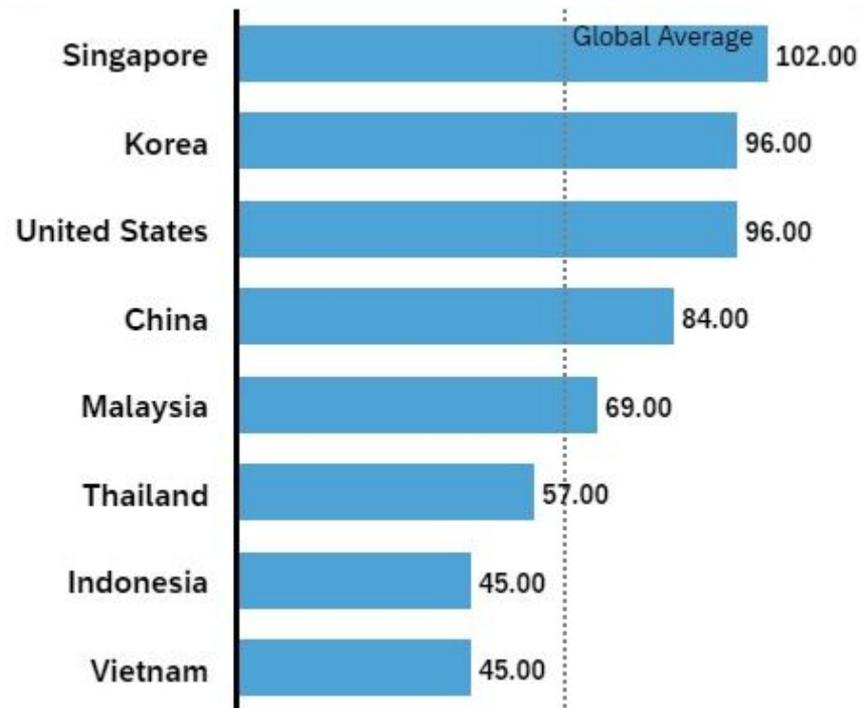
Source: Global Connectivity Index, 2019.

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Finding 2: Current Facilities in ASEAN

Internet speeds in ASEAN are mostly **below global average** and lag behind peers.

Figure 3: Comparison of download speed between Fixed Broadband & Mobile Broadband (Mbps) by Country, 2020
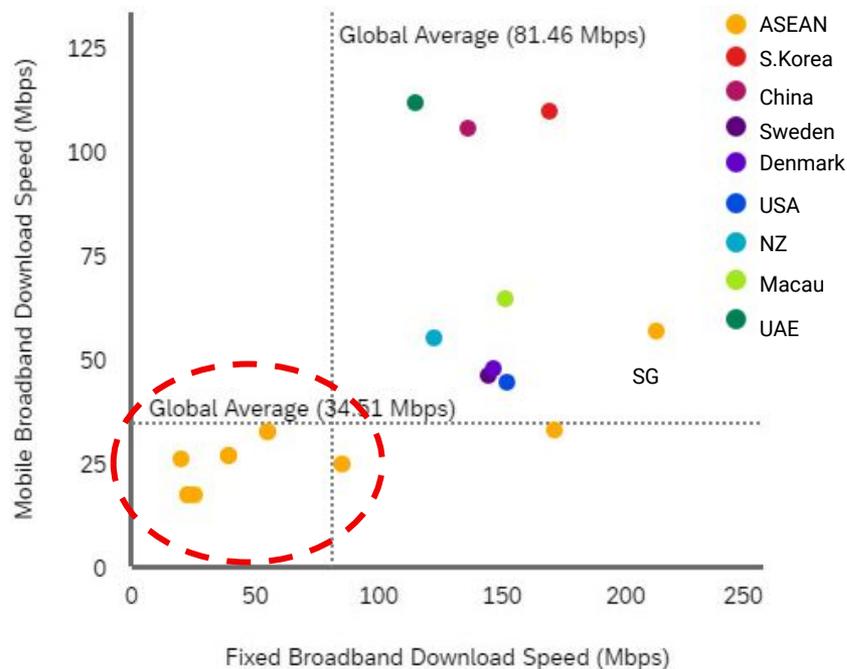
Source: Speedtest Global Index, January 2020.

Poor infrastructure is a main cause of **poor Internet speed**

Figure 4: Cumulative Broadband Infrastructure by Country
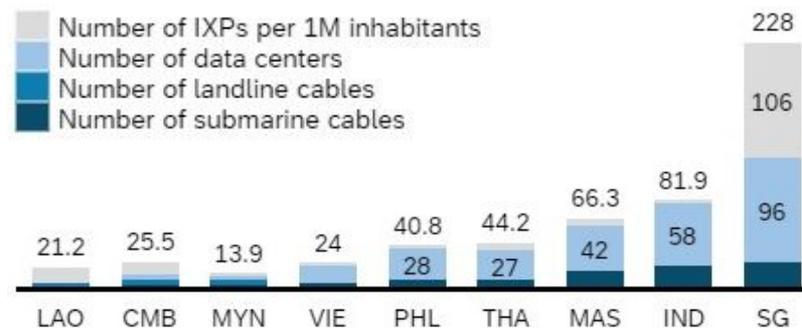
Source: TEIU 2020, OECD 2019

Figure 5: International bandwidth per user vs Mobile Download Speed by Country
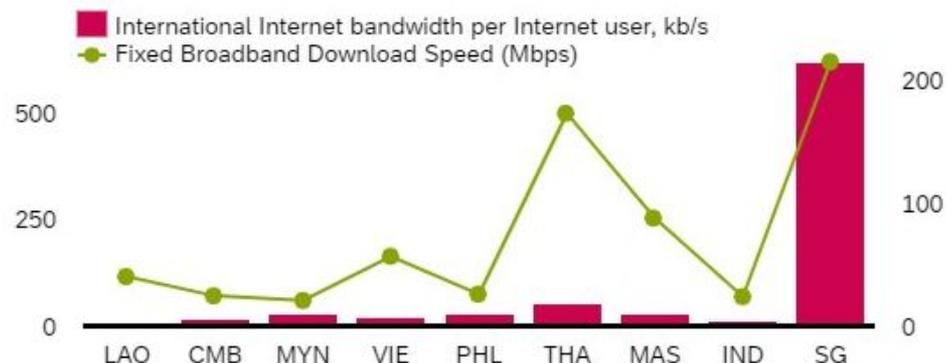
Source: TEIU 2020, UNESCAP 2019

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Unaffordable fixed broadband causes low digital adoption

Figure 6: Fixed broadband subscription vs Monthly cost as % of GNI per capita vs Cheapest broadband speed available for $20 (Mbps)
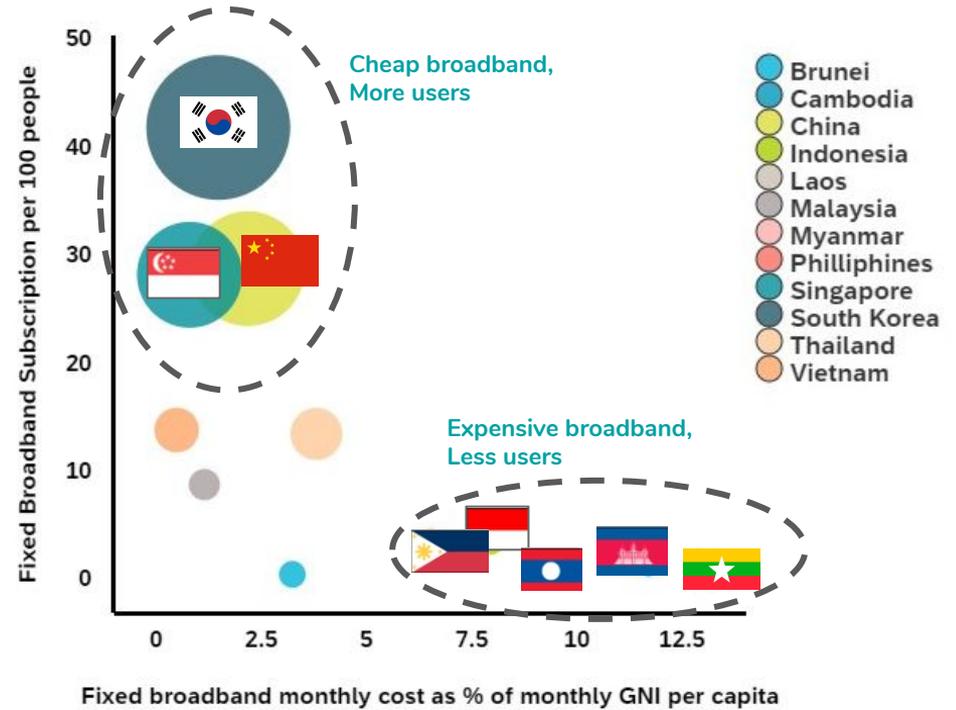
Source: ITU 2019, TEIU 2020, Picodi 2019

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Finding 3: Internet Affordability

Limited competition in Internet market leads to **poor affordability**

Figure 7: Market share (%) of fiber broadband providers in Laos, Malaysia, Singapore

Laos	75.0%		12.0%	13.0%	
Malaysia	6%	92.2%			
Singapore	22.0%	15.0%	32.0%	25.0%	5%

Source: OECD 2019, World Bank 2019

Value-for-money comparison of a **typical fixed broadband**

	Price	Value for $20	Affordability	% Users
LAO	High	3 Mbps	Very Poor	Very low
MAS	Medium	30 Mbps	Poor	Low
SGP	Low	500 Mbps	Good	High

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Finding 4: Lack of Talent

But,

the **supply of local tech talents** is **not meeting the demand**

46% of **ASEAN employers** faced **hiring difficulties** for **IT roles.**

Large SEA tech players (Grab, GoJek) have **opened tech hubs overseas** where **talents are abundant.**

Source: Manpower Group (2016), The Business Times (2018), The Straits Times, 2019

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Finding 4: Lack of Talent

⅓ of ASEAN's current **workforce** is still **concentrated** in the **traditional agriculture industry**

Figure 8 : ASEAN's workforce by sector

- Agriculture (Farming, Fishing and Forestry) — 34.37%
- Personal care & Maintenance — 13.56%
- Transportation & logistics
- Sales and Related
- Manufacturing & Production
- Construction and extraction
- Management
- Office and Adminstrative
- Business, Legal & Finance
- Computer, Mathematical and Science

1.66%, 1.97%, 6.42%, 6.52%, 7.14%, 8.49%, 9.01%, 10.87%
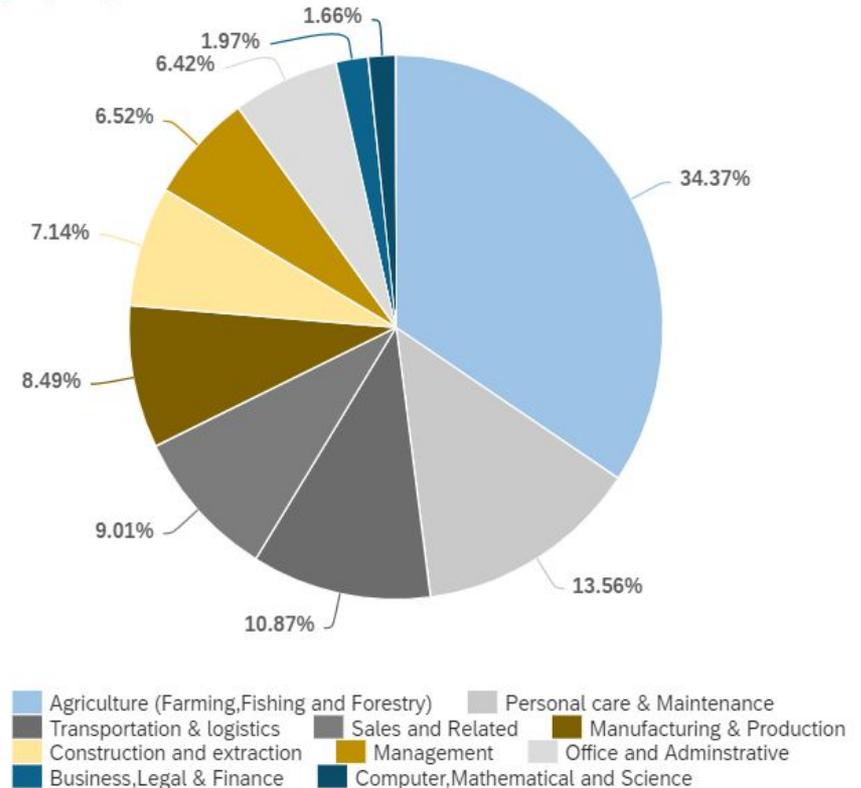
Source: The Future of Jobs, WEF 2016

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Our Findings In a Nutshell

Potential

ASEAN's digital economy has a huge potential & market

Situation

Businesses in ASEAN are not digitalising

Roadblocks

Poor Internet speed

Unaffordable Internet

Lack of tech talents

Recommendation 1: Improve Broadband Supply and Infrastructure

Goal

Focus

Recommendations

Impact

Ensure
**affordable,
accessible
& fast**
Internet
services

Improving
**Digital
Infrastructure**

Build Infrastructure

Upgrade to full fiber

PPP & FDI participation

**Accessible &
high quality**
Internet services

Promote
**Healthy
Competition**

Policy Formation

Infrastructure Sharing

Market Transparency

Affordable
Internet
services

Recommendation 2: Build a future-ready digital workforce

Transform the **education ecosystem**

- Agile future-ready curriculum
- Openness to education innovation
- Digital fluency as core skill

Facilitate **transition** into **disruptive ecosystem**
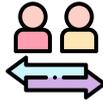
- Upskilling training
- Reskilling Fund
- Develop Expertise

Accelerating **innovation ecosystem**

- Establish Digital Hub
- Pro-business regulations
- Technology experimentation

ASEAN DIGITAL INTEGRATION BLUEPRINT 2021-2030 (ADIB)

Goals : ASEAN towards a **digitally enabled economy** that is secure, sustainable and transformative, and to cultivate an **innovative, inclusive and integrated** ASEAN community.

Aligned with:

ASEAN SOCIO-CULTURAL COMMUNITY BLUEPRINT 2025

ASEAN ECONOMIC COMMUNITY BLUEPRINT 2025

MASTER PLAN ON ASEAN CONNECTIVITY 2025

Inspired by:

THE ASEAN ICT Masterplan 2020

Targeted SDG:

4 QUALITY EDUCATION

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

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ASEAN SOCIO-CULTURAL COMMUNITY BLUEPRINT 2025

- A.2.2 - Harness the use of ICT to connect with the regional and global community.
- B.1.3 - Promote access to ICT for all.
- B.2.4 - Provide mechanisms and enhance institutional capacity to promote education & training.
- B.2.6 - Promote human capital development, economic self-reliance and sustainable livelihood.
- E.2.2 - Promote an innovative ASEAN.
- E.2.5 - Strengthen curricula and system of education in S&T.
- E.2.9 - Continuous training and re-training to support lifelong learning and workforce system.
- E.3.1 - Strengthen the supportive environment for entrepreneur.

ASEAN ECONOMIC COMMUNITY BLUEPRINT 2025

- A.5. Facilitating Movement of Skilled Labour and Business Visitors.
- B.1. Foster a "competition-aware" region that supports fair competition.
- B.3. Strengthening Intellectual Property Rights Cooperation.
- B.4. Productivity-Driven Growth, Innovation, Research and Development, and Technology.
- C.2. Propel ASEAN towards a digitally-enabled economy.
- C.3. Facilitate cross-border e-Commerce transactions in ASEAN.
- C.9. Making ASEAN innovative, competitive, vibrant, sustainable and economically integrated through S&T.
- D.1. Strengthening the Role of MSME in promote productivity, technology and innovation.
- D.3. Promote the use of PPP for infrastructure projects.
- D.4. Enhance productivity and competitiveness of rural economies.

MASTER PLAN ON ASEAN CONNECTIVITY 2025

Digital Innovation

- Support the adoption of technology by micro, small and medium enterprises (MSMEs).
- Support financial access through digital technologies.
- Improve open data use in ASEAN Member States.
- Support enhanced data management in ASEAN Member States.

4 QUALITY EDUCATION

Ensure inclusive and quality education for all and promote lifelong learning

Target 4.4: Increase the number of people with relevant skills for financial success

UN definition: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

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8 DECENT WORK AND ECONOMIC GROWTH

Promote inclusive and sustainable economic growth, employment and decent work for all

Target 8.2: Diversify, innovate and upgrade for economic productivity

UN definition: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.

Target 8.3: Promote policies to support job creation and growing enterprises

UN definition: Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.

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9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Build resilient infrastructure, promote sustainable industrialization and foster innovation

Target 9.C: Universal access to information and communications technology

UN definition: Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.

ASEAN Digital Integration Blueprint (ADIB) 2021-2030

Overview

2021-2030 Targets:

By 2030, Digital Economy contribute 20% of ASEAN's GDP

More than 25% of High-skilled Worker

Minimum 50 Mbps In ASEAN region

Enablers:

- Policies
- Research & Innovation
- Infrastructure
- Digital Ecosystem
- Talents

Key Drivers

Phase 1

WIDE, AFFORDABLE, QUALITY DIGITAL INFRASTRUCTURE

- Encourage private sectors investment & FDI in internet infrastructure.
- Allow stiffer competition along the broadband value chain.
- Set minimum broadband speed cap.
- Develop national & regional broadband strategies

Phase 2

CREATE KNOWLEDGE-DRIVEN DIGITAL ECONOMY

- Incorporate digital, entrepreneurship & innovation skills into curriculum.
- Provide subsidies and tax relieves for digital training
- Enhance the MSME technology platform
- Enabling regional mobility of skilled worker (mutual qualification recognition).

Phase 3

BUILD FOUNDATION FOR FRONTIER TECHNOLOGY

- Balance cross-border data flow with data localization.
- Ensure the existence and review of cybersecurity and data protection laws.
- Propelling growth through frontier technologies :

Internet of Things (IOT)

Artificial Intelligence

ADIB - ASEAN Member Countries Action Plan

Country Cluster	Short-term (1-3 years)	Long-Term (4-6 years)
Cluster 1: Growing nascent economy	• Digital Infrastructure development • Enhance quality basic education.	• Develop e-government services • Digital inclusion through digital services
Cluster 2: Joining middle-income country	• Empower education through STEM. • Improve cyber-security and data privacy	• Develop conductive business ecosystem • Support innovation & digital startup
Cluster 3: Breaking out of middle-income trap	• Encourage adoption of digital technologies • Provide incentives for digital skill training.	• Strengthen innovation & digital ecosystem. • Ensure policies are in place for investments.
Cluster 4: Maintaining leadership position	• Help MSMEs digitise & connect to ASEAN marketplace. • Open innovation focused regulation	• Future oriented, skilled digital worker • Propelling growth through frontier technologies

Digital is the **future,**

**A future not just for us,
but for our children and
future generations.**

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ADIB Appendix

Appendix: Country approach to ADIB Implementation

Identify country's cluster → Recognize best-fit strategy → Develop policy roadmap

Appendix: Cluster 1 - Growing nascent economy

Key Focus	**Digital Infrastructure Development**	**Enhance quality basic education.**	**Develop e-government services**	**Digital inclusion through digital services**
Policy Areas	• Broadband policy • LT spectrum strategy • Telecom regulation	• Primary & Secondary Education • Education Syllabus • Digital Foundation Education	• e-government strategy • E-government portal • Open Data Government	• Digital inclusion and awareness • Digital payment • Online banking

Appendix: Cluster 2 - Joining middle-income country

Key Focus

Empower education through STEM
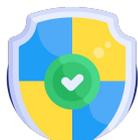
Improve cyber-security & data privacy

Develop conductive business ecosystem

Support innovation & digital startup

Policy Areas

- Digital inclusion and awareness
- Science & Tech Education
- ICT Higher Education
- Research

- Cybersecurity strategy
- Data protection and privacy
- Data Sovereignty

- Ease of doing business policy
- Digital business support
- Tax policy

- Digital business support
- Industry 4.0
- Industrial strategy
- Startup Incubator

Appendix: Cluster 3 - Breaking out of middle-income trap

Key Focus	**Encourage adoption of digital technologies**	**Provide incentives for digital skill training**	**Strengthen innovation & digital ecosystem**	**Ensure policies are in place for investments**
Policy Areas	• Broadband policy • LT spectrum strategy • National cloud strategy • 5G strategy • Telecom regulation	• ICT workforce development • Labor markets	• Digital business support • Industry 4.0 • Emerging Tech Regulations • Startup Incubator • Tech Sandbox	• Ease of doing business • Digital business support • Investment regulation • Tax Regulation

Appendix: Cluster 4 - Maintaining leadership position

Key Focus

Help MSMEs digitise & connect to ASEAN marketplace.

open innovation focused regulation

Future-oriented, skilled digital human capital

Propelling growth through frontier technologies

Policy Areas

- Ease of doing business policy
- Digital business support
- Investment/capital markets

- Broadband & spectrum
- 5G strategy
- Cloud strategy
- Cybersecurity and data protection
- Telecom regulation

- Digital foundation education
- ICT higher education
- ICT workforce dev.
- Specialized skills development

- National AI strategy
- Emerging tech. dev. and regulation
- IP rights
- Science and tech

Dimension	Key Policies	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Technology	National AI Policy	Critical	Good to have	Optional	Optional
	Emerging Tech Dev. Policy	Critical	Good to have	Optional	Optional
	Broadband Policy	Critical	Critical	Critical	Critical
	LT Spectrum Policy	Critical	Critical	Critical	Critical
	National Cloud Strategy	Critical	Critical	Critical	Good to have
	5G Strategy	Critical	Critical	Critical	Good to have
	IP Rights	Critical	Good to have	Optional	Optional
	Science & Technology Policy	Critical	Optional	Optional	Optional
	Cybersecurity Strategy	Critical	Critical	Critical	Critical
	Data Protection and Privacy	Critical	Critical	Critical	Critical
	Data Sovereignty	Optional	Critical	Critical	Critical
Ecosystem	Telecom Regulation	Critical	Critical	Critical	Critical
	Digital Service Taxation	Good to have	Good to have	Optional	Optional
	Emerging Tech Regulation	Critical	Critical	Good to have	Optional
	Digital Business Support	Critical	Critical	Good to have	Optional
	EoDB Reforms	Critical	Critical	Good to have	Optional
Capabilities	Digital Inclusion & Awareness	Optional	Optional	Good to have	Critical
	Digital Foundation Education	Critical	Critical	Critical	Critical
	ICT Higher Education	Critical	Good to have	Optional	Optional
	ICT Workforce Development	Critical	Critical	Critical	Optional
	Specialized Skills Development	Critical	Critical	Optional	Optional
Industry	eGov Strategy	Optional	Good to have	Critical	Critical
	Industry 4.0/Focus Sector	Good to have	Critical	Good to have	Optional
	Other Section Digitalization	Good to have	Good to have	Optional	Optional

Economic Policies

Policies that allow higher levels of achievement – necessary to excel in the action plan

Capital Market Policy	*Labour Policy*
Industry Policy	*International Trade*
Higher Education Policy	*Investment Policy*

Policy need for action plan:

- *Critical* (Green)
- *Good to have* (Yellow)
- *Optional* (Gray)

Appendix: ADIB Stakeholder Analysis

Enablers	Policies	Research And Innovation	Infrastructure	Digital Ecosystem	Talents
Stakeholders	Central Government ASEAN	Research Institutions Higher Education Institutions Ministry of Science & Technology Tech Industry	Investor Telco Industry Ministry of Multimedia & Communication Ministry of Trade	Public & Private Institutions Ministry of Education Ministry of Human Resource Ministry of Entrepreneurship Businesses	Research Institutions Higher Education Institutions Ministry of Education Ministry of Human Resource Businesses NGOs

Appendix

Promote healthy competition

Infrastructure Sharing

> Lithuania, France & S.Korea enforce open access to dominant operators' facilities.

