

Digital Skills Toolkit and Lessons Learned from Small Survey

Forum Kajian Pembangunan
12 October 2022

Background

Why digital skills matter?

1. Digital skills **represents the key aspect of the digital economy development** in a country and provide opportunity towards a more inclusive digital transformation
2. There is a **widening digital skills gap and it is exacerbated by the Covid-19** esp. in developing countries
3. Digital literacy & skills are among the **priority agendas** discussed in the Indonesian presidency in the G20 forum 2022

Why digital skills toolkit?

Some framework already developed (e.g. UNESCO, ITU, G20/OECD and Microsoft) and implemented in some countries (e.g. EU, Australia, Indonesia). Therefore, there is a need for a common framework

Improve the existing measurement and fill the gap from the prior digital toolkits by providing a framework that incorporates survey guideline to measure digital skills

This toolkit provides guidance for a country to optimize the exploration of digital indicators to generate strategic policies for digital economy development.

Objectives of Activities

- To **develop a toolkit** that measure the state of digital skill using relevant indicators in G20 countries
- To **gather information** from available data and complement it with survey guideline
- To **test the toolkit** for the case of Indonesia
- To **explore the possible use** of the digital skills toolkit to achieve a more inclusive digital economy

What is the added

**....improved
framework
and guideline**

Provides measurement improvement of digital skills and an analysis of existing measures adopted by various governments and organizations

**.....allows a
richer
analysis**

Consists of comprehensive pillars and elements, country and occupation-level analysis and across level of digital skills

**....more
flexible
implementati
on**

Offers flexibility to each G20 countries to optimize the available data and survey implementation

However,

**....does not
focus on
country
comparison**

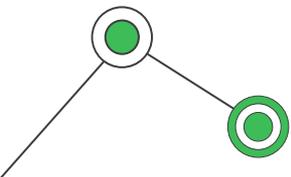
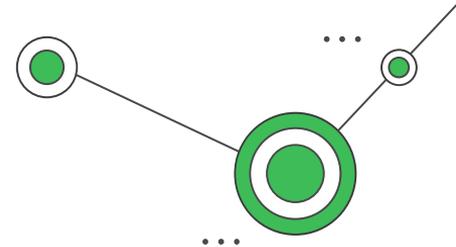
More explorative study that produce measurement and guideline as the output

**....does not
address
country-
specific issues**

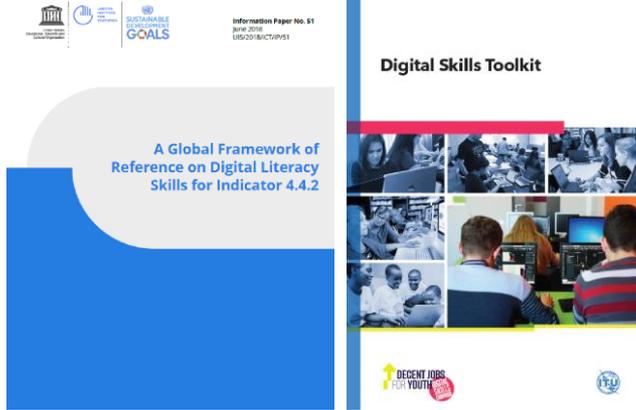
Instead, the toolkit is useful to give a starting point to approach digital skills challenges

**.....does not
aim to quantify
the digital
skills gap**

Will address this issue from both demand and supply but rather to identify the binding constraint and policy prioritization



International Organizations



G20/OECD

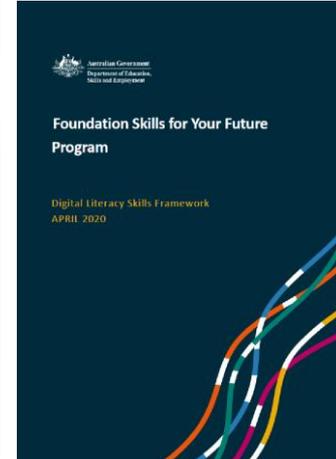
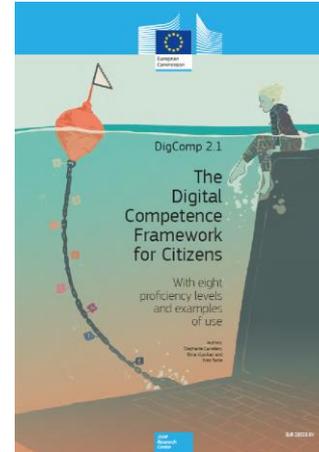


A ROADMAP TOWARD A COMMON FRAMEWORK FOR MEASURING THE DIGITAL ECONOMY

Report for the G20 Digital Economy Task Force
SAUDI ARABIA, 2020

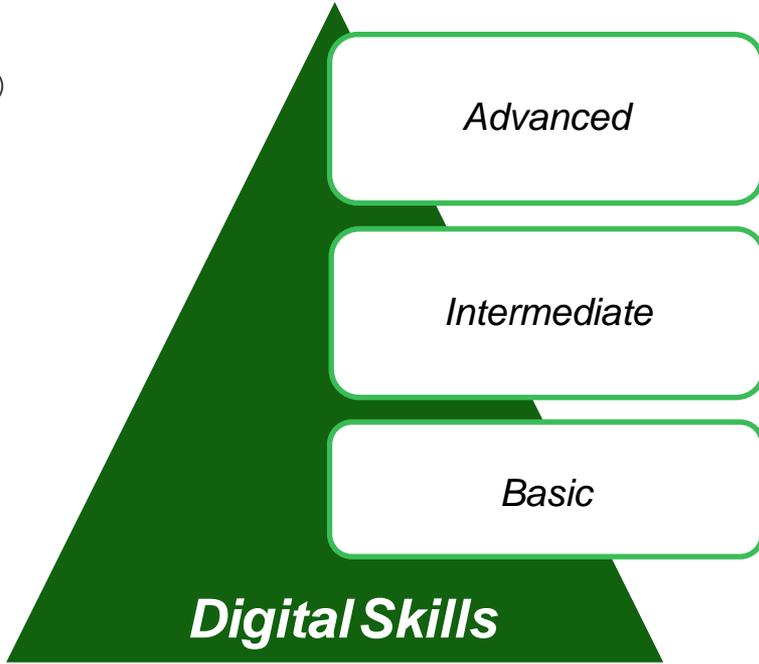
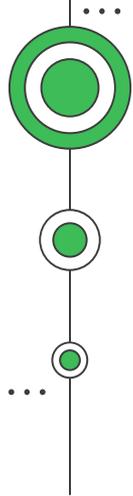


Countries



.....some of existing frameworks

How we define digital skills level?



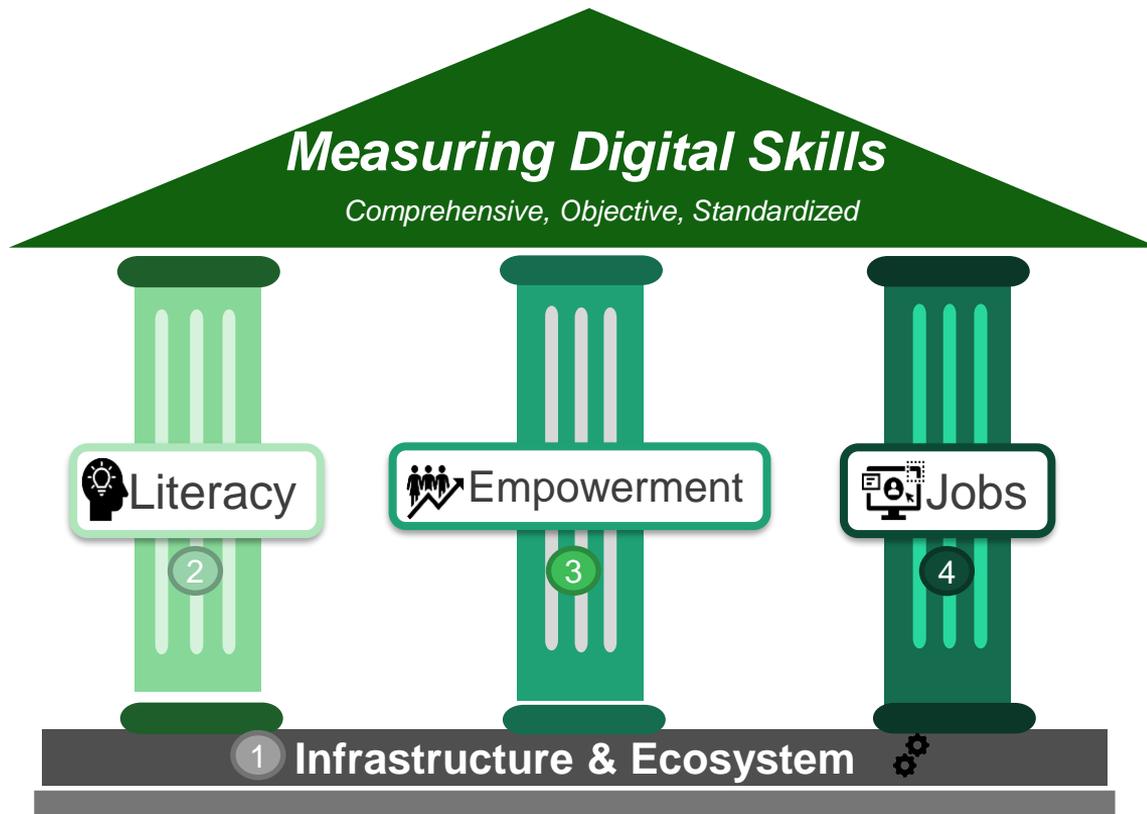
Programming and Industry 4.0 job-related skills (ITU, 2018)