> Singapore's National Broadband Network supplies wholesale-only, open-access services to all carriers and service providers.

Financing for new players

South Korea encouraged competitors with a low interest loan program to build their own broadband facilities, with a focus on rural areas.

Non-restrictive rules

> India regulates pricing and resale of international data via its Unified Licensing Regime.

> 6 of the top 10 countries for internet speed rank in the top 20 most economically free

Boost investment in Internet backbone

Innovate last mile supply

> Project Loon promotes access through balloons in rural Peru, New Zealand, Brazil, Puerto RIco.

> South Korea's Broadband Building Certificate has promoted 'cyber-ready' real estate construction practices since 1999

Upgrade to full fiber

In 2010, Singapore rolled out the Next Generation Nationwide Broadband Network replacing ADSL with ultra-high speed fibre optic. Cable and ADSL services were withdrawn permanently in June 2016.

Private Participation

> Indonesia's data center market attracts investments from industry giants Google, Alibaba and Amazon.
> Korean gov. & private telecom operators collectively fund the 34.1 trillion won upgrade of the national network to 1 Gbit/s service.

GOAL

Provide regulatory, financial, & infrastructural interventions to ensure a universally accessible, widely available and affordable broadband Internet services to promote a vibrant digital economy and improve the quality of life.

Appendix

Transforming Education Ecosystems

'Future-ready' curricular
- Design and deliver interventions that strengthen STEM skills, employability skills & global citizenship skills
- Broaden assessment beyond traditional test-based approaches

Digital fluency
- Mandate ICT and digital literacy in teacher training
- Develop digital literacy and ICT skills among current workforce through online learning platforms and short term training ("boot camps")

Openness to education innovation
- Experiment with greater autonomy for higher education and TVET institutions
- Provide learning opportunities outside the classroom (e.g. challenge based learning/hackathons)

Robust and respected technical and vocational education
- Organize work-based learning for current students (work exposure, internships, apprenticeships)
- Introduce vocational tracks in upper secondary education

Facilitating the Transition to a New World of Work

Current workforce learning and continuous reskilling
- Incentivize private sector to provide lifelong learning opportunities to their workforce
- Support on-the-job learning through individual, specific and agile training modules
- Increase emphasis on training for displaced worker
- MOOCs certificate recognition

Benchmarking Study

Singapore: Offered comprehensive adult training and skilling through SkillsFuture programme, offering credit for mid-career learning programme.

Germany: TVET Apprenticeship Systems that combined education and practical skill training. Employers in Germany have demonstrated that such practical application helps develop the skills of this critical talent pool allowing them to make an easier transition from the classroom to a work environment.

United States: Provided with digital literacy, professional skills, and online work competency needed to succeed in digital work and the freelancing economy

India : provided high quality education at affordable level through project-based learning with Standard of Excellence in Education and Development (SEED) organisation.

Appendix: Risk Analysis

- Cybersecurity threats
- Preparing talent to support the growth of Digital Economy
- Regulating innovative disruptions
- Readiness to embrace digital transformation across industries
- Digital Divide
- Data Localisation & Data Flow

What is a Digital Economy

# Appendix: What is the digital economy?

Digital Economy

+ refers to an **economy** that is **based on digital technologies**.

+ refers to **activities** & transactions that
produce, adopt & innovate digital technologies & services
for enhanced wealth creation, productivity & **quality of life**.

Source: *The Digital Economy* (1994), MDEC (2020)

Appendix: What is the digital economy?

Figure 2:   The "digital economy" definition

Sharing economy
Gig economy   **e-business**
Industry 4.0
Precision agriculture
Algorithmic economy
e-commerce

Information services
Telecommunications
Hardware manufacturing   Digital services
Software & IT consulting   Platform economy

Can be captured domestically

Dominated by a few countries

Core:
Digital (IT/ICT) sector

Narrow scope:
Digital economy

Broad scope:
Digitalized economy

Figure 3: Evolution and trends of the digital ecosystem

Revenues of the digital ecosystem vs. GDP[1,2]
World, 2009–2018, base 100 in 2009

+8% CAGR

Global digital ecosystem[2]
194

+3% CAGR

Global GDP[1]
130
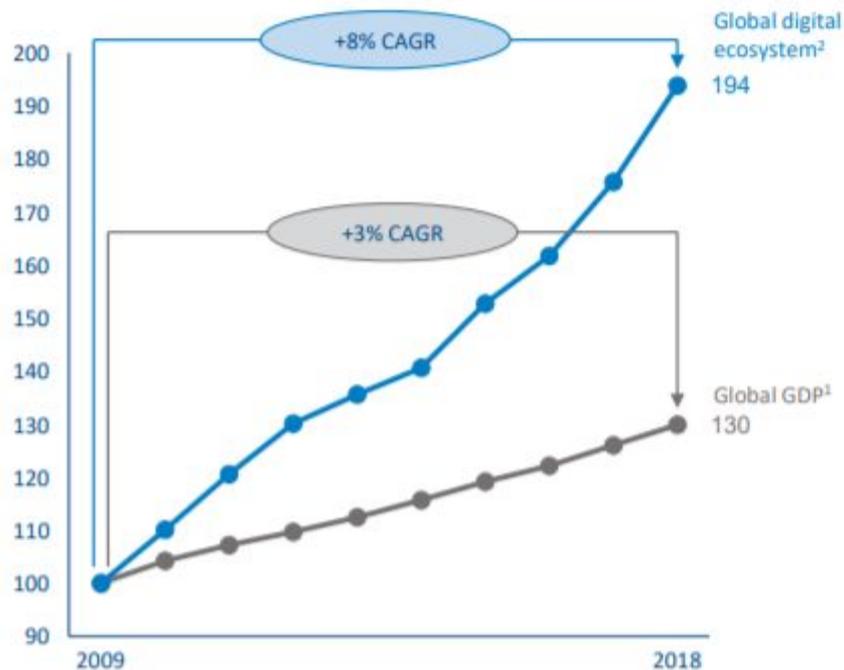
Revenues of the digital ecosystem by segment[3]
World, 2009–2018, USD Bn[4]

- Digital services
- Devices
- Equipment
- Telecom operators

2009–18 CAGR

Illustrative companies

Alphabet
amazon.com   JD.com
The Walt Disney Company   BERTELSMANN
vivendi
Microsoft   IBM   accenture

11%

2,610
682
718
159
1,051

5,060
1,686
1,610
210
1,554

+8%

SAMSUNG
HUAWEI
9%

ERICSSON   HUAWEI
cisco   NOKIA
3%

AT&T   verizon
4%
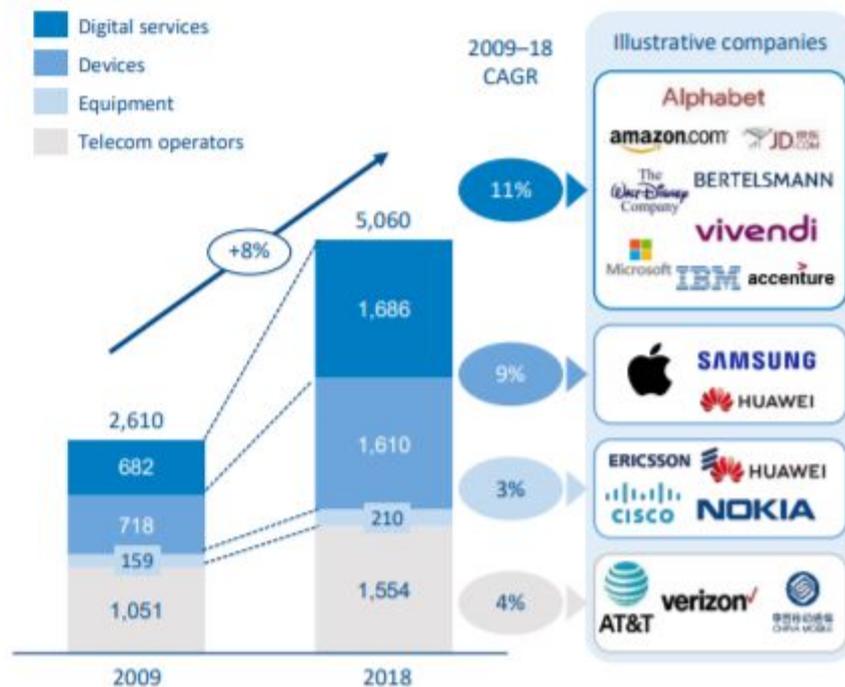
Source: Thomson Reuters, World Bank, Arthur D. Little; Note 1: GDP based on purchasing-power-parity growth of regions captured in the digital ecosystem (same scope); Note 2: Digital ecosystem: top 30 players by 2018 revenues in each category; Note 3: Top 30 per category by 2018 revenues; Note 4: Constant USD

2 Digital Consumer
- Cost savings
- Time savings
- Demand stimulation

1 Digital Industry
- Productivity improvements
- New business models
- Employment structure improvement

3 Digital Society
- Societal well-being enhancement
- Sustainability improvement
- Governance efficiency enhancement

Finance · Retail · Travel · Energy · Government · Agriculture · Education · Manufacturing · Healthcare

Sensors & Devices
Digital Services & Applications enabled by Emerging Technology
Digital Data Processing
Advanced Connectivity
Basic Connectivity

Digital Infrastructure

ASEAN Digital Economy

Potential

ASEAN GDP (USD billions, 2017–25)

Category	Value
2017 GDP estimate	2,670
Current state growth to 2025	~1,150–1,300
Productivity improvements	~400–600
Expansion of digital markets	~300–400
Growth of enabling sectors	~80–130
2025 GDP estimate	~4,060–5,100

2017 GDP estimate segments: Others, ICT, Transport & logistics, Retail, Agriculture, Manufacturing

Legend: ■ Low bound estimate ⸢⸤ High bound estimate
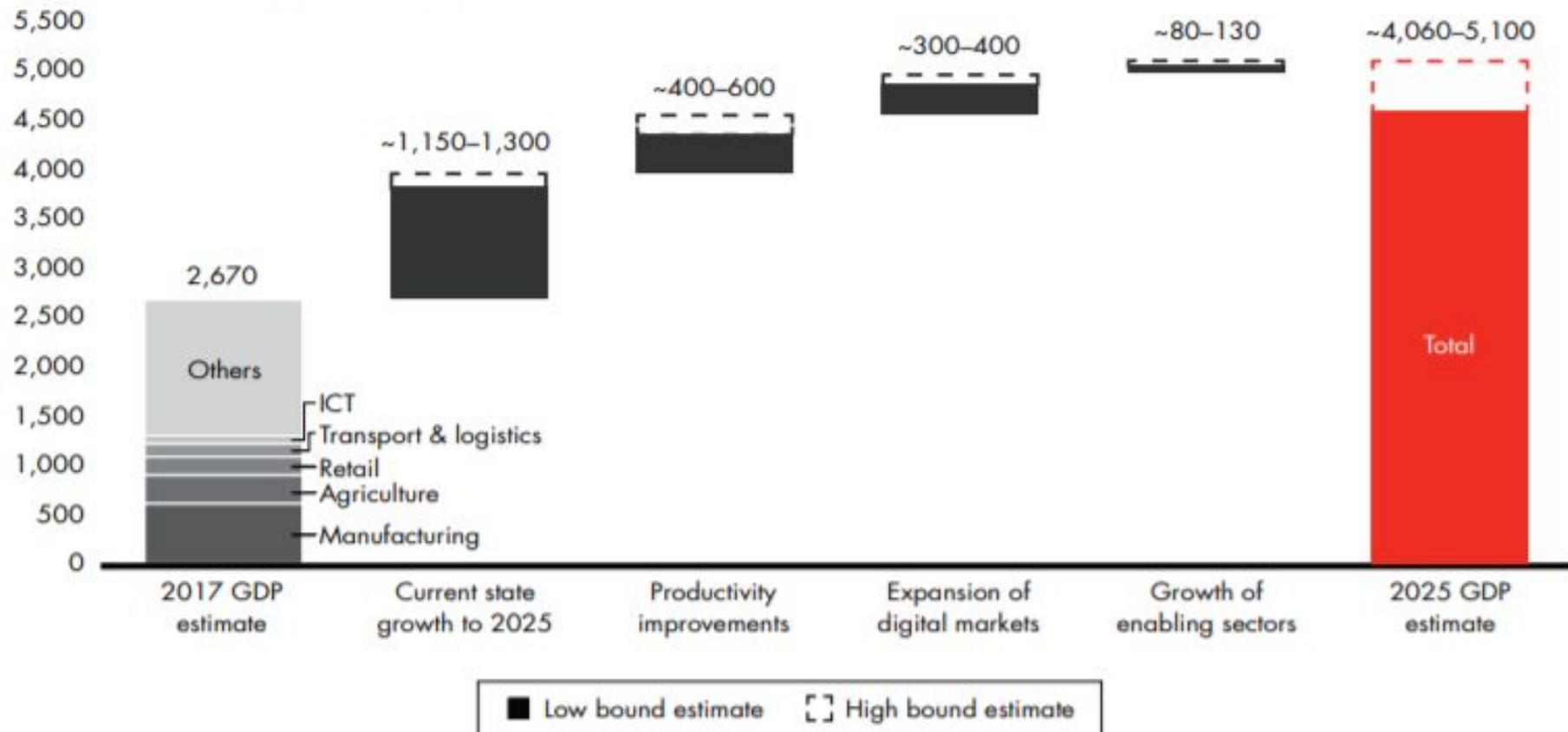
Asean GDP could soar by US$1 trillion as SMEs go digital

Boost may come by 2025 on trade, growth within region: Study

Getting more of South-east Asia's small businesses into the digital economy could significantly raise the region's gross domestic product (GDP), an industry study has found.

It noted that the region's digital economy is worth about US$200 billion (S$274 billion) today, or 7 per cent of total Asean GDP. More integration could send that rocketing by an additional US$780 billion to US$1.13 trillion over the next seven years with Asean GDP projected to hit US$5.1 trillion by 2025.

But non-tariff barriers such as logistics and cross-border digital regulations such as data localisation continue to be challenges, especially for small and medium-sized enterprises (SMEs), said the report from consultancy Bain & Co.

The trillion-dollar GDP boost could come by 2025, on the back of trade and growth within the region, with productivity improvements in sectors such as manufacturing, as well as expansion of digital markets and the growth of "enabling sectors" such as information communications technology, it noted.

Source: https://www.straitstimes.com/business/companies-markets/asean-gdp-could-soar-by-us1-trillion-as-smes-go-digital

SMEs can power ASEAN's digital integration

SMEs' contribution to ASEAN's economy

99% of enterprise

83% of employment

50% of GDP

16% of SMEs use digital to its full potential
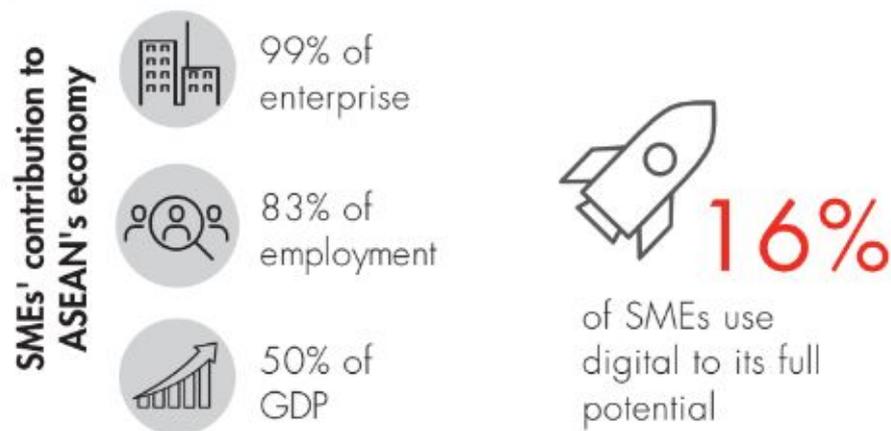
Small and medium enterprises (SMEs) are critical for expanding digital integration. In turn, digital integration will enable them to become regional and global players.

- SMEs contribute to more than 50% of ASEAN's GDP, employ more than 80% of the workforce and represent 99% of enterprises in key sectors, but on average, SMEs only contribute to 20% of their country's export value.

- Currently, 75% of SMEs see digital integration as an opportunity, but only 16% of SMEs truly utilise digital tools. Among those that do, more than 95% export their products.

Source: https://www.zdnet.com/article/digital-economy-can-push-asean-gdp-up-1t-if-markets-operate-as-one/

A **growing tech-savvy customer pool**
means a larger market size & opportunity

SEA Internet Users

260 mil

360 mil

2015

2019

Source: Google & Temasek, 2019

Population by Age Group

3.6 hrs
spent daily on
**mobile Internet
(Longest globally)**

26%
0-14 yo

7%
65+ yo

67%
14-65 yo

Source: Google & Temasek, 2019
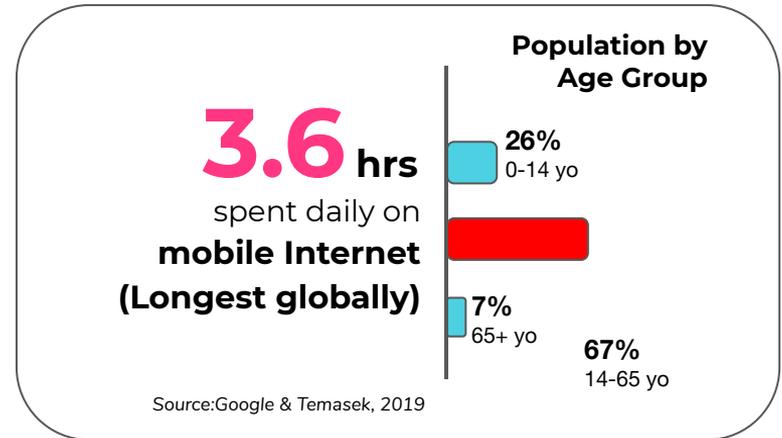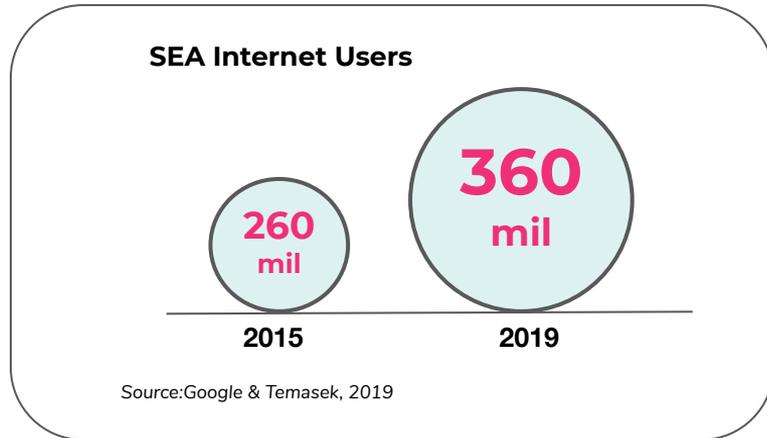
State of Digitalization

Appendix: Digital Adoption Index (DAI) 2016
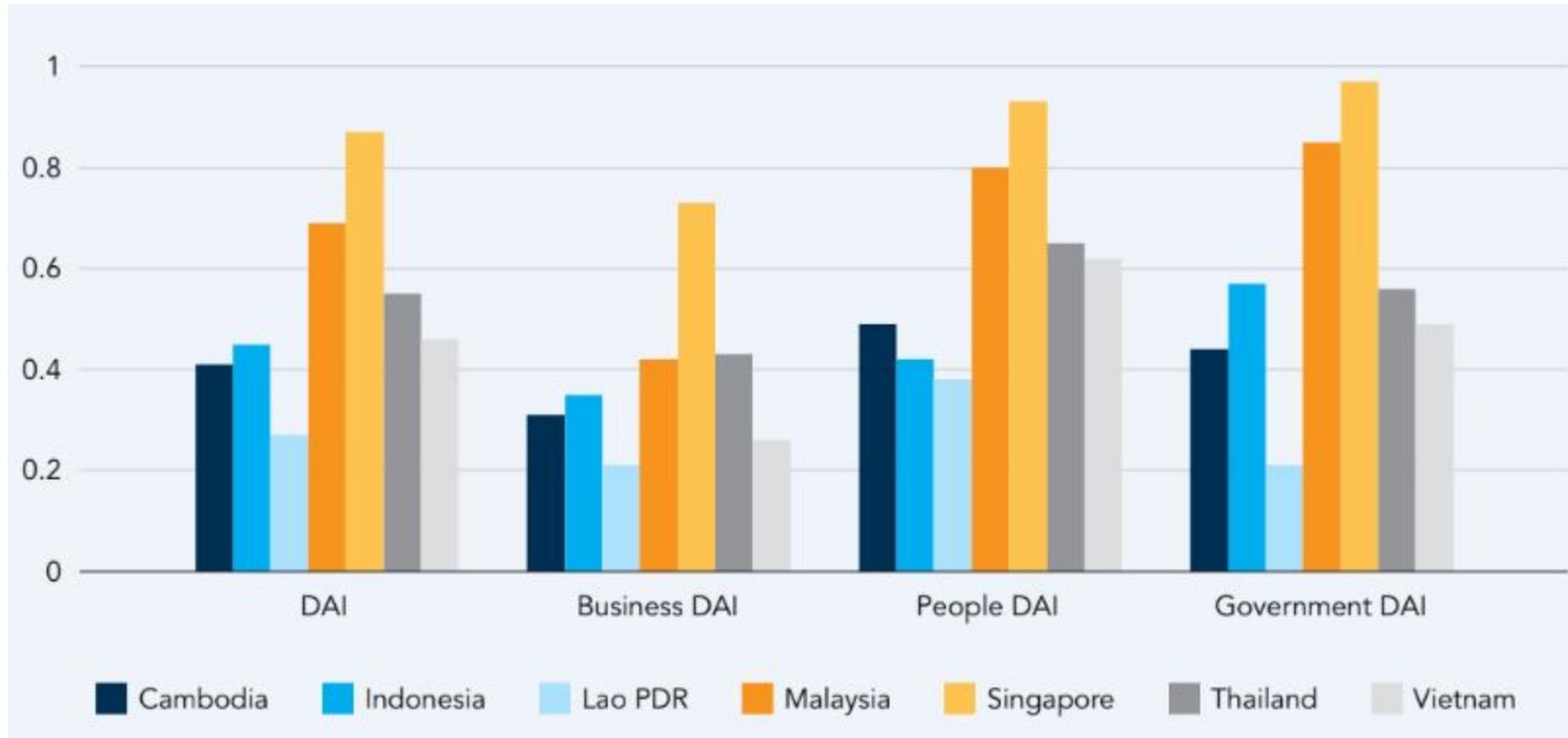
Source: World Bank (2016).

Appendix: State of MSME digitalization

	Level of Digitalization	Digital Tools/Processes	% of Digitalised MSMEs
Basic	Use of basic digital tools	Microsoft Office, email, WhatsApp, personal computers, mobile phones	**56%**
Intermediate	Online presence	Website, social media, e-commerce sites, tablets, printers	**34%**
Advanced	Use of advanced digital tools, or Digitalisation is part of the core business model	ERP, CRM, analytics, big data, automation, pure online business, central servers, imaging devices, scanners	**10%**

ERP = enterprise resource planning; CRM = customer relationship management.

Source: Bain & Company (2018), 'Advancing Towards ASEAN Digital Integration'.

Impact of Digitalization

Gig Economy

GRABCAR DRIVER PARTNERS' INCOME

BEFORE

People with zero income declined from **33%** to **0%** (Create new employment)

AFTER

BEFORE

- 9,000,001 - 11,000,000 — 4%
- 7,000,001 - 9,000,000 — 6%
- 5,000,001 - 7,000,000 — 11%
- 3,000,001 - 5,000,000 — 24%
- 4%
- > 11,000,000
- 0 — 33%
- 18% — < 3,000,000
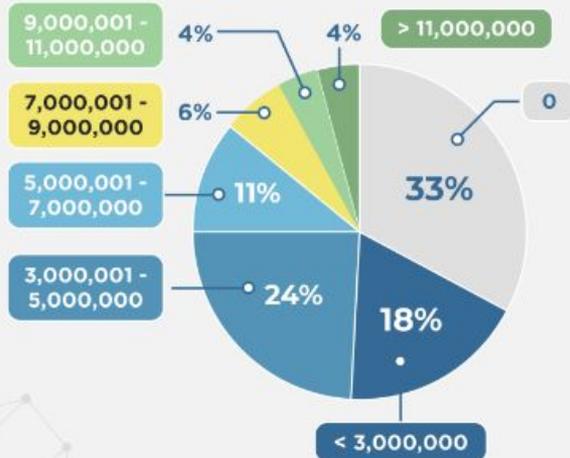
Before joining GrabCar, the majority of respondents **(75%)** had an income **less than Rp 5 million.**

AFTER

- 7,000,001 - 9,000,000 — 21%
- 9,000,001 - 11,000,000 — 10%
- > 11,000,000 — 15%
- 0% — 0
- 8% — < 3,000,000
- 24% — 3,000,001 - 5,000,000
- 5,000,001 - 7,000,000 — 23%
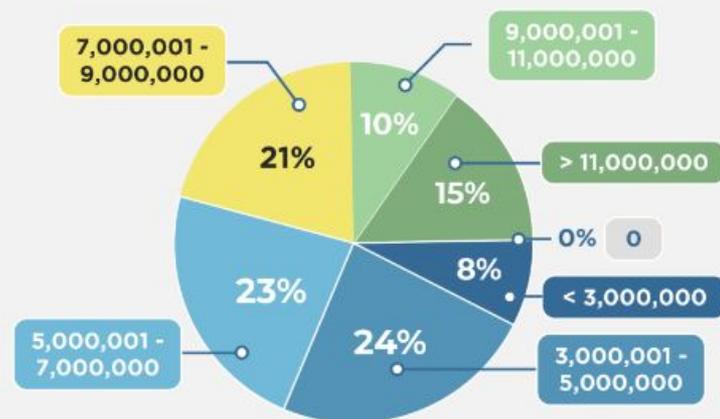
After joining GrabCar, the majority of respondents **(68%)** have an income **more than Rp 5 million.**

TENGGARA STRATEGICS

Centre for Strategic and International Studies

GRABCAR PROVIDES EMPLOYMENT OPPORTUNITY

Before joining GrabCar
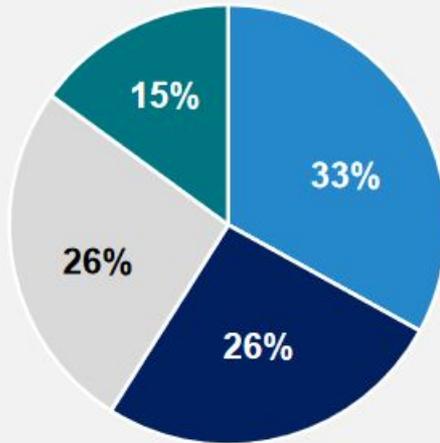
- 33% Did not have income
- 26% Worked in other professions
- 26% Owned business
- 15% Worked as driver

Not limited to young workers, GrabCar's technology benefits middle-aged and senior workers TOO!

Age	< 21	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45	46 - 50	51 - 55	> 55
%	2%	9%	15%	16%	22%	16%	10%	6%	4%

36%

Source: https://assets.grab.com/wp-content/uploads/media/grab_indonesia_economic_impact_report(2019).pdf
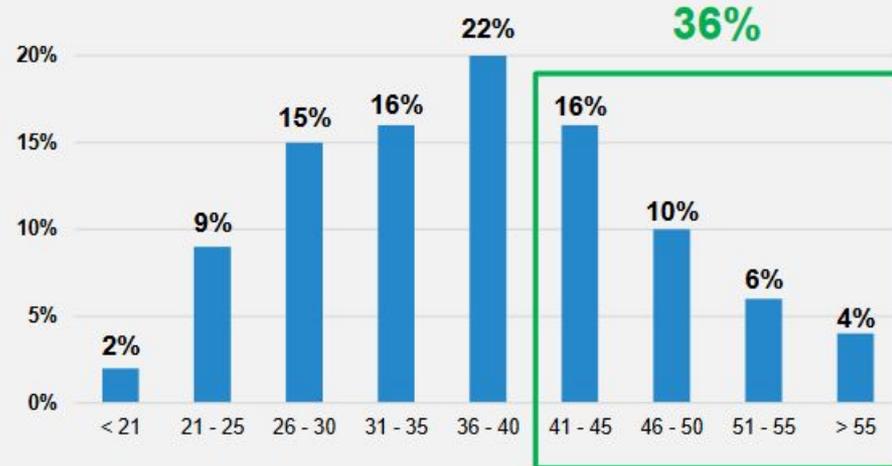
GRABCAR PROVIDES EMPLOYMENT OPPORTUNITY FOR PEOPLE WHO HAD NO WORK

TENGGARA STRATEGICS

CENTRE FOR STRATEGIC AND INTERNATIONAL STUDIES

33% of GrabCar's driver partners did not have any income before joining GrabCar
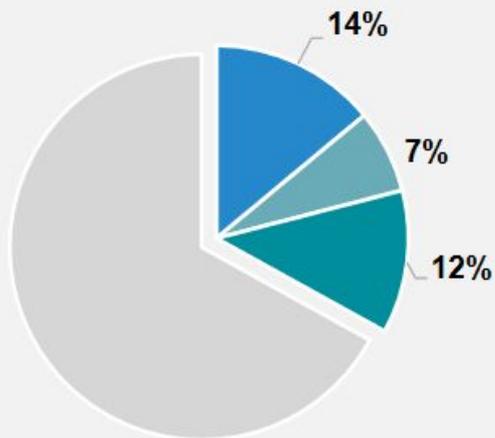
- 14% Not working
- 7% Lay-off
- 12% Failed business

14%

7%

12%

Why partner with GrabCar?

	Flexible work hours	Opportunity for higher income	Opportunity for extra income	More time with family	Have yet to get desired job	Failed business
	91%	88%	66%	47%	47%	46%
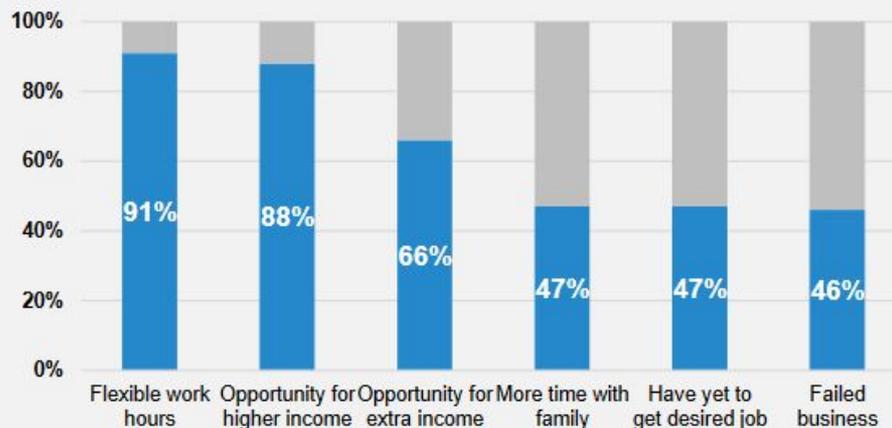
Average income of
7 million / month
after partnering with GrabCar

INCREASE IN GRABFOOD MERCHANTS' INCOME

TENGGARA STRATEGICS

CENTRE FOR STRATEGIC AND INTERNATIONAL STUDIES

52% merchants from having sales < Rp 500,000/day enjoyed sales increase to **> Rp 500,000/day**.

BEFORE

> 5,000,000 — 6.7%

3,500,001 - 5,000,000 — 5.7%

2,500,001 - 3,500,000 — 7.2%

1,500,001 - 2,500,000 — 13.6%

500,000 - 1,500,000 — 36.5%

< 500,000 — 30.3%
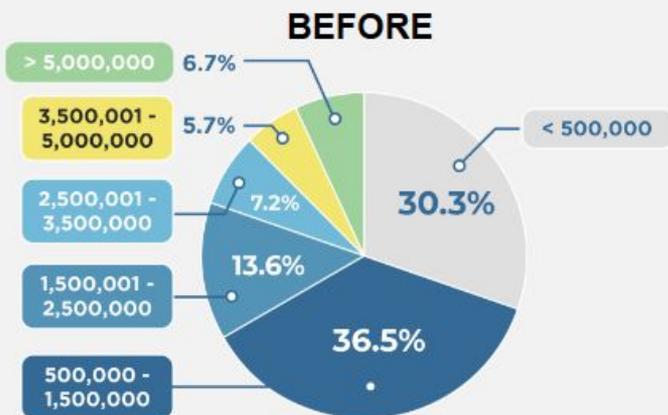
33.2% of GrabFood merchants had daily sales of **more than Rp 1.5 million** before partnering with GrabFood

AFTER

> 5,000,000 — 9.5%

3,500,001 - 5,000,000 — 7.0%

2,500,001 - 3,500,000 — 10.2%

1,500,001 - 2,500,000 — 16.4%

500,000 - 1,500,000 — 40.5%

< 500,000 — 16.3%
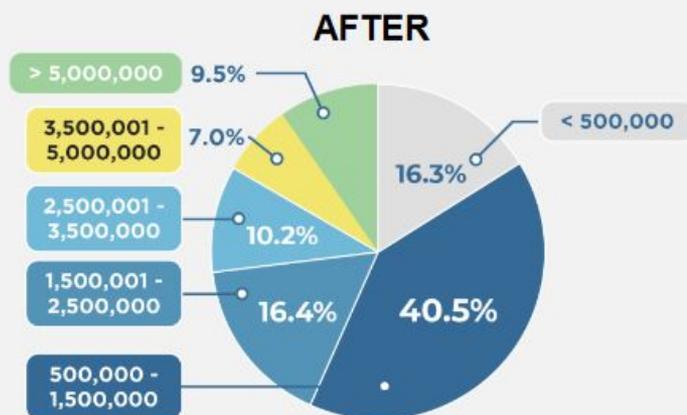
After partnering with GrabFood, **43.2%** of GrabFood merchants have daily sales of **more than Rp 1.5 million.**

Source: https://assets.grab.com/wp-content/uploads/media/grab_indonesia_economic_impact_report(2019).pdf

INCREASE IN SALES WITHOUT ADDITIONAL INVESTMENT
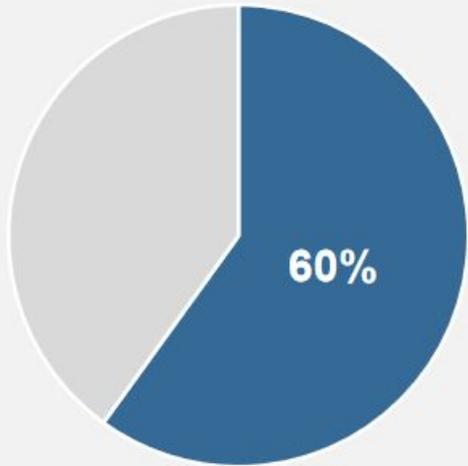
60% GrabFood partners succeeded to increase their sales by **24%** without incurring any additional investment

Sales increase vs Additional cost
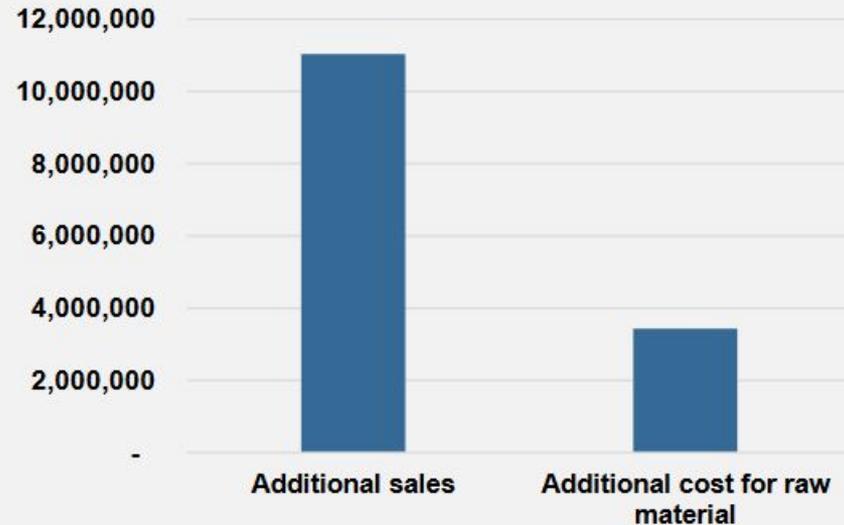
There is an increase of sales worth up to **Rp 11 million** per month for partners after joining GrabFood **without additional investment for business area.**

Appendix: Airbnb Economic Impact - Paris

In June 2013, Airbnb released the results of a study, which evaluated the economic impact of Airbnb guests and hosts in Paris. Spanning a 1-year timeframe, the study found that **Airbnb generated €185 million (approximately US$240 million) of economic activity in Paris**, and **supported 1,100 jobs**.

Between 2012 and 2013, 10,000 local hosts welcomed over 223,000 guests to Paris, primarily renting the homes in which they live. Almost half of hosts indicated they rely on Airbnb income to pay for household expenses. Twenty percent of hosts say that hosting income has allowed them to pursue other professional or personal interests, supporting a strong, creative and innovative society.

Highlights from the study include:

- Airbnb guests stay an average of 2.9 nights longer and spend €426 more over the course of their trip, compared to hotel guests.
- 27 percent of guests said they would not have come to Paris or stayed as long without Airbnb.
- 93 percent of guests want to "live like a local" and 80 percent use Airbnb to explore a specific neighborhood. Between 2012-2013, 611 hosts in the 20th Arrondissement welcomed 9,199 guests, who spent €3.5 million in the neighborhood. Of that, €1.2 million went directly to hosts and €2.3 million was spent at local businesses.
- Airbnb is complementary to the existing tourism industry in Paris. 70 percent of Airbnb properties in Paris are located outside the central hotel corridor. Hotel occupancy and average daily rates have grown to record highs as Airbnb has flourished.

Airbnb is proud to help connect travelers from around with the world with our Parisian host community. The hospitality of Paris's Airbnb hosts shows, too – 91 percent of Airbnb guests said they would recommend the property they stayed in to friends!

Source:https://blog.atairbnb.com/economic-impact-airbnb/

Appendix: Airbnb Economic Impact - Sydney

Airbnb guests and hosts supported **AUD $214 million in economic activity** in one year in Sydney – throughout the region's diverse suburbs. This economic impact is estimated to support **1,600 jobs** throughout Sydney. In addition to staying longer and spending more than traditional tourists, 31 percent of Airbnb guests said they would not have been able to make the trip had it not been for Airbnb as an accommodation option. Airbnb is proud to provide a mutually beneficial travel platform, as 60 percent of hosts indicated that Airbnb income helped them with their monthly rent and mortgage costs.

The study indicates that the overwhelming majority of Airbnb hosts in Sydney are ordinary residents who rent out the home they live in – their primary residence — and use the money to help make ends meet. Most Airbnb hosts are over age 40, employed and use the extra income to pay their mortgage or rent and stay in their homes.

Highlights from the study include:

- 63 percent of Airbnb guests say that Airbnb makes them more likely to return to Sydney.
- 75 percent of Airbnb guests visit Sydney from another country. The average age of Airbnb guests is 42 and 77 percent have at least a college degree.
- Airbnb hosts help their guests discover less-visited locales — 98 percent of hosts suggest local restaurants, cafes, bars and shops in their neighborhoods to their guests.
- 85 percent of Airbnb hosts rent out the home they live in and the typical host earns $4,505 per year by renting 37 nights per year.
- Airbnb guests spend AUD $1,822 over the course of their trip compared to average tourists who spend AUD $1,071.
- Airbnb is complementary to the existing tourism industry in Sydney – 80 percent of Airbnb listings in Sydney are outside of the main tourist areas and the average Airbnb guest spends AUD $1,042 in the neighborhood where she stays. For example, Airbnb guests spent an estimated AUD $142,422 in Randwick.