*Using technology to **create value** added and/or skills to **utilize data** i.e., gather, visualize, and interpret (ITU, 2018)*

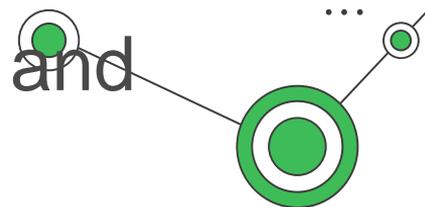
Digital literacy skills (UNESCO, 2018)



Digital Skills Toolkit Framework



Digital Skills Toolkit: Pillars, Elements and Indicators



Pillars	 1 Infrastructure & Ecosystem	 2 Literacy	 3 Empowerment	 4 Jobs
Elements	1.1. ICT sector, access & adoption 1.2. Learning & innovation	2.1. Complementarity 2.2. Familiarity 2.3. Security	3.1 Users/consumer 3.2 Providers/seller	4.1. Demand for digital skills 4.2. Supply of digital skills
Number of Indicators	6	6	9	11

Source of Data

Secondary Data

Available data from international organizations and relevant national survey

Firm level survey

Aim to measure digital skills condition from the demand side and analyze by occupation-level

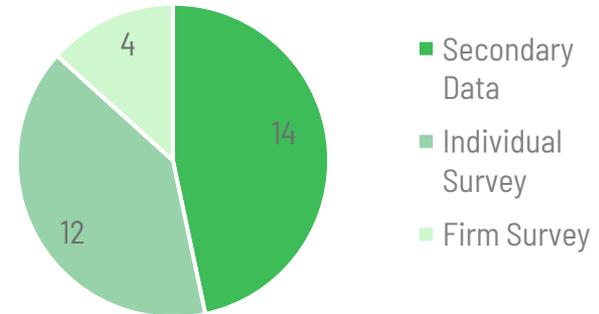
Individual survey

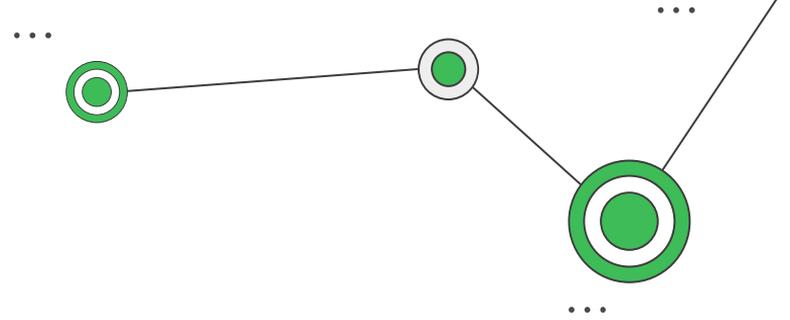
Captures individual's digital skills level (supply side) including literacy, the use of digital platform and jobs & trainings

G20 countries survey

Provides information on definition, instrument and program that related to digital skills development in each G20 countries

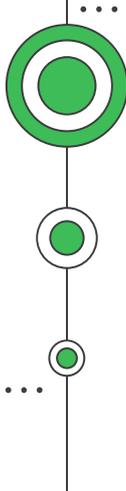
Number of Indicators by Source of Data



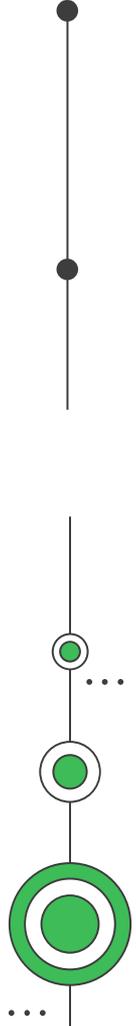


Pillar 1: Infrastructure & Ecosystem

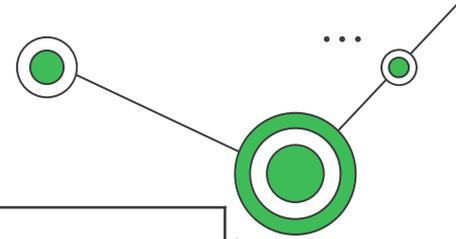
Digital Skills Toolkit



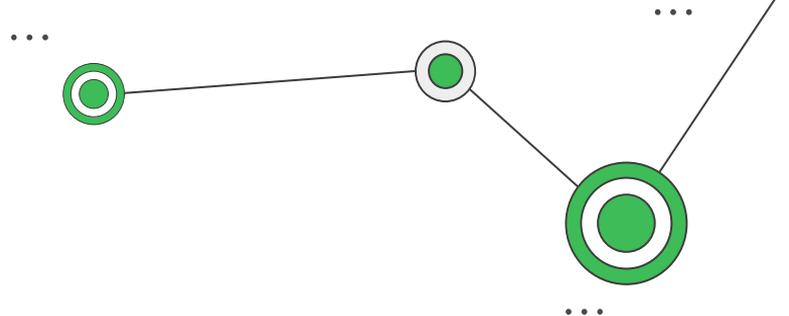
Pillar 1: Framework and Approach

- Provides a **key foundation** for the quality of the digital skills ecosystem and environment
 - Shows the level of development of ICT and the condition of infrastructure, both **hard (physical) and soft (policy)**
 - The pillar also acknowledges the importance of **equal digital infrastructure** esp in developing countries
 - The focus of learning ecosystem is to **increase people's adaptability** to meet 21st-century jobs and skills
 - The job creation effect of automation on jobs will depend on the innovation system and process (World Bank, 2019)
 - Most indicators are derived from the available secondary data
- 

Pillar 1: Indicators



Pillar	Pillar 1. Infrastructure & Ecosystem	
Elements	1.1 Technological Access & Adoption	1.2 Learning & Innovation Ecosystem
Indicators	1.1.1 ICT trade 1.1.2 ICT access and use 1.1.3 Business and technological adoption	1.2.1 School with internet access 1.2.2 Number of universities in the STEM-related QS Ranking 1.2.3 Patents by origin/bn PPP\$ <u>PLUS</u> Policy measures such as education policy (e.g., digital skills curriculum & roadmap), stakeholders' engagement in skill development, incentive for innovation related to digital skills development



Pillar 2: Literacy

Digital Skills Toolkit



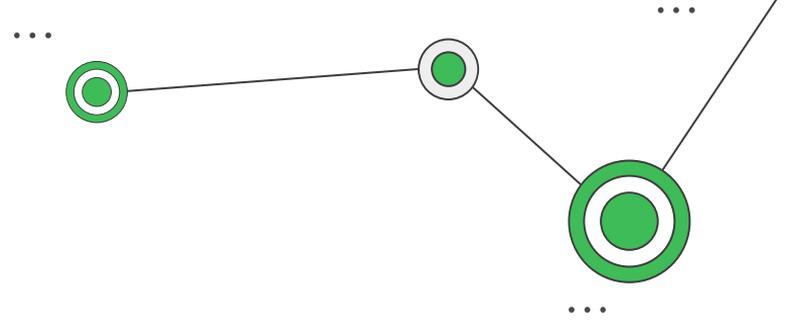
Pillar 2: Framework and Approach

- Digital skill is an empowering tool to achieve a more inclusive digital economy development
- **Literacy element** reflects basic digital skills
 - Following the Digital Literacy Index (ICT Ministry, 2020) that refers to Digital Literacy Global Framework (UNESCO, 2018) with some adjustments
- Most indicators will be derived from the self-assessment individual survey

Pillar 2: Literacy		
DLGF (UNESCO, 2018)	Digital Literacy Index (ICT Ministry, 2020)	Proposed Literacy Indicators (DSLIT, forthcoming)
Device & software operations	Technology ability	ICT familiarity
Information & data literacy	Information & data literacy	Data Literacy
Communication & collaboration	Communication skill	Communication & collaboration
Digital content creation	Personal security	Personal security
Safety	Device security	Device security
Problem-solving	Critical-thinking	Critical-thinking
Career-related competence	Ethics in technology	

Pillar 2: Indicators

Pillar	Pillar 2. Literacy		
Elements	2.1 Complementarity	2.2 Familiarity	2.3 Security
Indicators	2.1.1 Communication & collaboration 2.1.2 Critical thinking	2.2.1 ICT familiarity 2.2.2 Data literacy	2.3.1 Device security 2.3.2 Personal security



Pillar 3: Empowerment

Digital Skills Toolkit

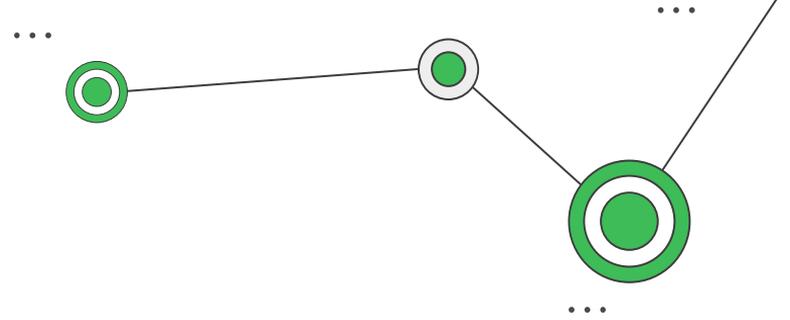
Pillar 3: Framework and Approach



- Digital skill is an empowering tool to achieve a more inclusive digital economy development
- The vitality of informal sector (De Soto, 1989)
- Platforms offer informal workers better incomes, quality of life and financial inclusion
 - Platform and its ecosystem creates new economic opportunities both within and beyond the platform
 - Sharing Economy: people share their **intangible assets and underutilized tangible assets** for money or for free with the help of the Internet which results in a new business model
- **Empowering element** defined as activities that will capture people's digital capabilities to improve their standard of living (economic empowerment)
 - Referring to the G20 toolkit on Digital Economy (2018)
 - Income-generating digital activities
- Most indicators will be derived from the self-assessment individual survey