By sharing their homes with over **30,000 Airbnb guests in 2012-2013**, Sydney hosts are helping to support the local economy, and creating special memories for travelers from around the world.

Source:https://blog.atairbnb.com/economic-impact-airbnb/

Appendix: Airbnb Economic Impact

Airbnb Economic Impact:London & Edinburgh

In 2014, Airbnb published its first study of economic impacts at a nationwide scale. The United Kingdom study reviewed impacts across the country, as well as within London and Edinburgh. In 2013, the Airbnb community generated **US$824 million in economic activity** in the UK and supported **11,600 jobs**.The typical Airbnb host occasionally rents out only the property in which he or she actually lives. About 80% of Airbnb hosts rent out the home they live in, and the typical host earns US$4,600 per year by renting 33 nights per year. And 63% of hosts said that their Airbnb income helped them pay bills they would otherwise struggle to pay.

Hosting enables UK residents to be more entrepreneurial and pursue nontraditional forms of work. Approximately 42 percent of hosts are self-employed, freelancers, or part-time workers, many of whom say Airbnb helped them pursue these careers.

Airbnb Economic Impact: Berlin

Between 2012 and 2013, the Airbnb community in Berlin contributed nearly €100 million (approximately **$130 million**) in total economic activity throughout the city. With 77 percent of Airbnb properties outside the main hotel areas, Airbnb guests spend significant amounts of money in diverse neighborhoods. Hosts and businesses in neighborhoods like Neukölln, Kreuzberg and Wedding all benefited from visitors staying locally. Highlights from the study include:

- Airbnb's 5,600 local hosts are regular people who occasionally rent out their homes and use the income they earn to pay the bills. Hosts spend 48 percent of their Airbnb income for essential living expenses, such as rent or mortgage payments. Nearly half of Airbnb hosts earn below Berlin's median household income (€1,650 or $2,170 per month). And 45 percent of hosts live in a single–income household.

Source:https://blog.atairbnb.com/economic-impact-airbnb/

Appendix: Facebook Economic Impact

Facebook stimulates economic activity by **providing tools for marketers, a platform for app developers, and demand for connectivity**. Facebook's broad economic impact enables far more revenue and jobs for global and local economies than Facebook's own company operations.

Facebook facilitates economic activity as it:
• Allows new and traditional businesses all over the world to reach customers locally, nationally, and globally;
• Reduces barriers to marketing by helping businesses of all sizes raise awareness of their brands and find the people most likely to be interested in their products and services;
• Supports entrepreneurship by providing a way for businesses to promote their activities;
• Enables new ecosystems such as the app economy that stimulate innovation and generate jobs; and
• Increases demand for mobile devices and internet services that carry positive spill-overs to other parts of the economy.

North America $104B impact 1.2M jobs

EMEA $67B impact 1.5M jobs

Platform effects $29bn

Connectivity effects $50bn

Marketing effects $148bn

Global economic Impact $227bn
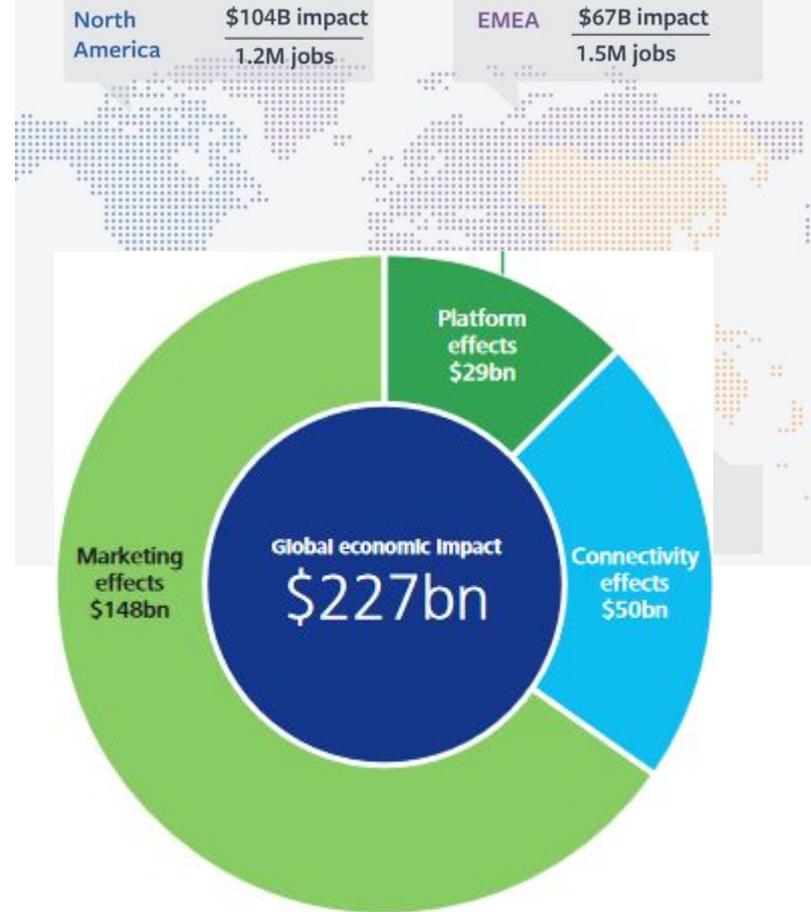
Appendix: Facebook Economic Impact - Marketing

Facebook Marketing Effect:

Pages - Pages provide businesses with a way to establish or enhance their presence online across desktop, mobile and tablet. People can discover Pages that are relevant to their interests.

Targeted advertising - based on characteristics of Facebook's audience, allows marketers to deliver messages at scale to their most likely customers

Referrals - businesses also benefit when people share links to their websites with their friends. Sharing of links can have significant effects on sales and fundraising. For example, Facebook helped spread awareness about the "Ice bucket challenge" initiative that raised $100m in donations to fund research for the cure of amyotrophic lateral sclerosis (ALS)

Marketing Analytics- Aggregated insights collected during their advertising campaigns allow businesses to further fine-tune their campaigns

Results
It is estimated that the marketing effect of Facebook in 2014 enabled $148bn of economic impact and 2.3m jobs globally.
North America, which contains Facebook's largest market, the US, captured nearly half of the overall global economic impact (**$81bn and 870,000 jobs**) through a mix of active advertising spend and high page engagement.
Brazil ranks as second in terms of economic impact from marketing globally. The country's large population and highly engaged base of people on Facebook have contributed to an estimated economic impact of **$8.4bn and 189,000 jobs**.
Economic impact in the **United Kingdom** is estimated to be the third highest in the world at **$6.6bn and 89,000 jobs**, as a result of active advertising and engagement in this region

Appendix: Facebook Economic Impact - Platform

Platform effects

estimate the economic impact from 3rd party products and services built atop of the Facebook platform. The Facebook platform provides app developers with significant opportunities for discovery and monetisation of their apps, enabling economic activity and jobs.

Apps integrate with Facebook to enhance customer experience, acquisition, and retention and can use advertising to drive installs or engagement.

Developers monetise their apps through in-app purchases within Facebook or through other channels, including in-app advertising or charging for downloads.

Results

Over 80% and 90% of top grossing apps in the United States on iOS and Android respectively are integrated with Facebook

It is estimated that the platform effect of Facebook in 2014 enabled $29bn of economic impact and 660,000 jobs globally.
EMEA is the largest beneficiary of the platform effect, with estimated $13bn of economic impact and 270,000 jobs. The impacts are driven primarily by the app economy, which **benefited from successful companies such as Spotify or King.com, the developers of a music streaming platform and the Candy Crush Sage games**, that are headquartered in EMEA. Additionally, clusters of entrepreneurs have emerged in cities such as Berlin, Minsk and Tel Aviv that focus on developing Facebook apps for their global audiences.

Appendix: Facebook Economic Impact - Connectivity

Facebook Connectivity

Also actively building open access internet infrastructure in low Internet access areas (undersea cables, mobile towers & devices, IXPS)

Terragraph, one of the company's most successful open-source infrastructure projects that helps bring high-speed connectivity to urban and suburban communities, is now seeing new trials in Athens, Greece and Curitiba, Brazil and it's already in production usage in Canon, Ohio and Penang, Malaysia, as well as Alameda, California.

Facebook also today announced the launch of Magma, a new open-source platform that makes mobile network deployments easier for carriers. The launch partner for Magma is Telefonica, which is using it in Latin America, and BRCK, which is using it to pilot a new LTE network in Kenya.

 Facebook is investing in a new 750km open-access fiber project in Nigeria, for example, which will provide fiber access to more than one million people.

Maybe the most interesting of these projects is called Internet para Todos (IpT) Peru. What Facebook is trying to show here is that it's possible to create an economically viable provider of rural mobile infrastructure. Facebook is building this together with Telefonica, IDB Invest and CAF (Development Bank of Latin America). It's an open access network that will be open to all carriers. "It is very economically challenging to think about connecting small communities in rural parts of Peru, let alone other parts of the world," Maguire said. "The idea is that we can create common infrastructure that is open access, let others innovate on business models and create competition etc.

Facebook, and a group of telecom companies including China Mobile International, MTN GlobalConnect, Orange and Vodafone, are collaborating to build the "most comprehensive" subsea cable to serve the African continent and Middle East region where nearly a billion people are still offline.
The project, called 2Africa, will see the companies lay cables that will stretch to 37,000km (22,990 miles) and interconnect Europe (eastward via Egypt), the Middle East (via Saudi Arabia), and 21 landings in 16 countries in Africa.

Source: https://connectivity.fb.com/network-investments/ , https://techcrunch.com/2020/05/14/2africa-africa-middle-east-facebook-subsea-cable/ , https://techcrunch.com/2019/02/25/facebook-expands-its-internet-infrastructure-projects/

How businesses digitalize to survive during COVID-19

MY FISHMAN

Fresh seafood online subscription & delivery service in Malaysia

Gift & Hampers · Steamboat Set · Support Local · Dried Seafood · Recipes

News

ON SALE

The Big Fillet (Salmon, Cod Fish, Grouper, Snapper, Prawn Meat)

RM 230.00 RM 260.00

ON SALE

Grouper Fillet（石班肉）

RM 95.00 RM 100.00

ON SALE

Cod Fish Skin-on Slices

RM 165.00 RM 220.00

REVIEWS

" Our business has definitely been affected by Covid-19, given that we aren't able to supply to restaurants, wholesale fish markets, grocery stalls or coffee shops, as most had to close, but being able to sell online is still keeping us in business, "

Audrey Goo is the owner of Malaysia-based MyFishman

Physical-turned-online-supplier of vegetables & fruits in Indonesia

Caisim

Daun Basil

Coriander / Wansui

Daun Bawang Kecil / Cung

"   The current pandemic situation is <mark>very challenging for us farmers</mark>, as we are used to selling our products through the traditional channels. But <mark>through Rumah Sayur group's e-commerce</mark> partnership, <mark>our harvests can still reach consumers nationwide</mark> - especially during the current situation where people are unable to go to the market like they used to "

Indonesian farmer Pak Opik on Rumah Sayur Group

M'sians Share How The Internet Helped Them Survive & Earn A Living During The MCO

Drum teacher continues job from home via **video calls**

Food seller had to close shop & move his **business online**

Ex-global car maker worker makes it big **selling food online**

Business closures in ASEAN during the COVID-19 pandemic

Over 2,000 coffee shops, eateries shut permanently

NATION

Friday, 12 Jun 2020

Source: The Star Malaysia

Vietnam's Economic Hopes Fade as COVID-19 Takes Away Business

October 04, 2020

Source: VOA News

Thailand Business Closures Spike Almost 40% from Last Year

Published 1 month ago on September 15, 2020
By CTN News

Source: Chiang Rai Times

More than 8,600 businesses closed down in April in Singapore

EDGEPROP.MY

May 12, 2020 | Updated 5 months ago

Source: Edge Property

70% of textile companies could go out of business because of COVID-19: Association

Mardika Parama
The Jakarta Post

Source: The Jakarta Post

Digital Infrastructure

Background

Appendix: FAQ - Digital Infrastructure

1. **What is digital Infrastructure?**
   a. **Digital infrastructure is the physical hardware and associated software that enables end-to-end information and communications system to operate.**
      i. Internet backbone including national and submarine fibre cables;
      ii. Fixed & Mobile broadband infrastructure;
      iii. Data and cloud computing facilities;
      iv. End user equipment such as mobile handsets, PCs, modems and local Wi-Fi and Bluetooth networks;
      v. Software platforms including computer and mobile device operating systems as well as application programming interfaces;
      vi. Network edge devices such as sensors, robots and other IOT facilitating devices and software.

2. **Why government need to develop digital infrastructure?**
   a. Digital infrastructure is the key to enabling the benefits of the digital economy and society.
   b. In today's world, digital infrastructure is basic to most social, economic and government activities. Therefore needs to be considered a utility.

Appendix: FAQ - Digital Infrastructure

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1. **What government / stakeholders can do for improving digital infrastructure ?**

   a. **Build internet infrastructure**

      i. Expand infrastructure coverage nationwide through mix of fixed and mobile internet.

      ii. Explore innovative approaches to meet the needs of difficult-to-connect communities such as rural village internet center.

      iii. Encourage public private partnership / FDI for infrastructure development.

   b. **Ensure quality of infrastructure for future use**

      i. Adapt quality monitoring and measurement to meet increasing demand on the amount, speed of internet.

      ii. Ensure transparency in service providers' performance for end consumers, to encourage healthy competition.

      iii. Enhance connectivity through submarine cable projects

   c. **Increase infrastructure affordability through market transparency**

      i. Encourage sustainable competitive prices at the edge of the infrastructure.

      ii. Encourage infrastructure sharing.

   d. **Involve more stakeholders participation on policy formation**

      i. Empower community leaders to connect communities' voice to policy makers.

      ii. Ensure two-way exchange of information between government and stakeholders.

Quality of Internet Services

Pructivity, Competitiveness

Digital Infrastructure driving economic growth

Improve Trade Incomes , Increased FDI

Greater Economic Growth , More employment, Greater GDP per capita
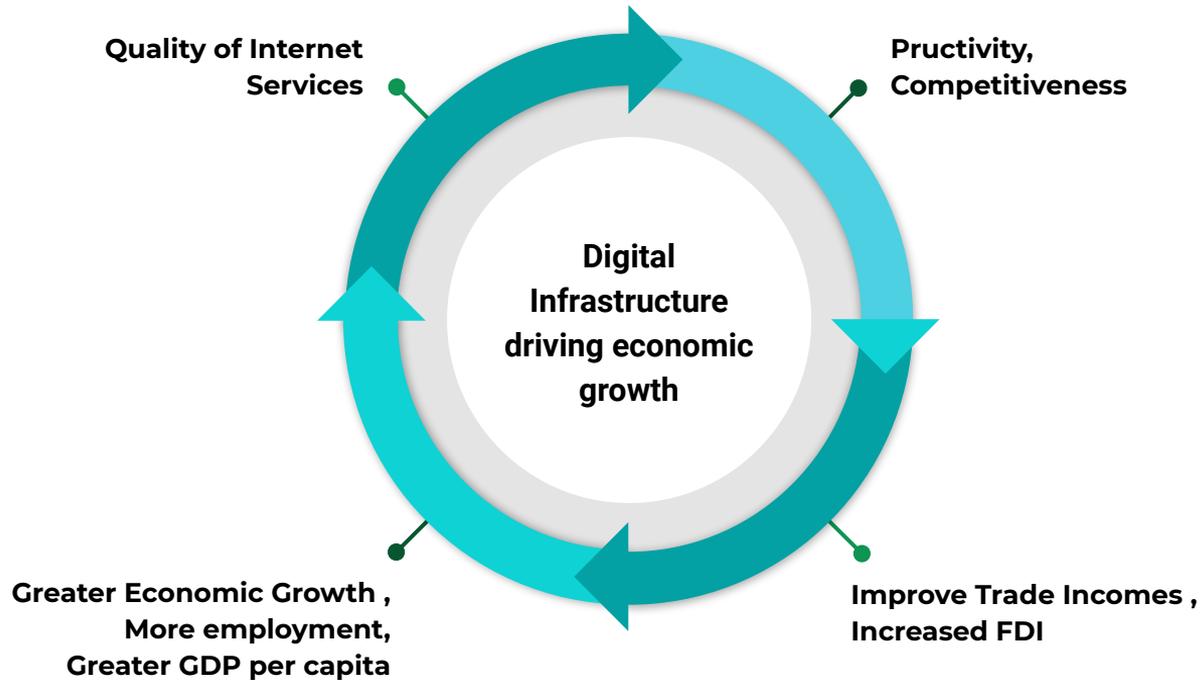
Government Roles:
- Setting the broader strategic context for digital economy and society development.
- Developing effective pro infrastructure deployment regulatory frameworks
- Directly investing or undertaking private public partnerships to deploy major digital infrastructure systems

Private Sector Roles:
- Developing and maintaining the network

Government Policies

Benchmarking

Decades of Policy Efforts Are to Credit for South Korea's Rise

1980 — Rebuild infrastructures after Korean War, **emphasis on telecommunications**.

1983 — Korean government invested nearly one percent of its GDP (60 million U.S. dollars) in **research and development of electronic switching devices**, eventually leading to the launch of the TDX electronic switching device.

1985 — **Universal telecom network was built** following launch of TDX electronic switching

1987 — Korean government launched the **National Basic Information System (NBIS)** to **computerize government services**

1990 — **Korean Information Infrastructure Government program to transition copper lines to fiber** between public institutions and buildings, with an initial investment of USD 620 million.

Source: https://www.infodev.org/infodev-files/resource/InfodevDocuments_934.pdf

1990 — Informatization Master Plans
Competition introduced in value added services (fixed cable Internet)

1992 - 1994 — Competition introduced in paging services (10 new operators).
Privatisation of Korean Telecom Authority.
Competition introduced in long-distance market
First PC Bang introduced

1996 - 2002 — Cyber Korea 21 (create a knowledge-based economy driven by IT)
High speed broadband Internet service introduced

2002 - 2007 — e-Korea Vision 2006 (to be world-leader in information infrastructure and ICT services)
Broadband IT Korea Vision 2007

**2006 – 2015** — U-Korea Master Plan (Phase 1 & 2)

The Korean Government's policy framework for broadband development

The policies broadly includes:

Broadband Infrastructure	Plans for **public investment** in broadband infrastructure & **incentives** for private investment
Universal access	Policies to promote **universal access to broadband**
Broadband demand	Initiatives to aggregate & **expand demand for broadband services** (e-Government services, e-commerce, digital literacy)
Supporting industries	Various **supporting industrial policies** (R&D promotion & incentives to vitalise venture capital markets)

KPIs used to assess the effectiveness of promotion policies in Korea

Number of internet users and internet usage rate, 2000 - 2003
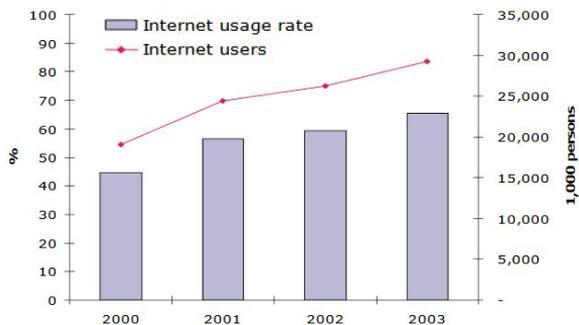
Trends in number of ISPs, 1998 - 2001
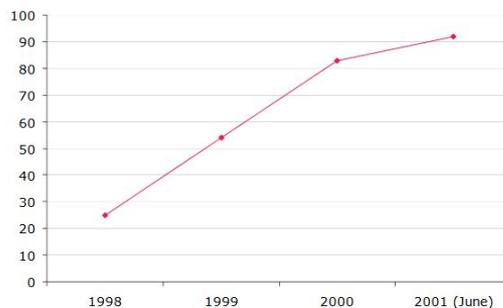
Growth rate of Internet use by type of users (%), 1998 - 2001
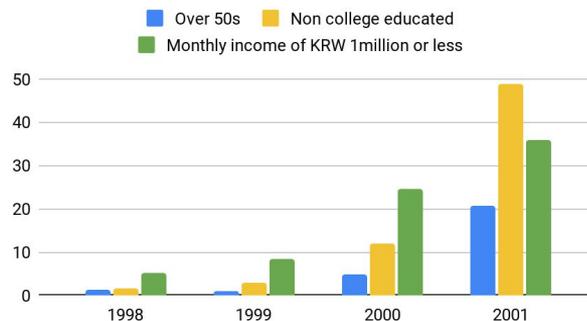
The Korean broadband market experienced **rapid expansion** on both the **demand and supply** sides

This growth was not limited to typical early adopters

Factors that drove the successful promotion of broadband in Korea

The Government's long-term strategic planning

Liberalisation of the telecoms market (Private Participation)

Low broadband pricing

The success of the KII initiative and Cyber Korea 21

Creation of a highly competitive environment

Popularity of PC Bangs

National Basic Information System (NBIS)

the first policy to focus on deploying computer networks, IT applications and systems nationally.

Primary objectives :
- computerize and connect all Government administrative functions in order to enhance public sector efficiency and quality of service
- developing the IT sector by providing initial market demand.

The NBIS focused on the **development of five 'strategic' information systems**:
- National Administration Information System (computerize and connect Government ministries and agencies);
- Financial Information System - interconnecting financial institutions;
- Education / Research Information System – providing schools with IT hardware and software and interconnecting universities, libraries, and research institutes;
- National Defense Information System; and
- National Security Information System.

In addition, a national computerised information database was constructed, which included
- a residents registration database,
- a real estate database,
- a vehicle administration database.

Cyber Korea 21

formulated as a response to the IMF crisis. It laid out the Government's vision for a 'knowledge-based economy' through the promotion and development of the telecommunications and IT sectors.

Policies include:

- plans to **expand and improve the Korean Information Infrastructure** (KII) project;

- support for the software and IT components industries, including promotion of foreign market penetration;

- **improvements in IT education** & policies to close the digital divide through increases in the PC penetration rate;

- further **liberalisation** in the **telecoms sector**;

- legal and institutional reform, in particular to promote e-commerce; and

- tax reductions for high technology businesses.

Accomplishments:

- Construction of an advanced information infrastructure

- Increased levels of informatization

- IT sector leading economy growth (Samsung, LG)

Estonia

"the most advanced digital society in the world"

- Wired -

#1

Start-up friendliness

Index Venture 2018

#1

Digital Health Index

Bertelsmann Foundation 2018

#2

Internet Freedom

Freedom House 2019

99%

State services that are online

1000+

Number of startups

4

Number of Unicorns

Factors that drives Estonia digitalization success

Government long term planning	Progressive digital infrastructure	Consistent investment in IT

Success Cases

Principles of Estonian Information Policy (1994)
Strategic outline for IT development.

CHALLENGE

- Politically turbulent times,
- IT as essential to solving the society's challenges

EFFECT

1% of GDP state funding for IT yearly

Tiger leap initiative (1996)
Country-wide IT infrastructure development.

CHALLENGE

- Update local IT infrastructure
- Prioritize computer skills in schools.

EFFECT

- 90% of population uses the Internet regularly;

- #1 in the Digital Development Index.

E-Governance drives Estonia digitalization success

Success Cases

e-prescription

A centralised paperless system for medical prescriptions.

EFFECT:

99% of medical prescriptions are handled online

m-parking

A system for drivers to pay for city parking via mobile phone.

EFFECT:

90% of parking fees are paid via mobile phones

x-road

An integrated information system for data exchange

EFFECT:

99% of public services are accessible online 24/7

i-voting

Maximise accessibility to local & general elections

EFFECT:

⅓ of online votes in elections, from over 110 countries.
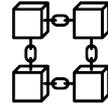
blockchain

Estonian cryptographers developed scalable blockchain tech KSI

EFFECT:

1st country to use blockchain on national level
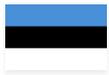
Decades of Policy Efforts Are to Credit for Estonia's Rise

1994 — The first draft of "Principles of Estonian Information Policy"

1996 — Launch of the tiger leap initiative (IT infrastructure development), First e-banking service

2000 — e-cabinet meeting, e-tax board, m-parking

2001 — x-road

2002 — e-id & digital signature

2005 — i-voting

2007 — Cybersecurity

2008 — Blockchain technology, e-health

2010 ● e-prescription

2014 ● e-residency

2015 ● World's first data embassy

2017 ● NIIS X-road consortium

2018 ● seamless services roadmap

2019 ● Government AI strategy

Infrastructure sharing

Appendix: Infrastructure Sharing Success Cases

New **infrastructure sharing** policies explicitly designed in rolling out 5G internet to allow other operators access to KT's **fiber backhaul & 5G towers** at fair and reasonable rates.

Impact:
Reduce deployment costs by $1 billion & Korea was the **first to deploy commercial 5G in many states**.

Mandatory sharing of mobile transmission towers helped extend the network coverage of competing telecom providers, especially in low density rural & regional areas.

Impact:
Assisted Australia's three mobile networks to extend their **coverage to approximately 94%, 96% and 98% of Australia's population**.

Singapore's **National Broadband Network** supplies wholesale-only, **open-access** services to all carriers and service providers.

Impact:
Allows **new operators to enter the market** (myRepublic, Colt,TPG Telecom)

The **"open network" requirement** facilitates competition at the content & service level.

Impact:
Allows the **new entrants to launch their services and extend service coverage in a shorter time** than if they have to roll out their networks.

Appendix: FAQ -Infrastructure Sharing

1. What is infrastructure sharing?
In telecommunications, it involves sharing of passive infrastructure (e.g., physical site and power systems) and sharing of active infrastructure (antennas/transceivers, base station, backhaul networks and controllers) and core network (servers and core network functionalities) to cost-effectively achieve the network performance & coverage.

Infrastructure sharing will conserve resources, protect user interests, promote market competition and improve network coverage

2. Why share infrastructure?
> **Cost** - High capital cost (CAPEX) to build base station, antenna, transmission lines. Also expensive to rollout new technology or network. To avoid redundant infrastructure & share the cost, it's better for multiple operators to share the cost & infrastructure.

> **Limited optimal locations for best coverage** - Usually there's only a few available location to build base station in dense urban cities where performance & coverage demands can be satisfied. More mobile operators further complicate the competition for the limited sites.

> **Enabler to Rationalise legacy networks** - The falling revenues of 2G/3G networks & a lot of devices are in inaccessible locations & higher spectral efficiencies of next-generation networks (4G and 5G), hence more operators are focusing on rationalising legacy networks. This will mean that there will be only one national legacy network shared by all operators & they will be able to divert resources (e.g., manpower and spectrum) to next-generation networks.

> **Increase competition in market -** Reduce barrier to entry for new operators on CAPEX & OPEX spending

LAND AND BUILDINGS
- Civil works
- Rights of ways
- Kerbs and in-building

OTHER SECTORS INFRASTRUCTURE
- Roads/railways
- Power grids
- Gas and oil pipelines
- Sewage and water systems
- Street furniture

DIGITAL INFRASTRUCTURE
- Ducts
- Poles
- Sites/towers
- Masts
- Dark fiber
- Submarine cables
- Active network elements
- Data Centers

Scope of infrastructure sharing

Ease of infrastructure sharing

- Civil engineering works of other operators
- Existing sites and masts
- Existing rail links and powerlines

- New roads, powerlines & gas, water and oil pipelines
- Building and housing estates
- Data centers premises

- Existing telecom fiber networks
- Local loop of existing operators
- Last mile fiber network
- Frequency spectrum

Easier sharing

Harder sharing

FIGURE 2 Key opportunities for infrastructure sharing

Source: Adapted from Deloitte & Association for Progressive Communication, 2015. Unlocking Broadband for All: Broadband Infrastructure Sharing Policies and Strategies in Emerging Markets.

Internet Backhaul

Infrastructure and application development policies in Korea

Year	Initiative	Attained Speed	Attained Technology
1995 – 2005	Korea Information Infrastructure (KII-P, KII-G and KII-T)	2Mbps	Copper cable
2004 – 2010	Broadband convergence Network (BcN)	50 – 100Mbps	Copper, Fiber Optic, Wireless
2009 - 2013	Ultra Broadband convergence Network (UBcN)	100 – 1 Gbps	Fiber optic, Wireless

Other supporting development policies in Korea

Introduction of **broadband technological standards** for premise networks	**Low interest rate loans** for building high speed networks	**Cyber Building Certificate Scheme** introduced	**Upgrading** of high speed telecoms networks for public institutions
1997	1999 - 2000	1999	2002 - 2006

Source: https://www.infodev.org/infodev-files/resource/InfodevDocuments_934.pdf

Korea Information Infrastructure Initiative (KII)

KII initiative	Government	Public	Testbed
Main user	Government	Home & business	Research institutes
Investor	Government	Private sector	Government & Private
Target	Backbone	Access	Testbed

Accomplishments

	Government	Public	Testbed
Phase 1	80/140 local call areas (up to 5Gbps)	Optical cables to all **cities & counties** (up to 40Gbps)	backbones between Seoul and Taejon (2.5 Gbps)
Phase 2	All 144 local call areas (up to 5Gbps)	Optical cables to **rural villages** (up to 40Gbps)	backbones in 5 metropolitan cities (2.5 Gbps)
Phase 3	Upgrade bandwidth to 40 Gbps	Upgrade bandwidth up to 320 Gbps	backbones in 6 metropolitan cities (40 Gbps)

Source: https://www.infodev.org/infodev-files/resource/InfodevDocuments_934.pdf

Appendix: FAQ - Base Station Coverage

The cell coverage area is determined by the base station output power and the environment. Things such trees, hills, buildings and land formations will have an affect on the coverage area.

In city areas, there is generally a larger number of users and also obstructions. To help compensate you will find a lot more base stations to cover demand, and the cell sizes will have a 2-5km radius.

In country areas where there are large open spaces the base stations will be further apart and the cell radius will be around 10-32km. Using extender cell technology like that used by Telstra's NextG™ network, a radius of 80-200km can be reached.

Source: https://mobilenetworkguide.com.au/mobile_base_stations.html

Appendix: FAQ - Base Station Coverage

- **Practical Example of Range**

    3G/4G/5G (FR1) Mobile base station tower: it is technically possible to cover up to 50 km-150 km. (Macrocell)

Base Station Type	Typical Coverage Radius	Typical Use	Number of simultaneous users
Femtocell	10 m	Home or office use	Home - 8, Office - 16
Domestic repeater	100 m	Home, office, or factory use	
Picocell	200 m	high rise building, hotel or car park use	32 - 64
Microcell	1-2 km	shopping centers, transport hubs, mine sites, city block, temporary events or natural disasters	32 - 200
Macrocell	5-32 km	Suburban, city & rural use	> 200
Macrocell-extended	50-150 km using extender cell	Suburban & rural use	

Source: https://mobilenetworkguide.com.au/mobile_base_stations.html , https://www.slideshare.net/3G4GLtd/an-introduction-to-macrocells-small-cells

Appendix: FAQ - Base Station Capacity

Source: https://www.slideshare.net/3G4GLtd/an-introduction-to-macrocells-small-cells

Appendix: FAQ - The need for backhaul

Why backhaul is just as important if not more?
When using your mobile phone, the signal is only carried wirelessly from your phone to the nearest cell tower. From there, the data will be carried over terrestrial and subsea fiber-optic cables.
A fibre pair can carry as much traffic as all geosynchronous satellites combined together. *A single duct of fibre can carry all the traffic in the world.*

How do cables work?

Modern submarine cables use fiber-optic technology. Lasers on one end fire at extremely rapid rates down thin glass fibers to receptors at the other end of the cable. These glass fibers are wrapped in layers of plastic (and sometimes steel wire) for protection.

How much information can a cable carry?
Cable capacities vary a lot. Typically, newer cables are capable of carrying more data than cables laid 15 years ago. The new MAREA cable is capable of carrying 208 Tbps.

Is it worth to invest in cables & backhaul?
It is very expensive to lay down new cables but relatively cheap to increase capacity within existing cables. Submarine cables are normally designed to have more capacity than the bandwidth usage.
**Potential capacity** is the total amount of capacity that would be possible if the cable's owner installed all available equipment at the ends of the cable. This is the metric most cited in the press. **Lit capacity** is the amount of capacity that is actually running over a cable. The lit capacity of existing submarine cables is, as highlighted previously, far below design capacity, leaving substantial amounts of 'dark fibre' available for future use. That means that current submarine cables are able to handle the immediate future growth of Internet bandwidth demand as long as carriers see commercial justification.

BDM: Batam Dumai Melaka Cable System - Using:80Gbps, Designed for: 1.28Tbps
TIS: Thailand-Indonesia-Singapore - Using:30Gbps, Designed for: 320Gbps

Source: https://www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions,
https://www.internetsociety.org/wp-content/uploads/2017/08/ISOC_ASEAN_Digital_Economy_Report_Full_s.pdf

Appendix: FAQ - The need for backhaul

Ministry of Communication and Information Technology

Palapa Ring Project

A 36,000 km (+ additional 20,000 km backhaul) fiber-optic submarine network connecting 33 provinces and 440 districts

Completed in August this year at a cost IDR21.6 trillion (about US$1.5 bln), the 13,000 kilometre (8,080 miles) Palapa Ring network traverses every Indonesian district from Sabang in the west, to Merauke in the east, and from Miangas in the north to Rote in the south.

Designed to bring broadband internet access to some 5.8 million people in 57 cities and regencies, the network comprises 12,148 kilometres of fibre optic cable and 55 microwave link hops.

Describing the project as a "highway in the sky" during its inauguration, President Joko Widodo said the Palapa Ring is expected to "bring justice to all Indonesian citizens… while "strengthening trade and connecting small and medium enterprises (SMEs) to local and global markets".

Appendix: FAQ - The need for backhaul

Lao Internet's Issues

Laos has no Internet eXchange Point (IXP) between domestic ISPs. Each ISP in Laos has to purchase and pay for expensive IP transit fee with neighbors' ISPs like: China Telecom, CAT Thailand, VDC(VNPT), VIETTEL.

Almost traffics access to oversea servers, there is unbalance between in-coming and out-going traffics. Therefore, the domestic ISPs cannot be peering (settlement free) with neighbors' ISPs.

Laos is landlocked country, from Laos cannot connect directly to submarine optical fibers. Laos need the International Private Lease Circuit (IPLC) from the neighbors to connect directly to Tier-1 Network like NTT Communications.

Internet Fiberisation

Copper-to-Fibre-Optic Internet Migration

Appendix: Fiberisation Success Cases

fastest fixed broadbands in the world

#1

#4

In 2010, Singapore rolled out the

Next Generation Nationwide Broadband Network

replacing ADSL copper cables with ultra-high speed fibre optic.

Impact:
Cable & ADSL services were withdrawn permanently in June 2016.

Beginning back in 1990 through

- **NBIS***
(to **computerize government services**)

- **KIIG** program**
(**transition of copper lines to fiber** between public institutions & buildings).

Impact:
In just a few years, South Korea had effectively **reached universal fiber access**.

*National Basic Information System (NBIS), **Korean Information Infrastructure Government (KIIG)*

Appendix: FAQ - Copper to Fiber Broadband

1. Successful copper-to-fiber migrations

- Singapore has the fastest fixed broadband in the world, and the country has full fiberisation. In 2010, Singapore rolled out the Next Generation Nationwide Broadband Network replacing ADSL with ultra-high speed fibre optic. Cable and ADSL services were withdrawn permanently in June 2016.

- Korean transition of copper lines to fiber between public institutions and buildings began back in 1990. This eventually resulted in the establishment of networks with speeds of 155 Mbps in dozens of major cities. And by focusing on deployment & competition, in just a handful of years, South Korea had effectively reached universal fiber access.

2. Why are we using copper?

Because copper conducts electricity, it was possible for the telephone network to provide power & telephone services simultaneously.

There's many names for copper technology (ADSL, VDSL)
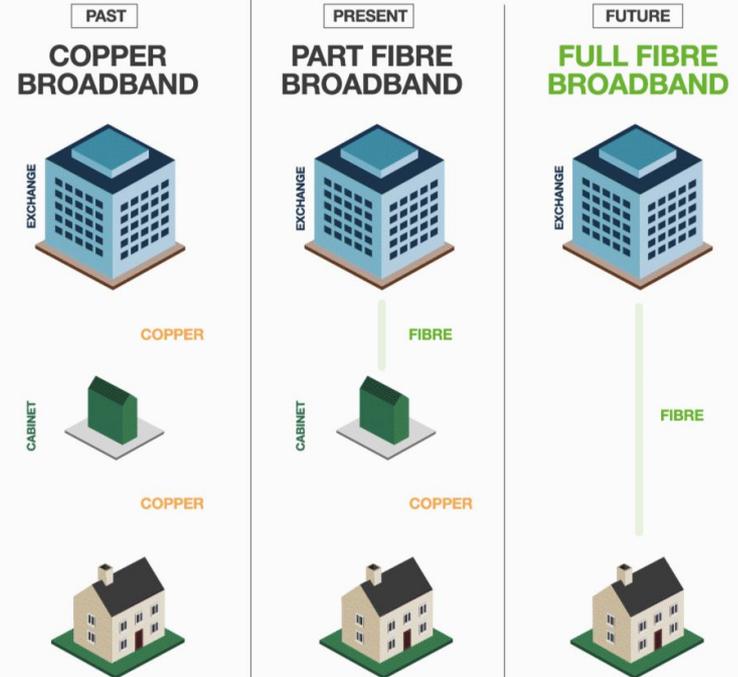
Appendix: FAQ - Copper to Fiber Broadband

3. Why migrate from copper to fiber optic cables?
- Greater bandwidth (capacity) than copper.
- More reliable and provides higher-quality service.
- Not subject to water damage & electrical interference like copper lines.
- Communications signals travel farther over fiber than over copper without signal loss/amplification, so a fiber network requires fewer powered components.

4. Challenges of copper-to-fiber migration
- expensive endeavor & require an overhaul in the cables that run across an entire nation.
- implementation period is thus longer as Internet service providers (ISPs) would have to dig up buried cable wiring and replace with glass or plastic-encased fiber optic cabling.
- fiber optic cables require more care at installation than copper wires. Glass-based fiber optic cables are **more fragile, prone to be affected by various chemicals** such as hydrogen gas (a problem present in underwater cables), **difficult to splice (join), can be easily cut or damaged** during the construction process.
- As data is transmitted through pulses of light, extra optical amplifiers need to be added across the connection to ensure minimum attenuation, a problem that didn't exist with copper cables.

5. Overcoming the challenges
- opening of underground ducts and using power and telephone poles. Fibre optics can be run through the ducts and poles to connect to a wider area. This is similar to what Vietnam and Thailand have done and that seems to be the only economical means of reaching out to areas that don't have fibre coverage.

Fiber vs. Copper

	Fiber	Copper
Bandwidth	10-Gigabit and beyond	Gigabit
Future-proof	Evolving towards the desktop	CAT7 under development
Distance	40 km+ @ 10,000 Mbps	100 m @ 1000 Mbps
Noise	Immune	Susceptible to EMI/RFI interference crosstalk, and voltage surges
Security	Almost impossible to tap	Susceptible to tapping
Handling	Lightweight, thin diameter Strong pulling strength	Heavy, thicker diameter Strict pulling specifications

	Distance	Bandwidth	Voice Channels
Copper	2.5 km	1.5 Mb/s	24
Fiber	200 KM	2.5+ Gb/s	32,000 +

Optical fiber vs. copper: the choice is clear

	Optical Fiber	Copper
Capex Cost (2,000-user optical LAN)	< $300,000	>$1,000,000
Lifecycle	30-50 years	5 years
Distance	12 miles	300 feet
Weight (per 1,000 ft.)	4 lbs.	39 lbs.
Energy Consumed	2 watts per user	more than 10 watts per user
Maximum Bandwidth	69 Tbps	10 Gbps
Security	Hard to tap, easy to alarm	Emits EMI

Carrier Neutral IXPs

Appendix: FAQ - Carrier Neutral IXPs

1. What are Internet Exchange Points (IXPS)
IXPs route local and regional Internet traffic locally, rather than over international networks. As countries, cities, and towns establish their own IXPs, more local Internet traffic is exchanged and routed locally, thereby reducing costs and network delays, increasing content upload speeds, and encouraging the growth and distribution of local Internet content.

2. What are the benefits of IXPs?
- Cost-saving: lowering Internet-access costs for end users by decreasing Internet service provider (ISP) operating costs and making Internet access more affordable. In addition, IXPs can ensure that traffic between local senders and local recipients use relatively cheap local connections, rather than expensive international links. The cost savings can be significant—20 percent or more in some countries—as local traffic can make up a significant portion of an ISP's overall Internet traffic.
- Faster content-loading: improve local users' quality of access by providing more-direct network connections for local content producers and consumers.

3. The need for carrier-neutral IXPs
A carrier-neutral IXP is an Internet Exchange Point that is not owned by a carrier. In the late 1990's, WorldCom, a large ISP at the time, owned MAE-East, a large IXP on the east coast of the U.S. Building into MAE-East supported a competitor (WorldCom) and required purchasing WorldCom circuits. Peering at MAE-East meant paying money to your competitor, supporting its peering business, and reinforcing its position as a central component of the Internet in North America.

Source: https://www.internetsociety.org/policybriefs/ixps/, https://drpeering.net/FAQ/Why-is-carrier-neutrality-important-for-IXP.php

Appendix: FAQ - Carrier Neutral IXPs

Case: The Philippines and the Lack of a Carrier Neutral National IXP

The Philippines provides a telling example of the need for a carrier‑neutral IXP to serve all ISPs on an equal commercial footing. PLDT, the dominant carrier, operates its own Vitro Internet Exchange and is able to deliver traffic from origination to termination anywhere in the Philippines at minimum cost and latency. Other ISPs, including major service providers such as Globe, Sky, Bayan DSL, and ETPI, are able to peer with each other on a bilateral basis and through a host of Internet exchanges such as PHIX, PHOpenIX, CORE and MIX.

However the Internet exchange market is fragmented, insofar as no exchange has the full participation of all major ISPs. The lack of cooperation means that consumers end up having to take double the amount of time to access local websites as traffic is routed to other countries before returning back to the Philippines. According to one estimate, 40--70% of local traffic is routed through either Hong Kong or Los Angeles (US), and most of this is due to transit through PLDT's gateway.

As PLDT has the major market share, they are not much interested in joining a multi--peering IXP and have consistently resisted calls by the National Telecommunications Commission (NTC) to mandate an IP peering policy, citing concerns regarding the security and adequacy of the technical arrangements of local Internet exchanges such as PHOpenIX.One group of users adversely affected are local gamers trying to connect to the platform of gaming providers, such as Garena, that use PLDT as its ISP. This leads to significant delays for gamers using other ISPs when they want to play online games with their peers who are using the PLDT network.