Pillar 3: Indicators

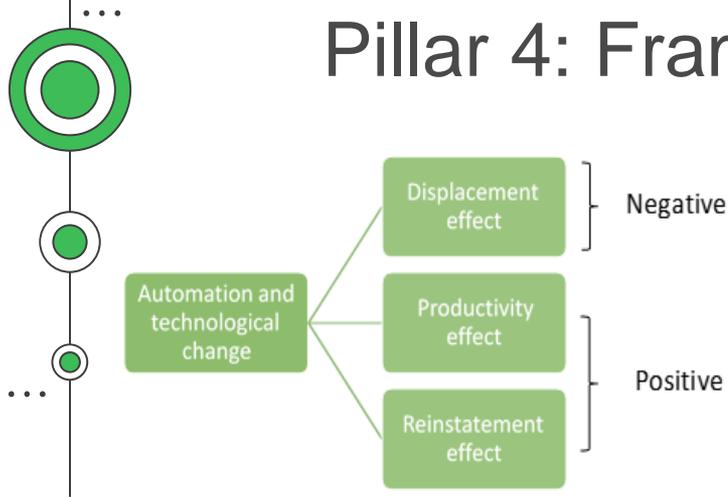
Pillar	Pillar 3: Empowerment	
Elements	3.1 User/Consumer	3.2 Provider/Seller
Indicators	3.1.1 Digital Financial User 3.1.2 E-commerce Consumer 3.1.3 Marketplace User 3.1.4 E-learning User	3.2.1 Digital Financial Provider 3.2.2 E-commerce Seller 3.2.3 Marketplace Provider 3.2.4 Social Media 3.2.5 E-learning Provider



Pillar 4: Jobs

Digital Skills Toolkit

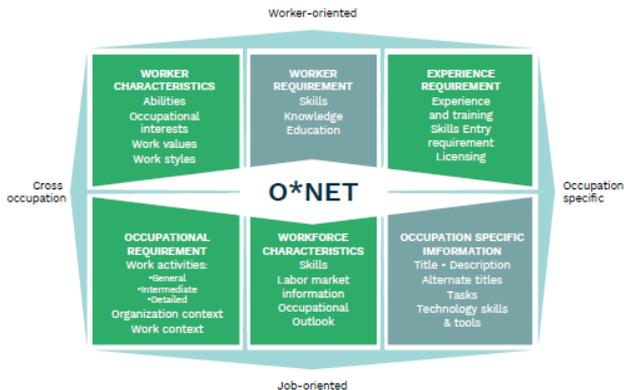
Pillar 4: Framework and Approach



Source: Acemoglu & Restrepo (2019)

- Focus on job-related digital skills
 - **Technological change** will create a new set of tasks that will demand for potentially new skills (Acemoglu and Autor, 2010)
 - McKinsey (2018) predicted that **demand for technological skills will increase 60%** in working hours from 2016 to 2030.
 - OECD survey found that 24.5% of respondents did not have a **computer task-related at work** (OECD, 2016)

O*NET Content Model

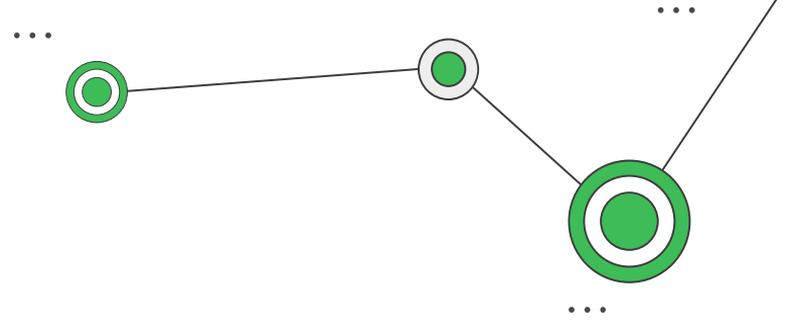


Source: World Bank (2021)

- Consists of two elements: demand and supply for digital skills
 - Use occupation-level approach to analyze the digital skills condition
 - Select occupation based on IndoTask (World Bank, 2021) + O*NET occupation list
 - Adopt O*NET framework for digital skills
- Most of indicators are from firm-level survey, secondary data and job platform data

Pillar 4: Indicators

Pillar	Pillar 4. Jobs	
Elements	4.1 Demand for Digital Skills	4.2 Supply for Digital Skills
Indicators	4.1.1 Most demanded digital skills 4.1.2 Firm digital skills training 4.1.3 Most digital occupations 4.1.4 Degree of automation in each occupation	4.2.1 Proportion of worker who uses internet at work 4.2.2 Most-supplied digital skills 4.2.3 Job-related digital skills level 4.2.4 Digital skills training

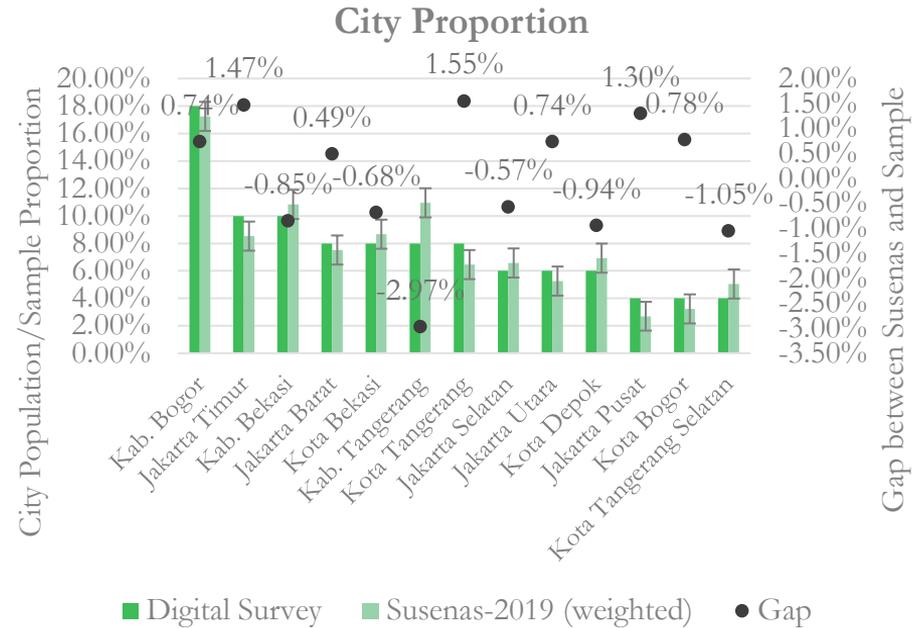
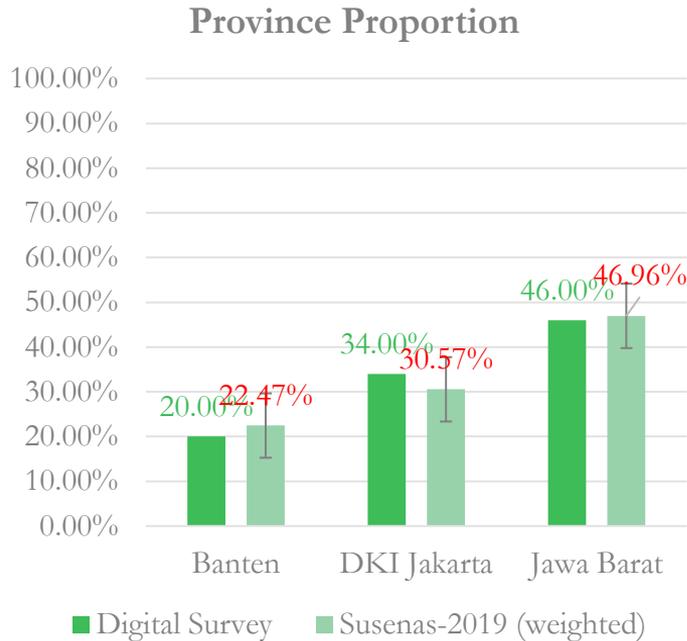


Pilot Survey Design and Characteristics

Digital Skills Toolkit

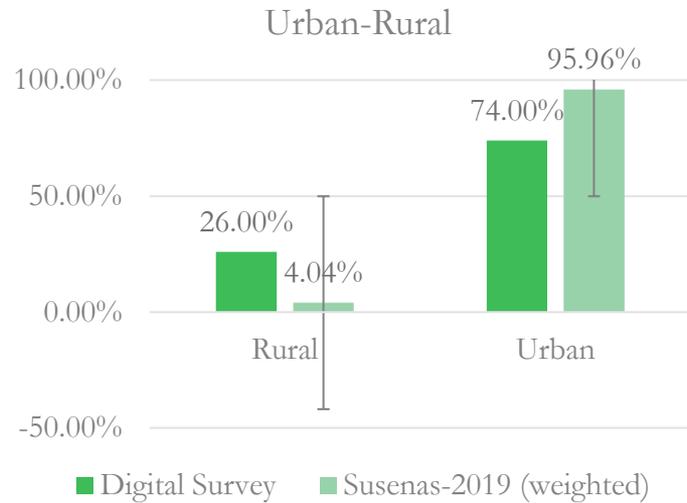
Criteria	Individual	Firm
Population	Working age population (above 15 years of age)	Selected sectors: <ul style="list-style-type: none"> - Chemicals & pharmaceuticals - Computers and electronics - IT services and Telco - Finance & Insurance - Law & accountancy services - Wholesale & Retail - Transport equipment - Manufacture: light manufacture
Survey Location	Greater Jakarta	Greater Jakarta
Sampling Method	Systematic Random sampling → grouped proportionately according to gender, age, education level	Purposive sampling
Target Sample	500	100
Sample Characteristics	Gender proportion (50:50)	<ul style="list-style-type: none"> · Firms with legal entity · Size: medium and large enterprises
Interview Method	Face-to-face interview	Online survey method using two modules of questionnaire: 1) General Module & 2) Occupation Module