Source: https://www.internetsociety.org/wp-content/uploads/2017/08/ISOC_ASEAN_Digital_Economy_Report_Full_s.pdf

Appendix: FAQ - Carrier Neutral IXPs

Case: MyIX in Malaysia

The Malaysia Internet Exchange (MYIX) is a non-profit and first neutral Internet Exchange where local Internet Service Providers ("ISP"s) and content providers connect to exchange Internet traffic. According to the MCMC's Decision to establish a new neutral exchange to meet the demands of the Internet industry, a neutral Malaysia Internet exchange, MyIX was set up through a cooperation of ISPs to provide direct connectivity among local ISPs.

Memorandum of Understanding (MOU) was signed by various ISPs for the formation of MyIX (2006). Benefit from the MyIX is: **preventing tromboning,better quality of broadband service, common platform for the national connectivity, cost saving and excellent value proposition** - for foreign content providers to peer with MyIX and as such improved business opportunities for members (content localization)

MYIX supports an open policy of interconnection with all members. MLPA (MultiLateral Peering Arrangements) is to improve the efficiency of routing and improve the general connectivity of the Internet.

To the CLMV countries, MyIX case is a good reference to build carrier neutral IXPs.

Source: https://www.internetsociety.org/wp-content/uploads/2017/08/ISOC_ASEAN_Digital_Economy_Report_Full_s.pdf

Global Internet Speed Comparison

Appendix: FAQ - Global Broadband Download Speed

(As of July 2020)

Global Average: <u>81.46 Mbps</u>

Country	Global Ranking	Fixed Broadband Download Speed (Mbps)
Singapore	1	213.18
Thailand	3	171.45
Malaysia	41	86.62
Vietnam	60	55.73
Laos	77	39.28
Philippines	109	25.07
Cambodia	110	23.72
Indonesia	111	23.06
Myanmar	118	19.97

Global Average: <u>34.51 Mbps</u>

Country	Global ranking	Mobile Broadband Download Speed (Mbps)
Singapore	13	56.43
Thailand	59	32.87
Vietnam	62	32.26
Laos	77	26.39
Myanmar	80	25.8
Malaysia	85	24.44
Cambodia	109	17.54
Philippines	113	16.95
Indonesia	114	16.94

Source: https://www.speedtest.net/global-index#mobile

INTERNET PENETRATION IN SOUTHEAST ASIA

THE NUMBER OF INTERNET USERS IN EACH COUNTRY, COMPARED TO THE TOTAL POPULATION (REGARDLESS OF AGE)

AUG 2019

BRUNEI	SINGAPORE	MALAYSIA	THAILAND	INDONESIA	PHILIPPINES	VIETNAM	WORLDWIDE	CAMBODIA	LAOS	TIMOR-LESTE	MYANMAR
95%	85%	83%	69%	65%	64%	61%	56%	50%	43%	39%	39%
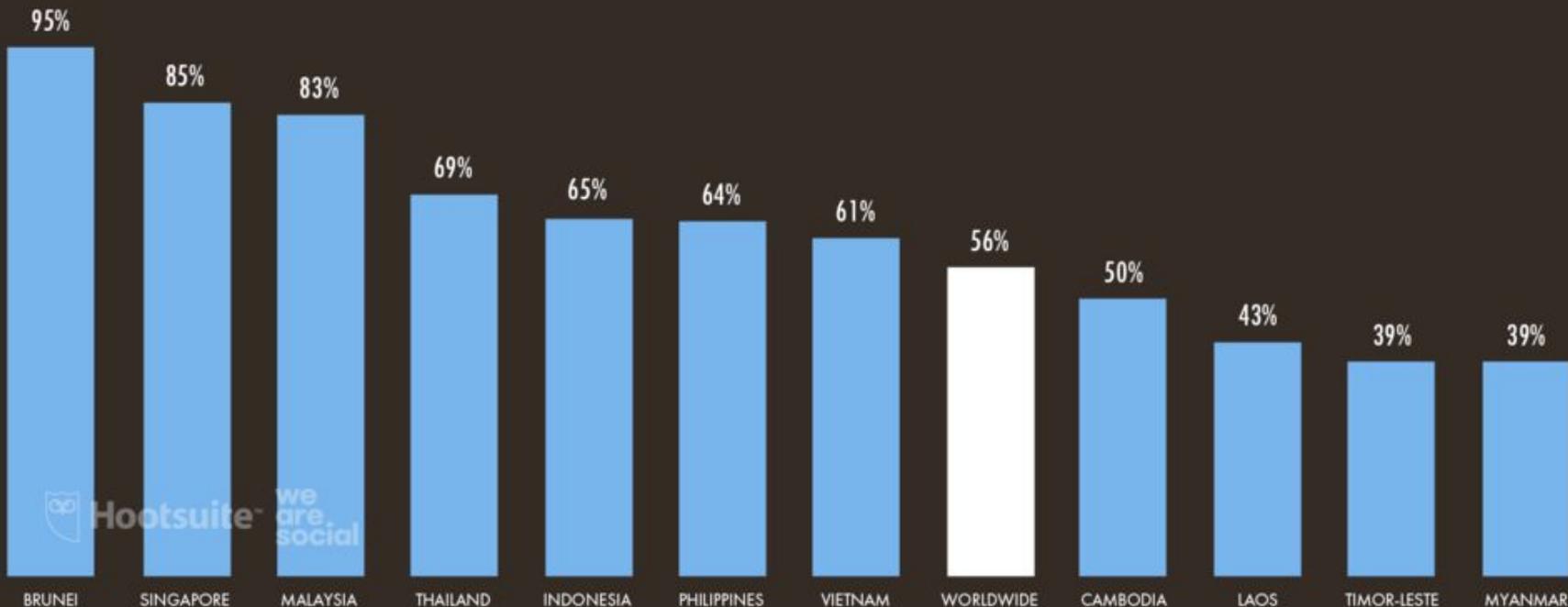
Internet Market Share

Appendix: FAQ -Policies for Competition

FIGURE 2.8 Fixed broadband market share of incumbents (2017)

	Indonesia	Malaysia	Philippines	Thailand	Vietnam
		7%	6%	7%	5%
	12%			17%	18%
	32%		36%	33%	29%
	49%	90%	54%	38%	45%
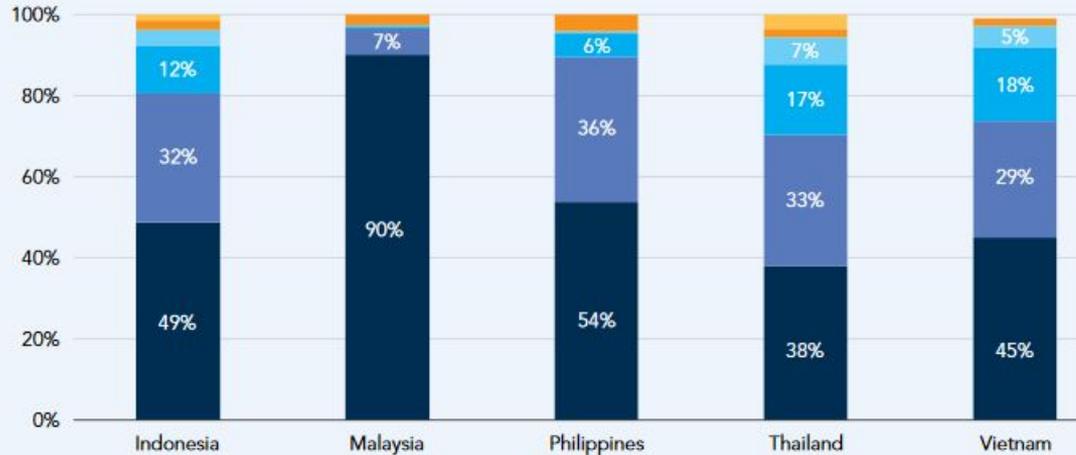
Source: Telegeography. Each column shows the market share of individual companies within the fixed broadband market, with names of compar
removed. Values are not included for sections of each bar where the market share is lower than 5%.

REPUBLIC OF KOREA
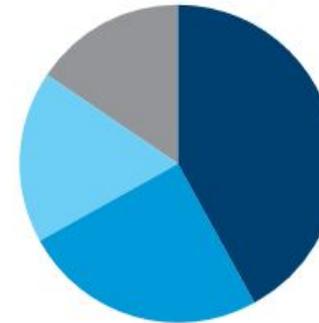
Subscribers (June 2017)
- KT Corp (42.2%)
- SK Broadband (25.0%)
- LG Uplus (17.4%)
- Other Players (15.4%)

JAPAN
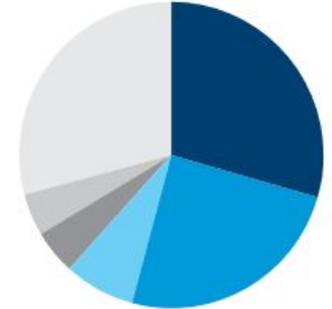
Subscribers (June 2017)
- UQ Communications (29.7%)
- NTT (24.7%)
- Softbank BB (7.3%)
- KDDI (4.8%)
- NTT DOCOMO (4.4%)
- Other Players (29.1%)

Source: https://openknowledge.worldbank.org/bitstream/handle/10986/29926/127679.pdf?sequence=5&isAllowed=y

Appendix: FAQ -Policies for Competition

Share of Subscribers for Fixed Broadband Services, June 2017

Subscribers (June 2017)
- Telekom Malaysia (92.2%)
- Maxis (6.2%)
- webe (0.9%)
- YTL Communications (0.2%)
- Other Players (0.5%)
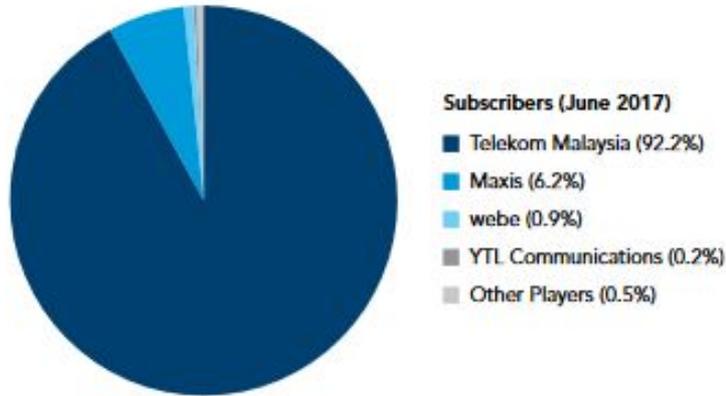
The high cost of fixed broadband internet services is partly driven by limited competition in the fixed broadband market.

In Malaysia, Telekom Malaysia (TM), the leading fixed broadband service provider, as a significantly larger market share than the leading firms in other countries. The limited competition contributes to the higher fixed broadband prices in three ways.

1. while TM is the major incumbent of cable landing stations in Malaysia, rather than allowing for co-location of its stations with other operators, it instead **provides point-of-access connection outside the stations and charges a higher fee**, which **translates to a higher cost of broadband rollout**.

2. given TM's extensive broadband networks, it has been awarded exclusive memorandums of understanding with the government to deploy the high-speed broadband (HSBB) and sub-urban broadband (SUBB) plans, without contest. This eventually eliminates the possibility of attracting private investment by the network rollout operations.

3. Malaysia also pays a higher IP transit prices than is the case in other countries, and this is subsequently passed on to retail consumers of broadband services.

Source: https://openknowledge.worldbank.org/bitstream/handle/10986/29926/127679.pdf?sequence=5&isAllowed=y

Appendix: FAQ -Policies for Competition

Singapore Fixed Broadband Market Share

ViewQuest
5.0%

Other players
1.0%

M1
22.0%

Starhub
25.0%

MyRepublic
15.0%

Singtel
32.0%
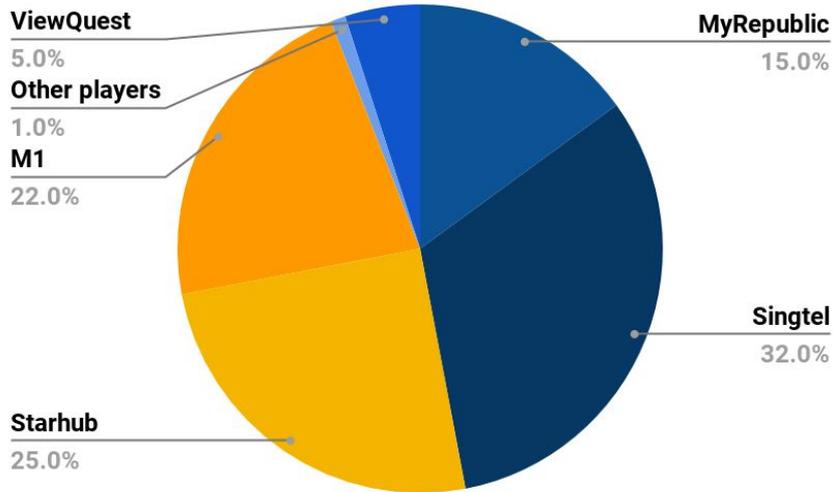
Competitive market

Laos Fixed Broadband Market Share

Unitel
13.0%

Other players
12.0%

LTC & ETL
75.0%
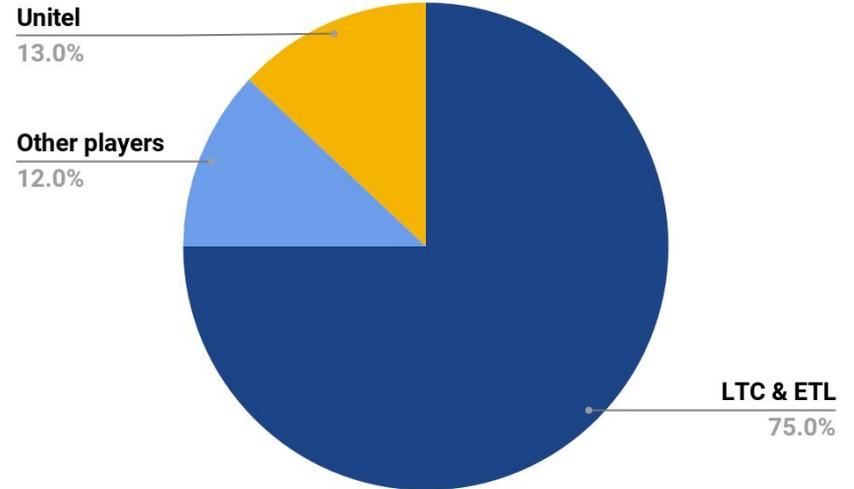
Policies for Competition

Appendix: Competition Policies Success Cases

Fastest fixed broadband in the world

REPUBLIC OF KOREA

Subscribers (June 2017)
- KT Corp (42.2%)
- SK Broadband (25.0%)
- LG Uplus (17.4%)
- Other Players (15.4%)

S.Korea's competition policies (1999 - 2009):

- **easing entry restrictions** for service provides

- **ensuring fair access to infrastructure** for new entrants, through for example local loop unbundling and infrastructure sharing;

- introducing **regulations on retail pricing** to boost demand;

- facilitating **access to spectrum** for new mobile technologies

- Liberalising in the telecom sector, Low interest rate loans for the establishment of high speed networks

Figure 6: Fixed broadband penetration in Korea, 1999 – 2009

Bar chart values: 1999: 1.92%, 2000: 27%, 2001: 53%, 2002: 69%, 2003: 72%, 2004: 76%, 2005: 76%, 2006: 87%, 2007: 90%, 2008: 93%, 2009: 94%
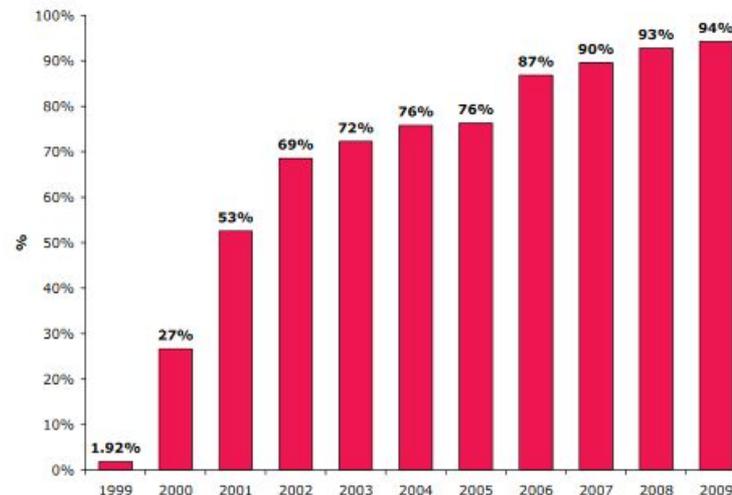
KPIs used to assess the effectiveness of regulation policies in Korea

Monthly ADSL entry level prices (KRW), 2000 – 2008
(base year = 2000)
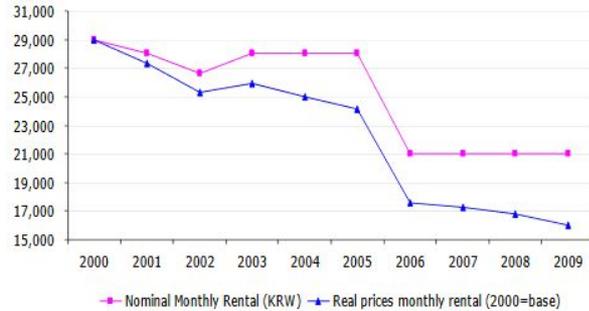
Source: OVUM

Average cost per Mbps for entry level & premium ADSL
offers (KRW, real prices), 2000 – 2009 (base year = 2000)
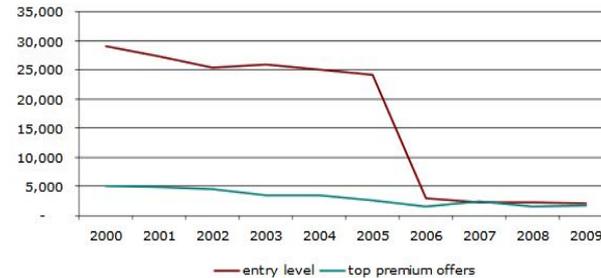

Source: POINT TOPIC, OVUM

Downward trend in
ADSL entry level prices

Downward trend in the average
broadband cost per Mbps

KPIs used to assess the effectiveness of regulation policies in Korea

The HHI in the fixed Korean broadband market, 2001 - 2009

Source: KCC, OVUM

Telecoms sector revenue as a % of GDP, 1975-2006
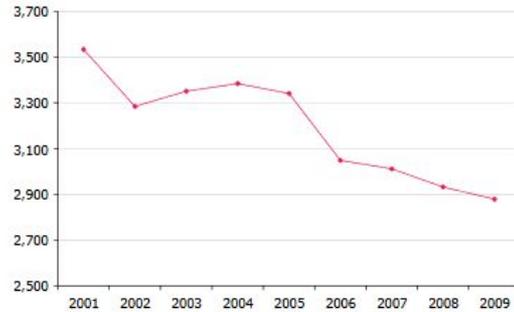
Source: ITU

Downward trend in the overall level of concentration in the market.

Increase in telecoms revenue as a % of GDP

Bangladesh

An **opening of the international transit market** leads to more innovations, competitions & efficient market, leading to an increase in broadband expansion.

In February 2008, the Bangladesh Telecommunications Regulatory Commission awarded a licence to a second service provider to operate an international Internet gateway .

In April 2012, the same regulator awarded 30 additional licences for international Internet gateway services.

Fixed Broadband Subscriptions in Bangladesh during liberalization of international gateways between 2007 & 2014

Fixed broadband subscriptions in Bangladesh

As a result, **fixed broadband subscriptions** was **boosted** both in 2008 & 2012.

1 additional IGW licensee

30 additional IGW licensees
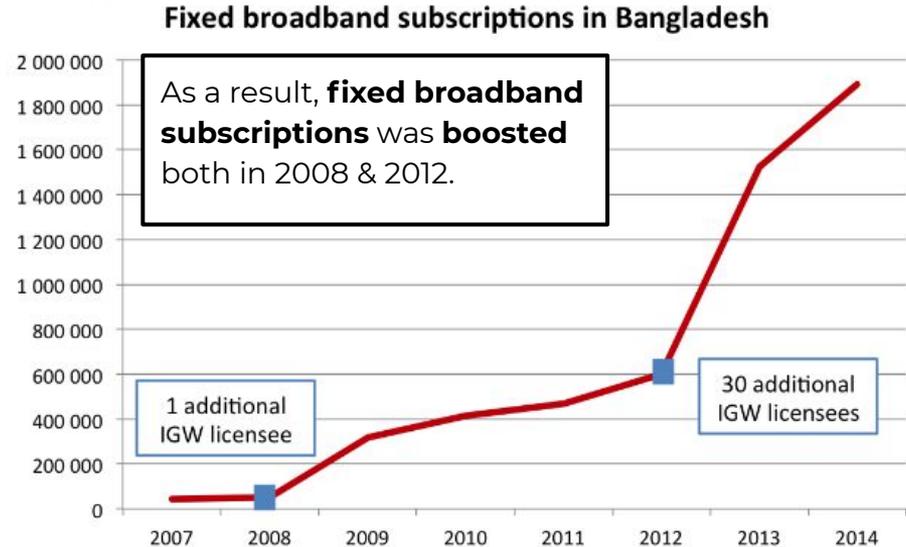
Sources: ITU and Diffraction Analysis.