Respondent proportion by region

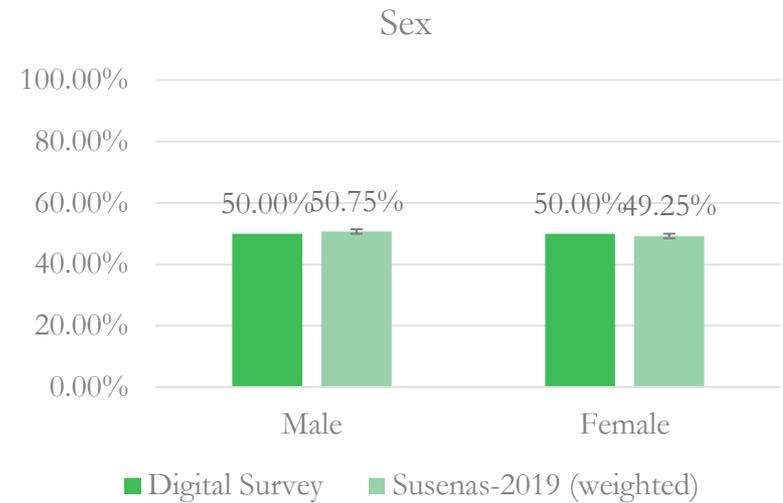


Based on the Susenas-2019, it can be inferred from the chart above that most of the respondents reside in Jawa Barat (46,96%) while Banten holds the least amount of respondents (22,47%). It can be inferred from the chart above that Kabupaten Bogor holds the largest amount of respondents (17,26%), followed by Kabupaten Tangerang with 10,97%. On other side, Jakarta Pusat is the city with the least amount of respondents (2,7%).

Urban-Rural and Female-Male Proportion



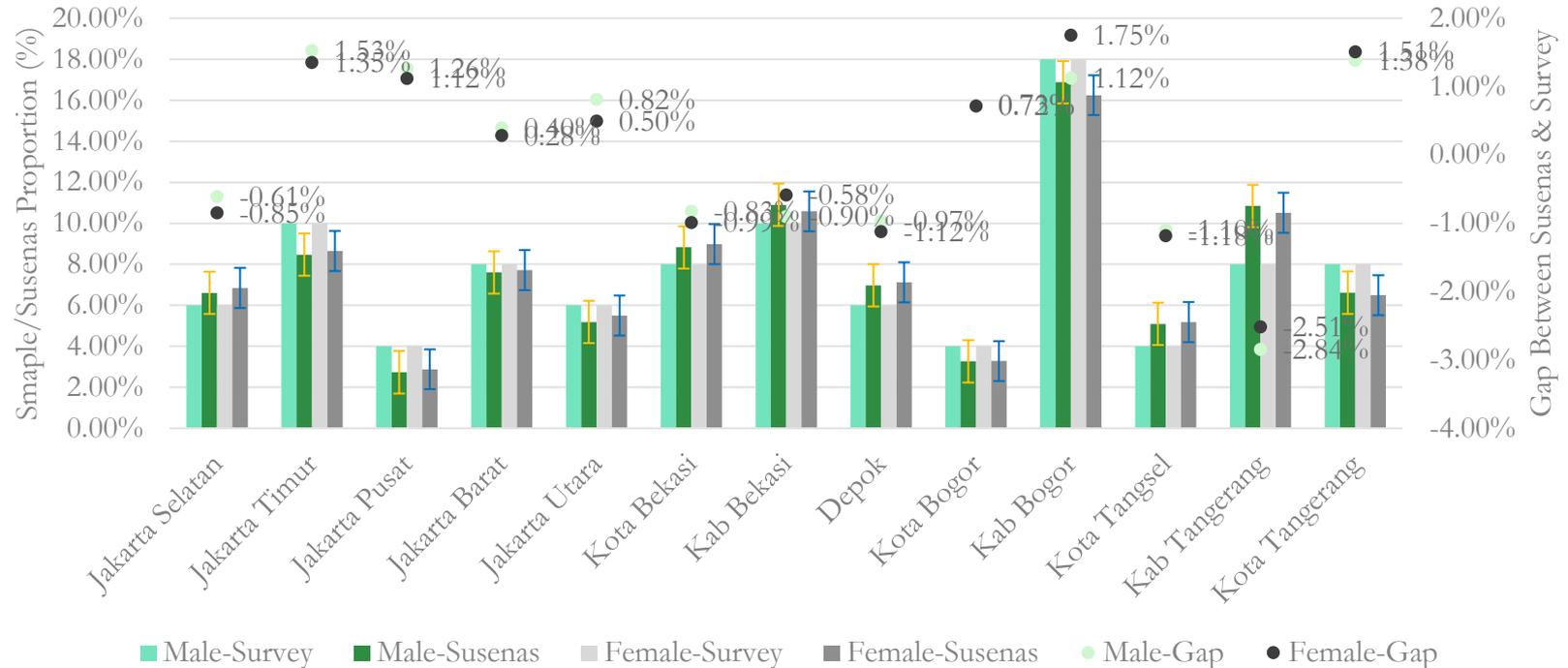
There is a remarkable difference in urban-rural proportion between the survey and the Susenas-2019 (weighted).



It is clear from the chart above that the respondents' sex is similar between the digital skills survey and Susenas-2019

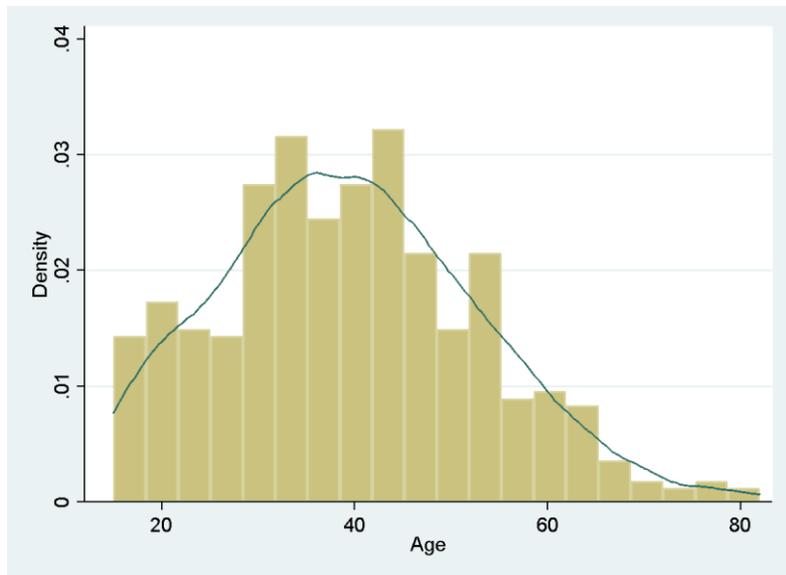
Male-Female by City/Regency

The grey and black dots are the gap between Susenas proportion (weighted) and the survey sample. The gap between Susenas and Digital Skills Survey sample is up to $\pm 3\%$.



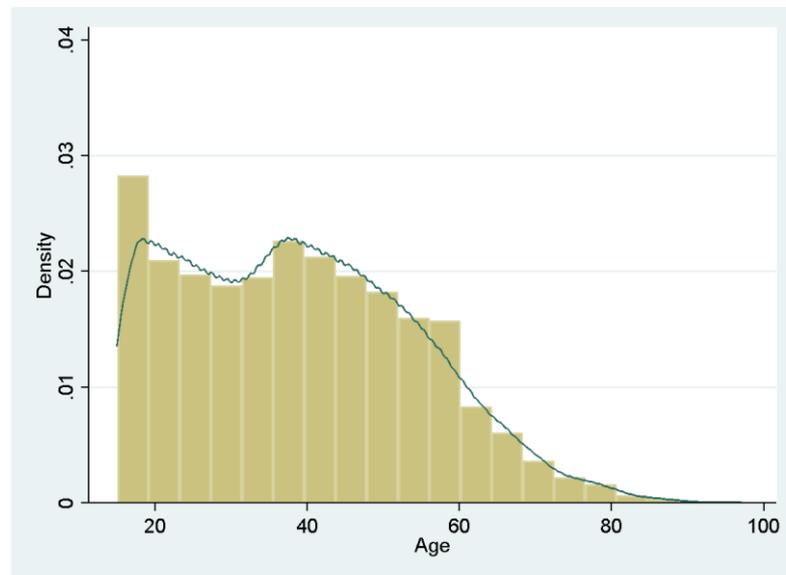
Age Distribution

The histogram of age distribution contains 20 bins each. The Susenas age distribution only includes Jabodetabek Population ≥ 15 y.o.



Survey Sample Age Distribution

MEAN	MEDIAN
39.59 years old	39 years old



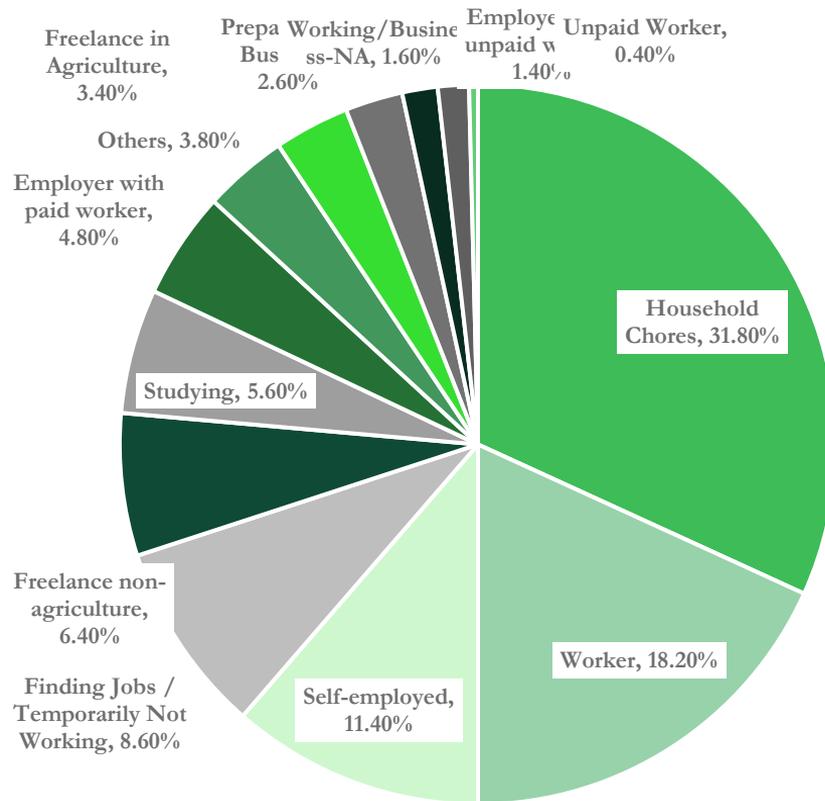
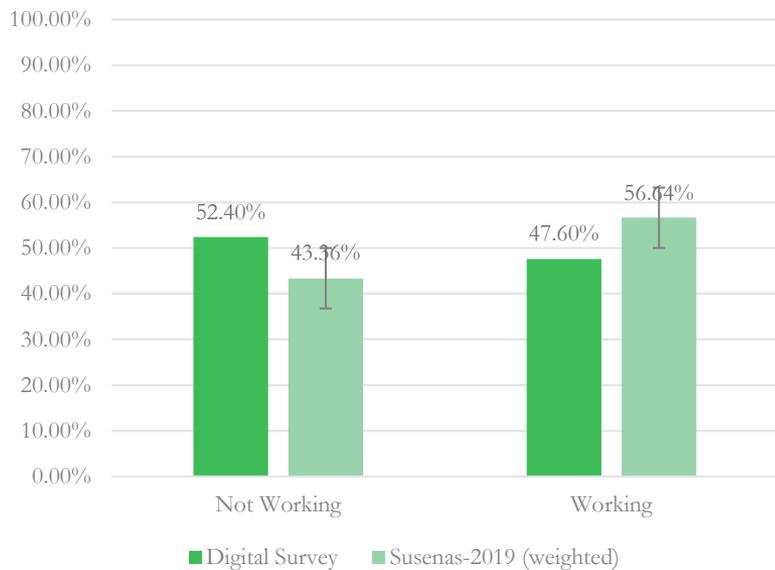
Susenas-2019 Age Distribution

MEAN (weighted)	MEDIAN (weighted)
37.45 years old	36 years old

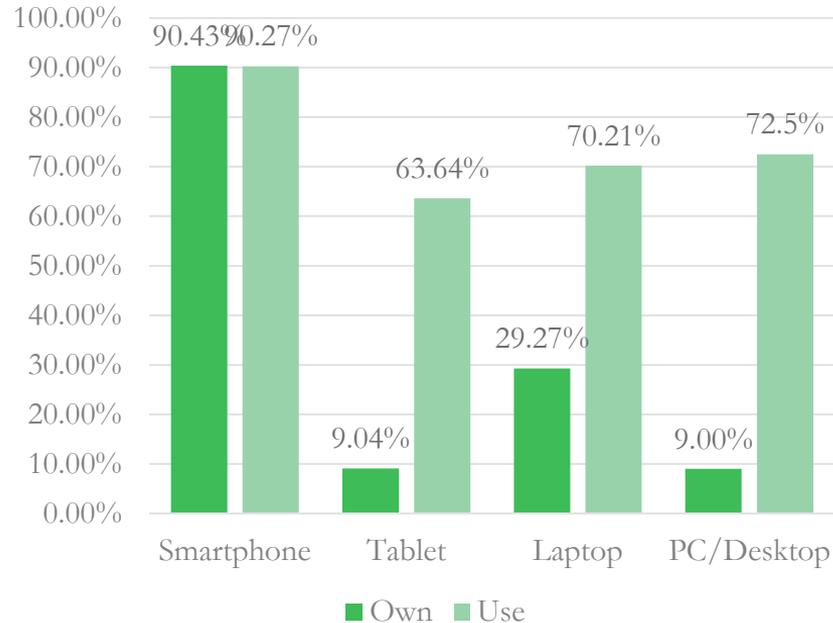
Working Status

Job Status / Most Spending Time Proportion

Working Status

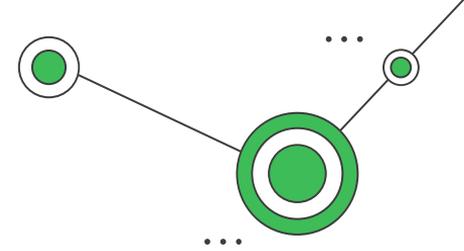


Gadget Ownership and Usage

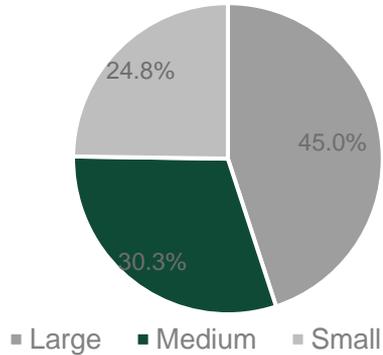


Gadget	Total Respondent answering "Own question"	Total Respondent answering "Use question"
Smartphone	500/500	442/500
Tablet	500/500	44/500
Laptop	500/500	141/500
PC/Desktop	500/500	40/500

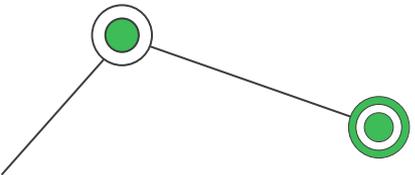
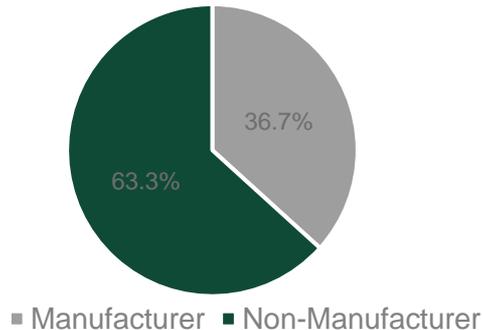
Firms Characteristics