Appendix: FAQ -Policies for Competition

Successful policies that create competitive Internet market

1. Korea

developed and implemented policies designed to foster competition and deployment. This included

a) changes in law such as the passage of the Monopoly Regulation and Fair Trade Act which has rules that:

- barred unfair practices and prohibited unreasonable rates for access to fiber lines.
- restrained corporate concentration in the telecom sector by restraining mergers and acquisitions and the overall market share by any one company was allowed to hold.

b) performance monitoring schemes and announcements of the connection speeds and installation time of service providers. In 2000, the Government's telecoms performance monitoring system was extended to cover the speed of Internet and broadband services and

c) service level agreements (SLAs) were introduced for broadband services in 2002. Under these agreements, operators must compensate customers for delays in service activation, service downtime and quality problems such as failure to meet the minimum guaranteed connection speed.

d) The liberalisation of the telecommunications market in Korea also gave broadband roll-out a real kick-start, with competition between KT and Hanaro spurring much of the DSL rollout between 1999 and 2001.Broadband market development in Korea was driven by intense and sustained competition both between technologies and between service providers.

e) reclassification of broadband as a facilities-based service (A telecommunications service provider owning, as opposed to leasing, networks used to provide telecommunications services). In reclassifying broadband services, the Government not only increased entry regulation by obligating providers to acquire licence to enter, but it also obligated providers to report the terms and conditions of their business.

Such changes shifted the telecom market from a duopoly in 1999 to a more competitive market of four companies in just two years. In just a handful of years, South Korea had effectively reached universal fiber access.

Appendix: FAQ -Policies for Competition

Successful policies that create competitive Internet market
2. Singapore
In 2000,for example, the Info-communications Development Authority (IDA) of Singapore mandated the incumbent operator to provide co-location services to other service providers in its submarine cable landing stations. The connection services were,however,left to be negotiated on commercial terms between the players. The IDA reviewed this decision when a study of connection charges revealed that they were significantly higher than in other countries, and could constitute a bottleneck for providing international capacity. In 2002,the regulatory authority mandated the incumbent operator to provide connection services at cost-based rates, effectively reducing the charges by more than 90 per cent.

3. Bangladesh
an opening of the international transit market should lead to more innovations, competitions and efficient market, leading to an increase in broadband expansion. The example of Bangladesh is striking: in February 2008, the Bangladesh Telecommunications Regulatory Commission awarded a licence to operate an international Internet gateway to a second service provider. In April 2012, the same regulator awarded 30 additional licences for international Internet gateway services. As shown in Figure 8, the growth of fixed broadband subscriptions was boosted both in 2008 and 2012.

Source: https://www.unescap.org/sites/default/files/Effect_of_Open_International_Gateways_on_the_Broadband_Connectivity_Market_0.pdf

Public-Private Partnership

Appendix: FAQ -Public-Private Partnership

Korea

The majority of funding for Korea's broadband infrastructure projects has **come from the private sector rather than the public sector.** The government investment against the total investments are in brackets as follows:

- backbone network – KRW 9.97 trillion ($8.4 billion);
- service control platform – KRW 4.48 trillion ($3.8 billion);
- fixed access network – KRW 8.79 trillion ($7.4 billion); and
- mobile access network – KRW 9.1 trillion ($7.7 billion).

The government encouraged competitors with a low-interest loan program for companies that built their own broadband facilities. **The program offered $77 million in two years alone, with a particular focus on rural areas.**

Shortage of Digital Talents

Appendix: FAQ - Digital Literacy & Talents

Go-Jek doubles down on India with yet another talent acquisition

Go-Jek isn't alone in setting up R&D centers in India, rival **Grab,** ⓘ which is backed by SoftBank's Vision Fund and valued at $14 billion, is present in the country, too.

Aware of the limits of the talent pool in its native Southeast Asia, Grab has long maintained engineering outposts overseas. These include Beijing, Seattle and — as of 2017 — Bangalore, in addition to various countries in Southeast Asia.

Grab has also made an acquisition in India.

It's challenging to keep up with Go-Jek acquisition spree because many of its deals are not announced at the time, or, indeed, at all.

But we do know there have been many. According to Crunchbase data, AirCTO is its tenth purchase. Three of those came from India — C42 Engineering, Pianta and Leftshift Technologies — to form an offshored R&D division. In

Source: https://techcrunch.com/2019/06/12/go-jek-india/ , https://techcrunch.com/2018/01/17/grab-ikaaz/

Appendix: FAQ - Digital Literacy & Talents

Grab taps into with new R&D City

- Doubles the number o
- Plans to add more tho worldwide

- Grab's new R&D centre in India will be located on Indira Nagar, in the heart of Bangalore, India's Silicon Valley. The new centre will house up to 200 talented engineers, who will focus on developing new payments technologies for GrabPay, Grab's digital payments platform, that will

- Grab Singapore, which started in a 4,500 square foot office in April 2015, will move to a larger office space of almost 100,000 square feet in Singapore's Central Business District. Grab Singapore is Grab's largest R&D centre and will continue to drive development of the app based on local market research, and introduce new services and features that improve the user experience.

space for 60 engineers. Led by Microsoft veteran Raman Narayanan, the Seattle team has developed the technology behind one of the company's key products, GrabShare, Grab's private carpooling service, as well as enhancements around user trust and data management.

Appendix: Talent shortage

What ICT skills are in demand? Case studies of ICT Skills in ASEAN-5

Country	Skill Challenges	Skill Shortage
Indonesia	ICT graduates' skill sets often fall short of what the industry requires.	Projected shortage of 9 million skilled and semi-skilled ICT workers 2015-2030.
Malaysia	Lack of industry-ready graduates.	• 10% of the new entrants to the ICT industry are employable, 90% requiring substantial training before they are work-ready. (PIKOM, 2014). • The demand for ICT graduates (such as computer science, information technology, and software engineering) 7,121 in 2010 to 13,300 in 2014, the supply of graduates had decreased from 8,237 to 8,000 during the same period. (MDEC, 2015). • There would be a shortage of close to 10,000 ICT professionals at various levels in 2016.
Philippines	ICT graduates lacking relevant IT skills, soft skills, English proficiency, numerical competence, verbal and report writing skills, familiarity with different business models and terms, industry specific knowledge and processes codes and terms.	• Needs IT workers at least 200,000 graduates every year. • Shortfall of 150,000 every year. • High attrition rate of up to 60-70%.

Appendix: Talent shortage

What ICT skills are in demand? Case studies of ICT Skills in ASEAN-5 [2]

Country	Skill Challenges	Skill Shortage
Singapore	The shortage of skilled workers for cyber security at the middle and senior tiers due to insufficient training programs and entry routes for mid-career professionals.	• In 2012, only 0.8% of Singapore's 144,300 ICT workers were considered IT security specialists. • It is projected that by 2017, the ICT industry would require an additional 15,000 workers particularly in the areas of cyber security, data analytics, development and network infrastructure – a number set to rise to 30,000 by 2020.
Thailand	ICT graduates lack basic skills like coding or a strong foundation in core subjects such as advanced mathematics.	• 90% of the 20,000 ICT graduates each year are unable to meet the basic qualifications for companies. • The industry needs 6,000 to 7,000 workers annually, which translates to a skills shortage of 4,000 to 5,000 a year.

Source: https://blogs.worldbank.org/sites/default/files/preparing_ict_skills_for_digital_economy-revised_7mar2018.pdf

Appendix: Talent shortage

Companies hunt for talent as Singapore tech sector continues to grow

And according to the 2018 Infocomm Media Manpower Survey, demand for infocomm professionals – which hit 202,600 in 2017 – is expected to grow by another 28,500 by 2020. Already, there were 12,300 infocomm job vacancies in 2017.

To meet the growing demand, recent years expanded their i... Latest figures released by the ... information technology cour... increased by close to 800 in f...

While intake has gone up, tec... said it will still not be enough to meet their manpower needs, particularly in areas such as software development, cybersecurity and artificial intelligence. To plug the labour gap, these companies have had to hire from overseas or open offices abroad.

Darius Cheung, the founder of property portal 99.co, said that the increased intake size will not "even make a dent" in meeting demand for tech talent. For him, there has been "no other solution" but to "actively recruit" from overseas, he said.

Many companies also open offices overseas, in countries such as Vietnam where wages are lower, and move some of the web development and technical support work over, said Chia Hock Lai, the president of the Singapore Fintech Association.

Appendix: Talent shortage

Asia

Indonesia aims to plug skills shortage in booming tech sector

JAKARTA: An Indonesian government plan to allow start-ups to hire foreign staff more easily could help plug a sho[...] a tech entrepreneur, though the i[...]

The proposal, contained in a new[...] week, stipulates that foreign staf[...] permit "for a certain amount of t[...]

One local success story, the US$10 billion ride-hailing and payments company Gojek, now maintains a large engineering and development office in the Indian tech hub of Bangalore, as does online travel app Traveloka, which is valued at over US$4 billion.

Other unicorns, including e-commerce marketplace Tokopedia, will hold recruitment events abroad to recruit top Indonesian talent. Firms say that due to demand, experienced Indonesian tech executives or engineers can be paid more working for unicorns at home than in Silicon Valley.

Digital Transformation Challenges

17%	14%	11%	11%	10%	10%	10%	9%	9%
Shortage of digital skills and talent within my company	Lack of necessary technologies to enable digital transformation	Lack of budget/ commitment from management	Lack of insight into operational and customer data	Lack of digital mindset/ cultural challenges in the organization	Lack of a proper digital transformation roadmap	Cultural resistance to change	Digital transformation is too big, we don't know where to start	Too expensive/ not worth it in my industry

Source: IDC–Cisco 2020 Asia Pacific SMB Digital Maturity Study

Source:https://www.cisco.com/c/dam/global/en_sg/solutions/small-business/pdfs/ebookciscosmbdigitalmaturityi5-with-markets.pdf

SMBs in infrastructure services industries are the most challenged with the lack of skills. Conversely, Financial Services Institutions (FSIs) are the least impacted of all.

Legend:

Lack of digital skills and talent within my organization

Lack of insight into operational and customer data

Lack of a robust IT platform to enable digital transformation

Financial Services Institutions (FSI)

14%
13%
12%

Infrastructure

21%
15%
13%

Manufacturing

17%
14%
16%

Services

16%
15%
15%

Public Sector

16%
12%
12%

Retail and Wholesale

18%
14%
11%

Figure 9: Top 3 challenges in digital transformation (by industry)

Building Digital Talents

Appendix: FAQ - Digital Literacy & Talents

1. **What government / stakeholders can do for empowering digital talents ?**

   a. **Accelerating Innovation**
      i. **Technology experimentation** - make targeted development efforts to encourage demand for experimentation
         1. Hackathon - buildy industry understanding on technologies
         2. Technology Sandbox - Low cost prototyping for future technologies
      ii. **Establish Digital Hub** - to nurture and grow digital entrepreneurs and startups.
         1. Provide training and skill
         2. Seed-funding for business
         3. Connect digital entrepreneur
      iii. **Pro-business regulations**- Facilitate FDI / DDI in attracting key digital companies and entrepreneurs

   b. **Transform Education System**
      i. **Agile-future-ready curriculum**- Start digital education on computotry skill early will help bridge future talent supply gaps.

   c. **Facilitate transition to disruptive work ecosystem**
      i. **Upskilling Training** - keeping the workforce current on latest developments through MOOCs (Massive Open Online Course)
         1. Partnerships with Massive Open Online Course (MOOC) providers
         2. Determine list of recommended MOOCs relevant for industry segments
         3. Create awareness of mechanism and value of courses to boost enrolment and completion rates in courses
      ii. **Reskilling Fund** - Provide fund to equip workforce with updated technological skills so that it can embrace and exploit advancements and disruption.
         1. Design training curriculum to bridge gaps in increasing and revising skills with focus on technology topics
      iii. **Develop Expertise** - produce high-standard, industry-ready ICT graduates and bridge the demand supply gap in ICT graduates.
         1. Increase awareness and uptake of ICT-related careers
         2. Strengthen quality of ICT graduates
         3. Promote recognition of TVET qualification to industry and among potential students

Appendix: Building Blocks of Upskilling

1. Identify skills gaps and mismatches

Assess the current environment and challenges. Identify the size and nature of an organisation's skills gaps and mismatches, where to start and what to prioritise.

- Define future workforce and understand the impact of automation
- Assess current workforce capabilities
- Understand the organisational culture
- Identify skills gaps, mismatches and role adjacencies
- Validate the case for change

2. Build a future-proof skills strategy

Build strategic plans to deal with the skills gaps which have the most impact on delivering business value.

- Rapidly review and refresh upskilling strategy
- Make inclusion a priority
- Improve effectiveness of learning organisation & tech
- Test strategic alternatives and scale best-performing programmes

3. Lay the cultural foundation

Use culture as the bedrock of an organisation's upskilling efforts.

- Create a cultural shift and the right behaviours
- Inspire citizen-led innovation
- Nurture physical vitality and mental wellbeing

Appendix: Building Blocks of Upskilling

4. Develop and implement upskilling

Create and deploy programmes which harness the organisation's culture and use key behavioural economics principles to deliver the right learning experience and rapid results.

- Create buy-in and align rewards and incentives
- Free up time for learning
- Design for an engaging learning experience
- Build digital understanding
- Focus on targeted personal transformation journeys
- Deliver training

5. Evaluate return on investment

Measure the return on investment from upskilling programmes.

- Measure Return on Learning investment
- Track Employee Engagement
- Benchmark the L&D function

Appendix: MDEC Tech - Talents Development

Creating & Nurturing Talent

As the world shift towards digitalisation, we here at MDEC have the responsibility to help ensure that Malaysians are able to adapt accordingly. We here at MDEC believe that it is our responsibility to prepare the people for the future and have prepared a series of programmes that can help Malaysians prepare for the digital future ahead.

School Students

We help lay the foundations of digital knowledge.

Relevant Programmes:

#MYDIGITALMAKER +

LEVEL UP @ SCHOOLS +

KRE8TIF @ SCHOOLS +

Tertiary Students

We help hone the knowledge into marketable skills.

Relevant Programmes:

GLOW +

EUSAHAWAN +

DATA SCIENCE +

KEJOHANAN E-SUKAN KAMPUS +

PREMIER DIGITAL TECH UNIVERSITY +

Existing Workforce

We help the workforce expand their horizons.

Relevant Programmes:

GLOW +

LEVEL UP KL +

EUSAHAWAN +

Latent Talent

We ensure that the digital nation is inclusive to all.

Relevant Programmes:

GLOW +

EREZEKI +

EUSAHAWAN +

LET'S LEARN DIGITAL +

Appendix: MDEC Tech - Talents Development

Our Achievements

Over the years, we've introduced numerous programmes and initiatives to push digital knowledge to the forefront. Here's what we've achieved thus far:

Computational Thinking / Computer Science
Integrated into the national school curriculum

1.2M
Number of students participating in IT-related courses

16
Established Premier Digital Tech Institutes

15%
Estimated growth of talent requirement by 2020

23
Universities that offer data courses

Over 400
Number of Digital Ninjas

11,000
Number of data professionals in Malaysia

8,000
Number of cybersecurity professionals in Malaysia

Over 630K
Number of users in eUsahawan, eRezeki and GLOW

50
Number of women in the Cyber-risk programme

CS education in Malaysia's curriculum (since 2017)

Primary school: Year Six

Subject: Information and Communication Technology (ICT). **33%** of it covers coding and programming.

Module: Scratch Programming.
- Understanding programming
- Using algorithm through Pseudocode and flowchart
- Coding and debugging
- Project work

Secondary school: Lower secondary

Students have the option to learn either Basic Computer Science or Design and Technology.

Subject: Basic Computer Science. **63%** of it covers coding and programming.

Form One
- Sequential control structure algorithm
- Coding: Scratch and HTML

Form Two
- Selection and repetition control structure algorithm
- Coding environment - Python
- Selection and repetition control structure coding

Form Three
- Search and sort algorithm
- Database and SQL
- Search and sort coding

Subject: Design and Technology. **41%** of it covers covers coding and programming.

Form One
- Introduction to Design & Technology
- Project Management
- Design Process
- Sketching
- Application of Technology (Fertigation System Design & Fashion Design)

Form Two
Applications of technology
- Manufacturing technology
- Electronic design

Form Three
Applications of technology
- Mechatronic design

Product development
- Product making

Secondary school: Upper secondary

Students have the option to study coding in subjects such as computer science, invention or engineering and vocational related subjects as elective subjects.

Subject: Computer Science. **83%** of it covers coding and programming.

Form Four
- Programming
- Database

Form Five
- Advanced database
- Web-based programming

Source: Education Ministry curriculum development division

Vietnam's growing tech talent pool is attracting foreign companies to settle down

"Vietnam has the **highest-performing computer science students** I've ever encountered… the **exercises** I watched them solve would be **considered challenging problems for a Google hiring interview**,"

- Google engineer Neil Fraser

- Seen as an attractive alternative for tech outsourcing

- A strong cultural affinity for STEM skills

- Public schools introduce computer science into the curriculum at a very early age

- Improved internet connectivity & IT infrastructure

Improve digital literacy & reduce the digital divide.

2000 - 2002

10 million people Internet education project:

free & subsidised Internet education programmes targeted at previously unreached groups.

free Internet access centres in remote areas & schools

subsidies for purchasing PCs for low income citizens

Growth rate of internet use by type of user (%), 1998 – 2001

- Over 50s
- Non college educated
- Monthly income of KRW 1million or less

10 million Internet education project

50
40
30
20
10
0

1998   1999   2000   2001
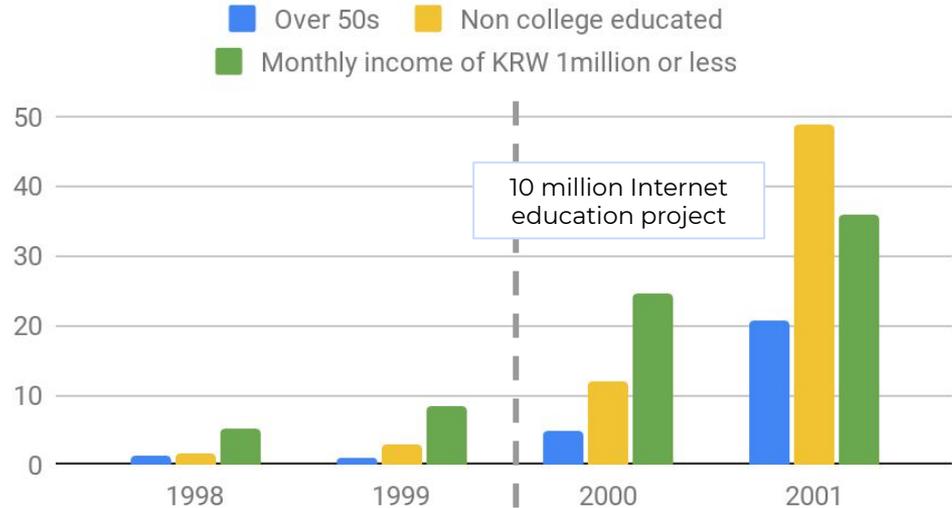
Policies in building IT talent capital in South Korea

1999 – 2002
(Cyber Korea)

Support R&D and technology development activities in IT:

Government investment in next generation IT technologies

Venture capital loans for researchers

Tax reductions & deregulation for high technology start-ups

Rent reductions in various industrial complexes

1999 – 2005
(Cyber Korea, e-Korea, First Master Plan)

Foster IT human resources:

Advanced computer literacy programs

High technology equipment for tertiary & vocational schools

Computer literacy certification for points in university entrance exam scores

2006 – 2010
(u-Korea)

Help companies to commercialise leading technologies:

test-beds for IT companies & undercapitalised SMEs to test new technologies and services

Promote greater IT use to create new added value:

in traditional industries (agriculture, fishery, SMEs)

![ProgeTiger logo]

2012

GOAL

**enhance technological literacy & digital competence**

"*Huvitav Kool*" (Interesting School)
make learning diversified + playful + interesting

ACTIONS

integrate technological education into curriculum

financial support for programmable devices

resources & training for teachers

Critical thinking and the ability to solve problems

Understanding technology and how it works

Engineering Sciences
Informatics (programming)
Mechatronics (robotics)
Electronics

Design and Technology
3D technology
Drawing and graphics
Multimedia
Animation

Information and Communications Technology
Computer science
Digital communications