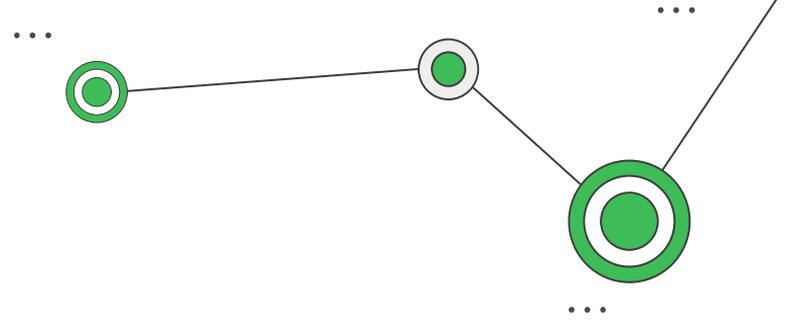


According to number of Workers



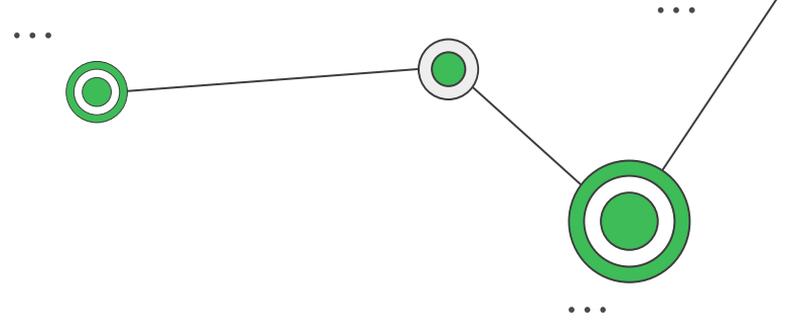
According to Sector





Findings from Pilot Survey

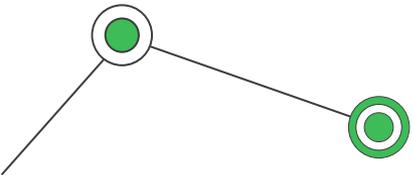
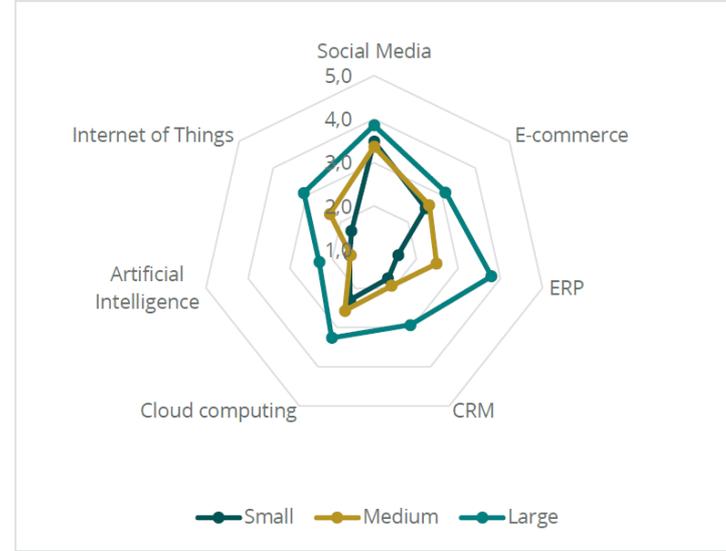
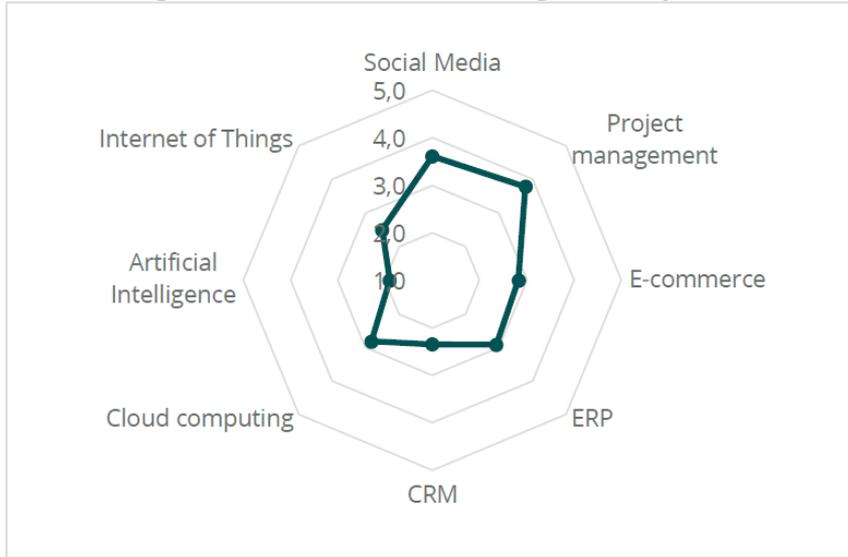
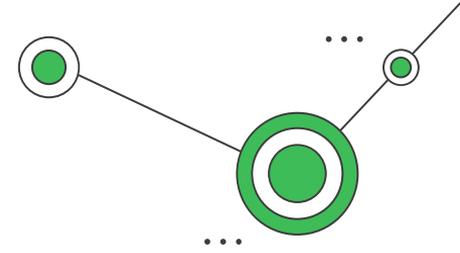
Digital Skills Toolkit

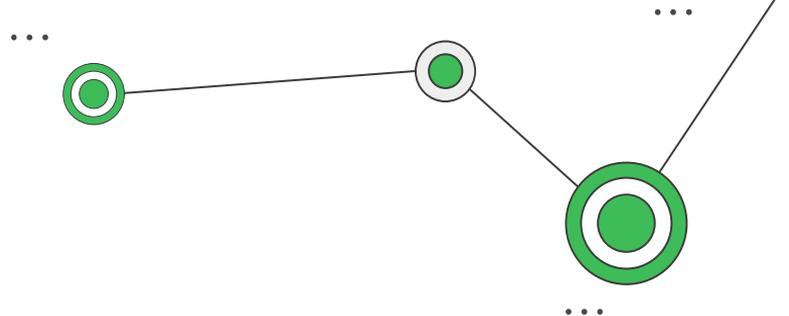


Pillar 1: Infrastructure & Ecosystem

Digital Skills Toolkit

Business Technology Adoption

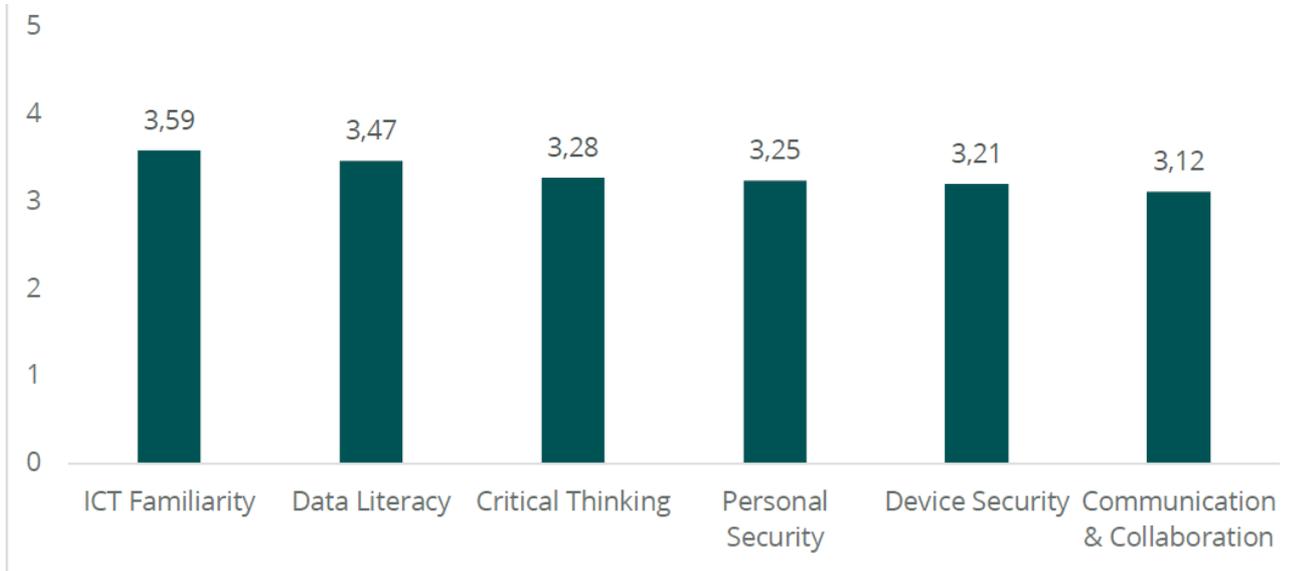




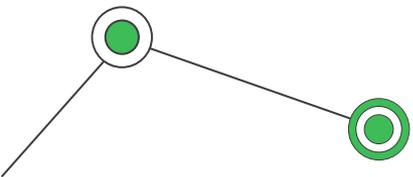
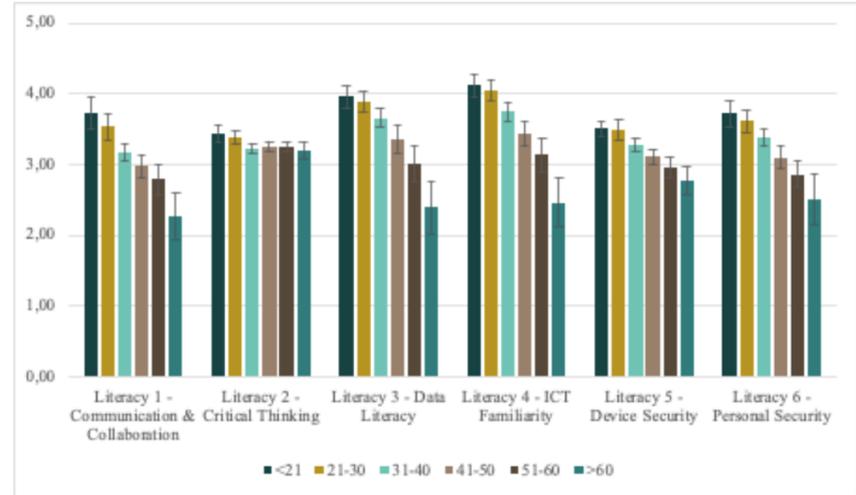
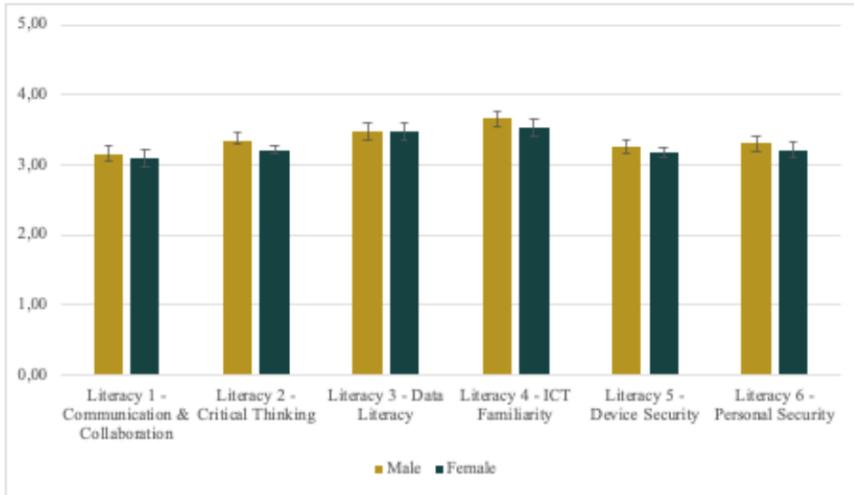
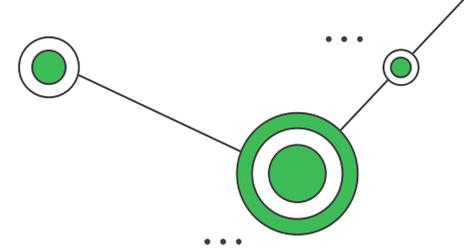
Pillar 2: Literacy

Digital Skills Toolkit

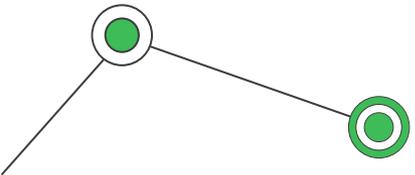
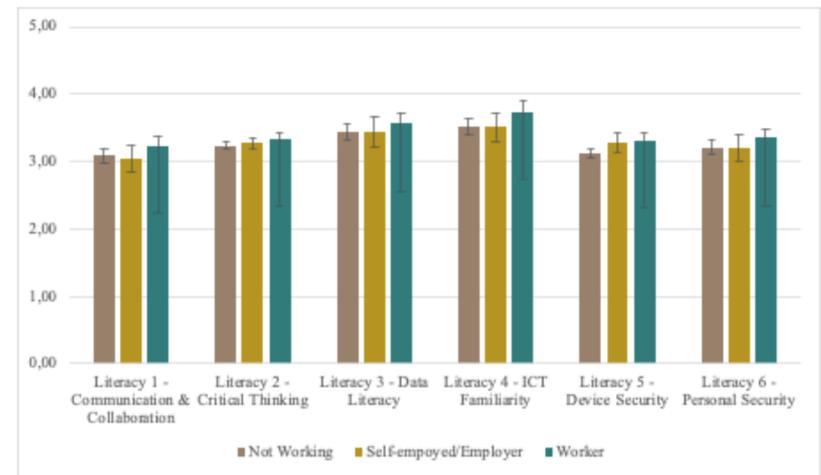
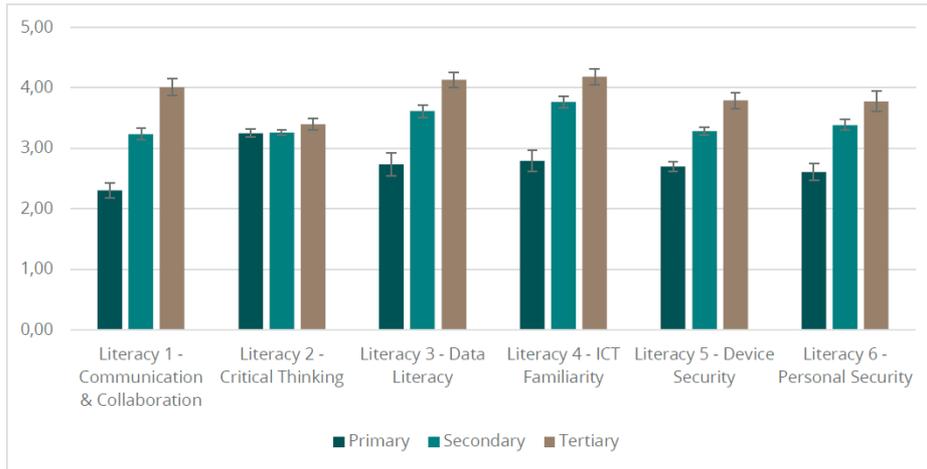
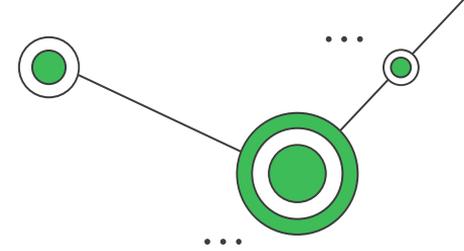
Digital Literacy Score

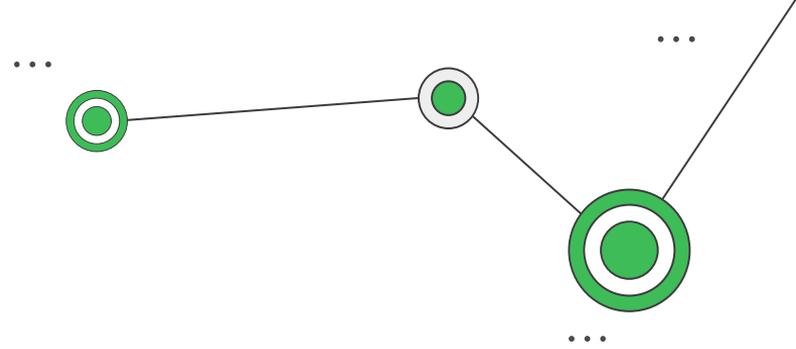


Digital Literacy Score



Digital Literacy Score

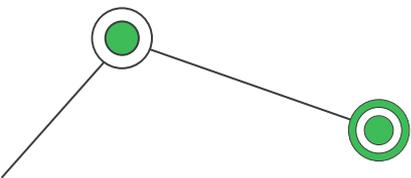
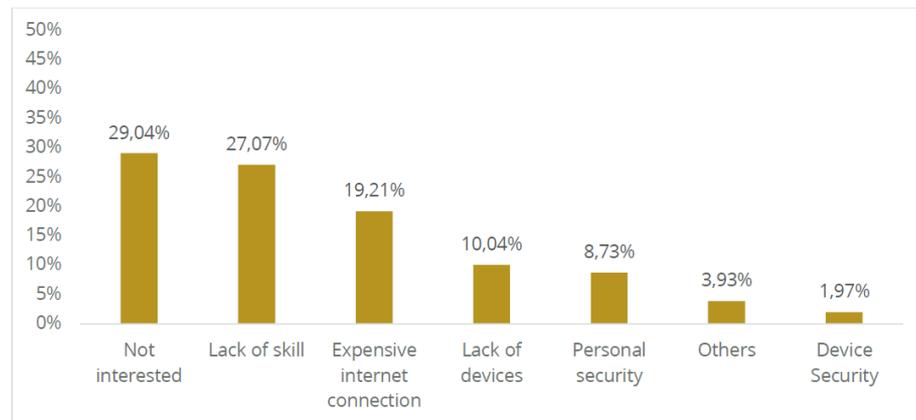
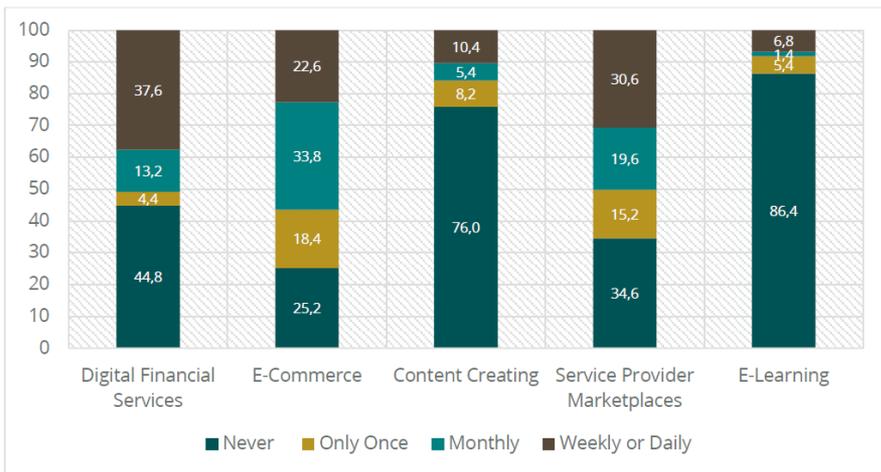
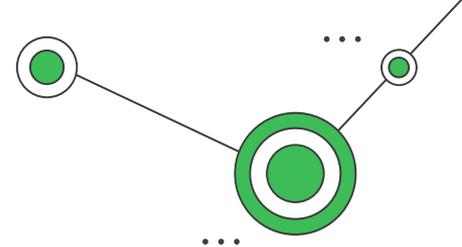