The abilities to create and collaborate

Preschool Tech Programmes

Kodu Game Lab

Visual coding to make games

Lego WeDo

Lego style programmable robot

Primary School Tech Programmes
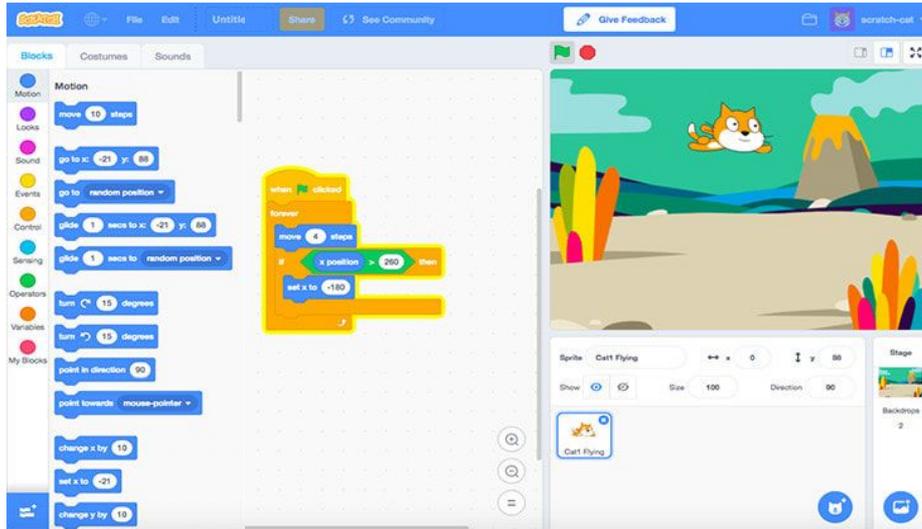
Scratch

Visual coding to make games,
animations; apply in maths
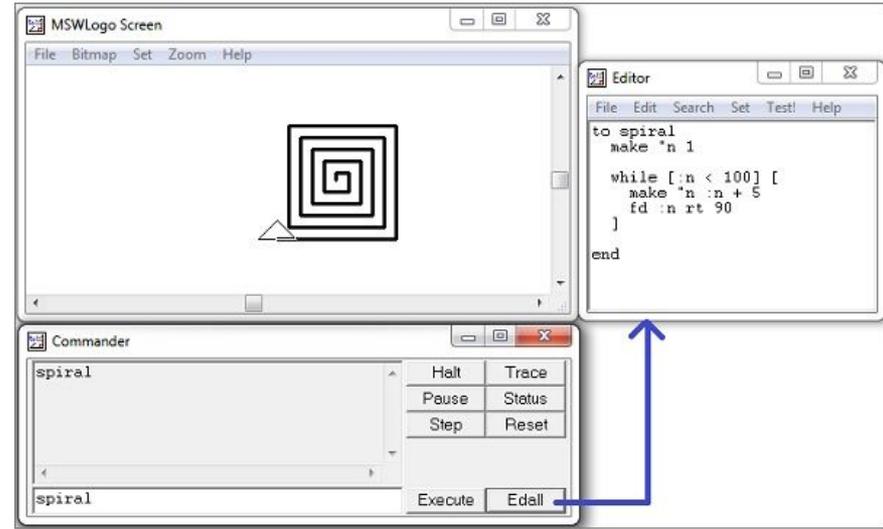
Logo MSW

Coding commands to create art
graphics

Primary, High, Vocational School Tech Programmes

MIT App Inventor

Visual coding to make mobile apps

Lego Mindstorm eV3

Lego style programmable robots
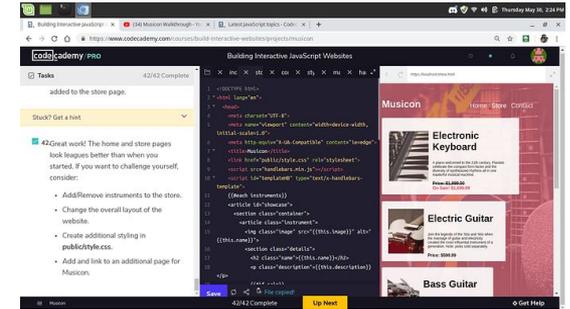
Codecademy courses

Build websites & learn coding.

ProgeTiger

2012

OUTCOME

Best European projects concerning **digital skills development** by EC (2016)

ICT Graduates increased from

University			EU Average
5.3% 2013	→	**7.4%** 2017	**3.6%** 2017
4.8% 2013	→	**13.6%** 2017	**4.2%** 2017

Share of enterprises with hard-to-fill vacancies for jobs requiring ICT specialist skills

- - - Nordic average   —— Baltic average (ex. Estonia)   - - - EU28 average   —— Estonia
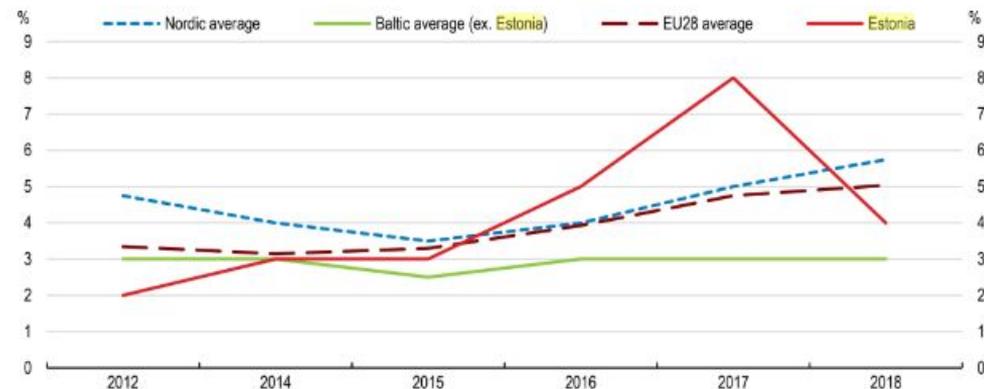
Source: Eurostat digital economy and society database (accessed 26 June 2019).

Appendix: FAQ - Digital Literacy & Talents

1. What initiative government should do to promote digital adoption in business?

   a. Provide targeted support to encourage the use of ICT, and to bridge the technology adoption gap.

   b. Shift investments and co-investments as the primary model of financial support.

   c. Generate and promote success stories to advance the use of technology.

   d. Create targeted awareness campaigns to SMEs

Why digitalize?

Appendix: FAQ - Digital ASEAN

1. **Why ASEAN need to go digital?**

   a. **The opportunities and benefits.**

      i. Economic - Expand local market to global level, increase productivity, job creation.

      ii. Social - addressing unemployment issue,narrowing urban-rural divide through leapfrog rural economies.

      iii. Politic - Increase transparency and efficiency of government services

   b. **The inevitable trends**

      i. Adapt to unpredictable socio-economic events or global market climate

      ii. Lose competitive capability leading to the economy being challenged by others

2. **What need to be done to ensure the success of digital integration of ASEAN?**

   a. Develop accessible, affordable and high quality internet infrastructure

   b. Promote open data & cybersecurity (National and regional policies & regulations)

   c. Broaden & scaleup government digital services across all priority citizen needs

   d. Accelerating Innovation through R&D with the support of agile policy approach.

   e. Empowering digital talents through education, re-skilling & up-skilling.

   f. Regional cooperation (DFTZ, MOOC mutual recognition, Data localisation)

Appendix: Why digitalize?

1. Generate & sustain revenue & growth

2. Seize new markets & opportunities

3. Keep up with technology & times

4. Adapt to unforeseen circumstances

Appendix: 1. Generate & sustain revenue & growth

	Regional	Singapore	Indonesia	Malaysia	Vietnam	Thailand	Philippines
~10 B	Grab		GO-JEK				
~1+ B	LAZADA GROUP, sea		tokopedia, traveloka		UNS		
	2018 entrants PropertyGuru.com, ZILINGO	carousell, Qoo10	Bukalapak				
~100+ M*	iflix, GHL, Red Doorz, fave, 2C2P, snapcart, ADVANCE.AI, NINJA VAN	REEBONZ, cxagroup, Carro CARRO, honestbee, 99.co, SHOPBACK, M-Daq	Akulaku, modalku, MATAHARI Mall, OVO, PAYFAZZ, RupiahPlus	HappyFresh, iCarAsia, FASHIONVALET, CARSOME	momo, Sendo.vn, TIKI.VN, trustingsocial	Ookbee, Pomelo.	xurpas

Source: Cento research

* List of US$ 100M+ companies is not exhaustive

☐ Publicly-listed company

Appendix: 1. Why SMEs should digitalize?

Streamlined Operations

+

Business Competitiveness

=

Revenue Growth

Resilience

Dedicated customer & sales management

Key business intelligence, incorporating data & insights

Streamline purchasing & inventory control

Empowering information-based decision-making

Efficient employee management

Flexibility & efficiency in financial management

Enabling overseas sales

Compete with large brands & corporations

Higher brand awareness

Wider customer reach & better marketing

Keep up with customers purchasing

Increased payment modes

Appendix: 2. Seize new markets & opportunities

IOT	qlue	eFishery	borderpass
Robotics	ROBOT 3T LET'S REALIZE YOUR IDEAS	df AUTOMATION & ROBOTICS AUTOMATED GUIDED VEHICLE	aerodyne
AI	ViSENZE	ADMOV	Kata.ai
Blockchain	SiX network	the DApact	PUNDI
Data Analytics	RUMAROCKET	AGRIBUDDY	DATTABOT

Appendix: 3. Keep up with technology & time

Once-big companies	Core Product	Disrupted by
KODAK	Photography films	Digital camera
NOKIA	Keyboard-based mobile phone	Smartphones
FOREVER 21 / TOYS R US / BORDERS	Brick-&-mortar sale model of products	Online shopping

Companies that **fail to embrace technology** & **innovation** may struggle to stay **relevant & competitive**

Appendix: 4. Adapt to disruptive circumstances

With the COVID-19 pandemic lockdown, agriculture farmers are **pivoting online** to **survive & adapt to the changing circumstances**

Vegetable farmers
(Indonesia)

Fruit producers
(Thailand)

onboard online

Fishermen
(Malaysia)

In Malaysia, COVID-19 has **adversely affected** many businesses.

Notable business closures

> 2000

Coffee shops & mamaks **shut down permanently** since MCO.
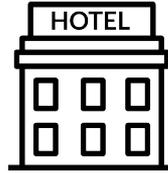
15%

Of hotels in Malaysia are **closing down for good**.

MPH BOOKSTORES

ESPRIT

SPEEDY Video

Inclusive Growth

Case Study

Appendix: Taobao Village - Case Study

a Taobao Village is a cluster of rural e-tailers within an administrative village where:

1. Residents got started in e-commerce spontaneously primarily with the use of Taobao Marketplace;

2. Total annual e-commerce transaction volume is at least RMB 10 million ($1.6 million);

3. At least 10% of village households actively engage in e-commerce or at least 100 active online shops have been opened by villagers.

As of August 2019, there are a total of 4,310 Taobao Villages in 25 provinces, where **250 million out of China's total 564 million rural villagers reside**

The total sales generated by Taobao Villages – and Taobao Towns, which are larger-scale rural townships that deploy the same Taobao Village model – amounted to **RMB 700 billion** in the 12 months ending June 2019.

Taobao Villages **created 6.8 million jobs in the 12 months** ending June 2019 throughout the e-commerce value chain

The total number of active online shops on Taobao operated by Taobao Villagers surged by nearly **tenfold to 660,000 in 2018, from just 70,000 in 2014,** said AliResearch.

Appendix: Desa Project - Case Study

DESA Project poised to unleash Malaysia's rural eCommerce potential to global markets

- *The launch of DESA Project will catapult Malaysia's expansive culture-rich products from rural areas into a global eCommerce market*
- *Development of rural eCommerce will be a significant force in Malaysia's eCommerce aspirations*

KUALA LUMPUR, 9 DECEMBER 2019 – A far-reaching new move called the DESA Project with the aim of connecting rural areas to the global eCommerce boom, has been launched today in conjunction with eCommerce Day 2019 (9 & 10 Dec), held at the Ministry of International Trade and Industry (MITI) Tower.

The DESA Project – a digital economy programme – is a significant catalyst to Malaysia's eCommerce as it enables the rural-based entrepreneur supply chain. With the support of Alibaba, Lazada, and the Malaysia Digital Economy Corporation (MDEC) – rural-based businesses, which includes food and agriculture products, are now able to participate and benfit from the digital economy.

Miscellaneous

Appendix: Fixed Broadband vs Mobile Broadband

Fixed Broadband	Mobile Broadband
More reliable, lower latency	Patchy depending on location
Faster than mobile broadband	Fast depending on location
Isolated to router zone	Portable
Unlimited/Higher data cap	Datacap restrictions
Suitable for high load activities	Suitable basic loads & for reaching difficult to reach areas

5G networks are **highly dependent** on **fixed/wired (fibre) infrastructure** for the backhaul.

Source: *Lavallee*, Cienna (2016)

Source: *Heaney* (2018). Retrieved from:
https://www.broadbandchoices.co.uk/reviews/mobile-broadband-vs-fixed-line-broadband

Appendix: 5G & the need for speed

Technological comparison of 4G/5G

Latency
ms
10
<1
4G 5G

Device density
#/km²
>1,000,000
>100,000
4G 5G

Data rate
GB/s
~10
1
4G 5G

Area-traffic capacity
GB/s/km²
10.0
0.1
4G 5G

Power consumption
%
100%
1%
4G 5G

Bandwidth
MHz
100
10
4G 5G

Spectral efficiency
bps/Hz
30
10
4G 5G

Reliability
%
99.999
99.990
4G 5G
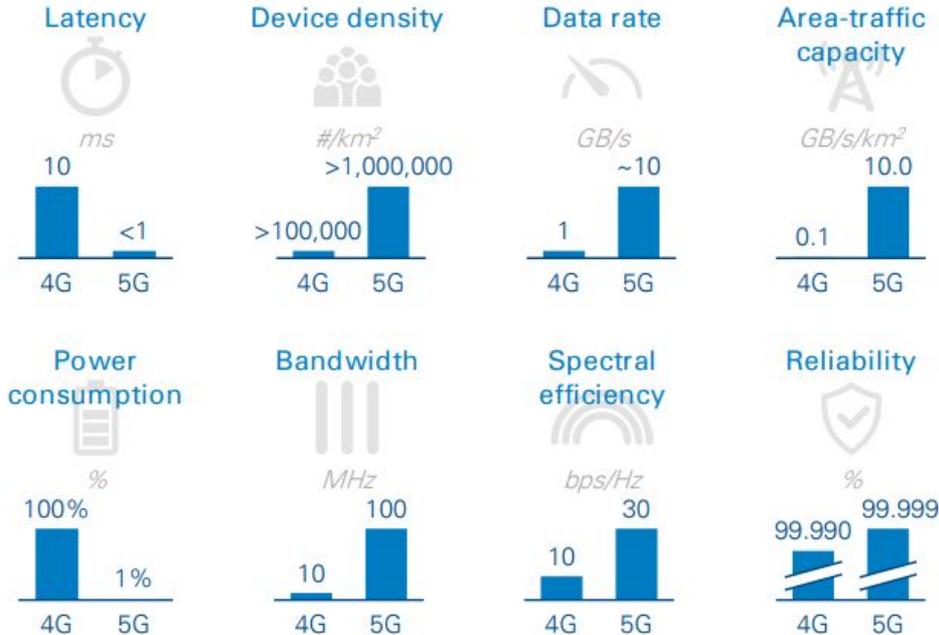
Use cases

+ Massive IOT

+ Driverless car navigation

+ Telesurgery

+ Simultaneous translation

+ Immersive VR Gaming

Source: *D.Little* (2020). Retrieved from: https://www.adlittle.com/en/insights/viewpoints/your-city-ready-go-digital

Appendix: Data center locations of big cloud players
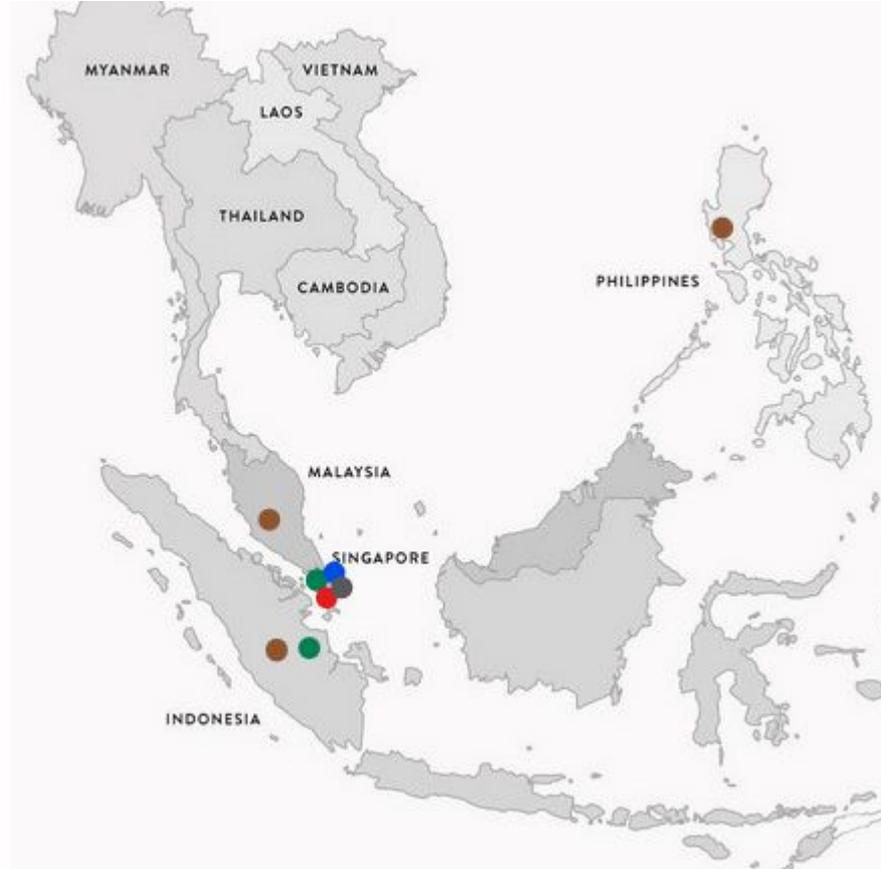
Appendix:

IXP locations in

ASEAN nations

Source: TeleGeography (2020). Retrieved from:
https://www.internetexchangemap.com/#/
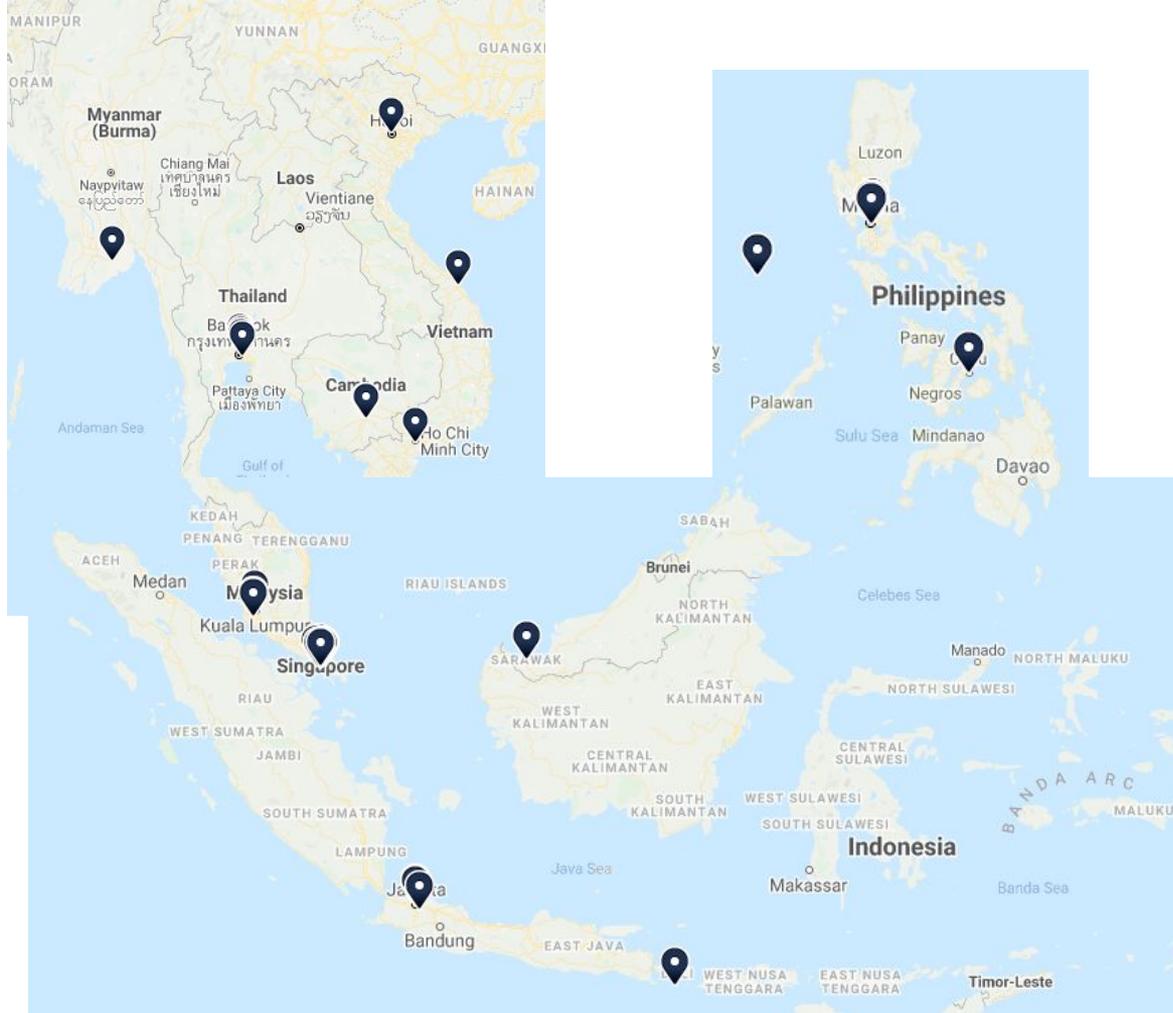
Appendix: Internet as a core infrastructure in DE