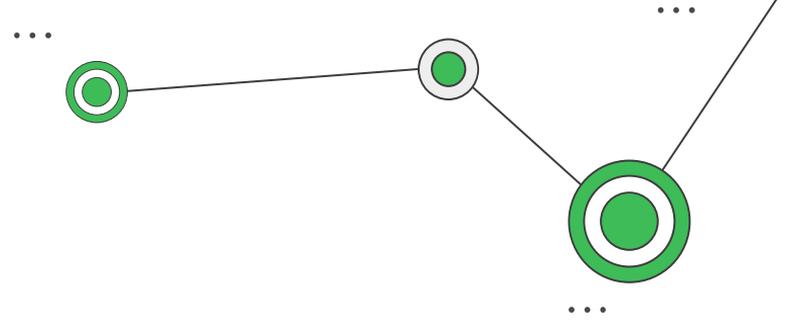


Pillar 3: Empowerment

Digital Skills Toolkit

The use of Digital Tech for Empowerment

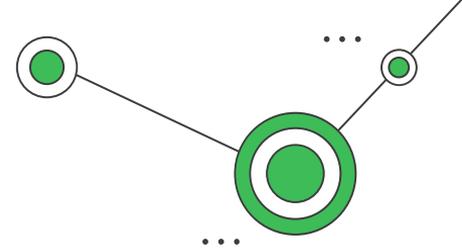




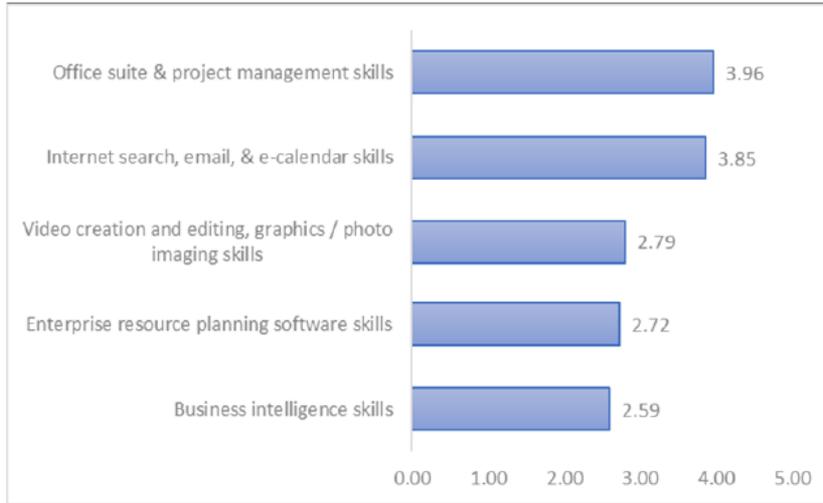
Pillar 4: Jobs

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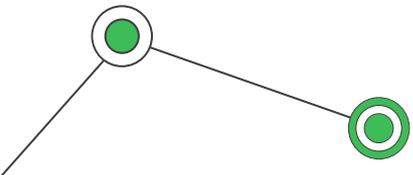
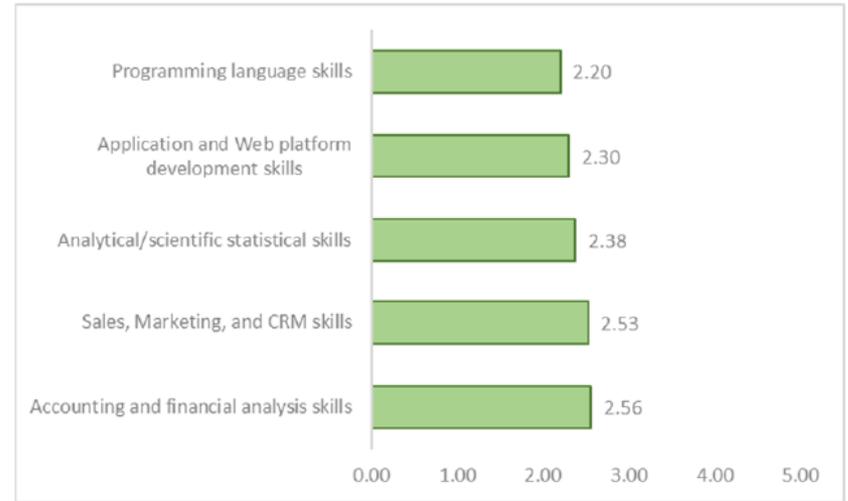
Most Important Digital Skills



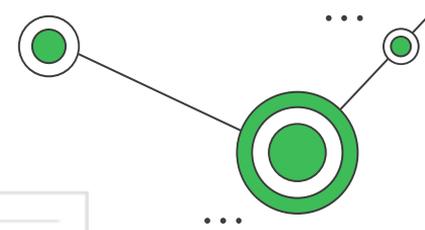
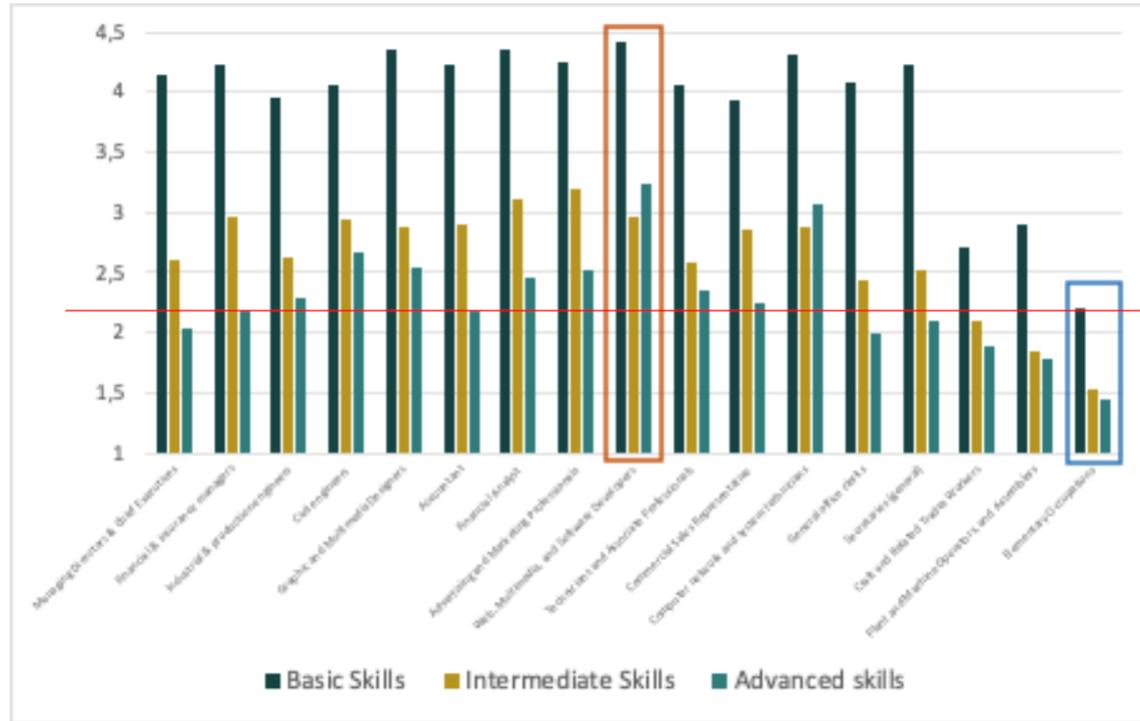
Most important digital skills



Least important digital skills



Digital Skills Level by Occupation

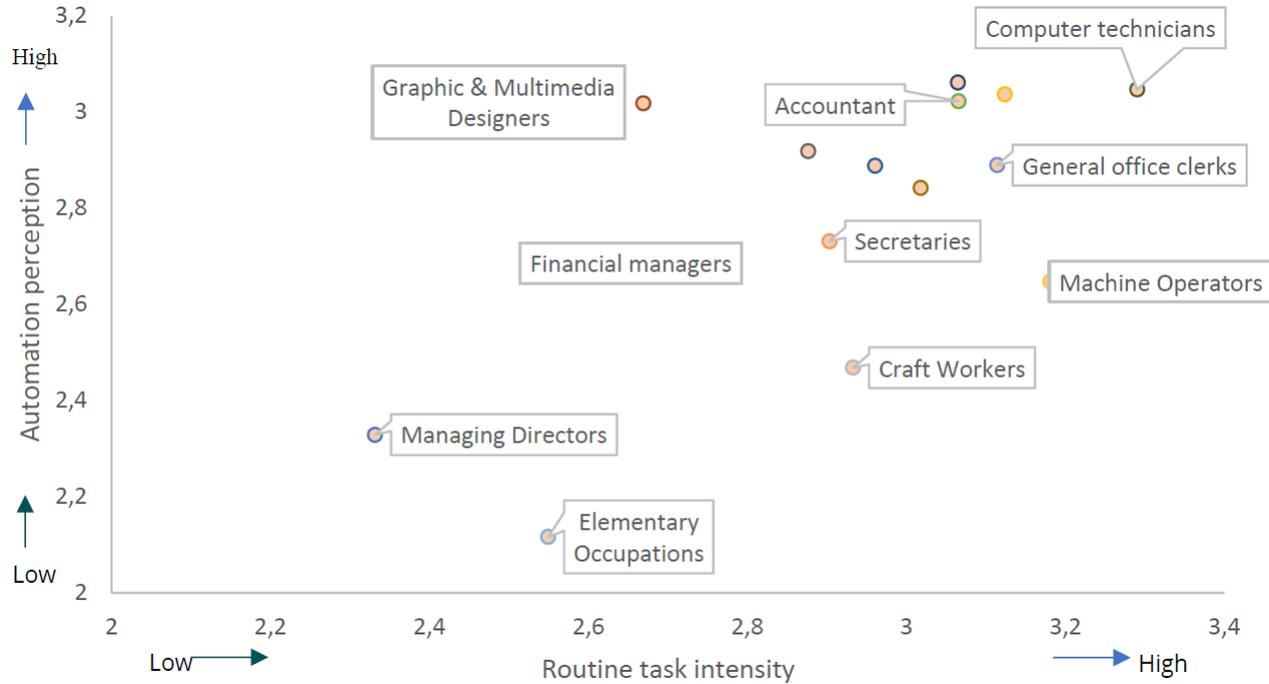


Basic digital skills: Office suite, project management, internet search, email & e-calendar skills

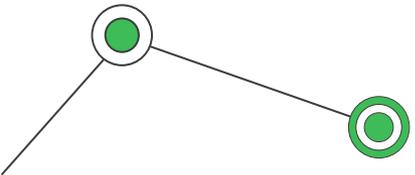
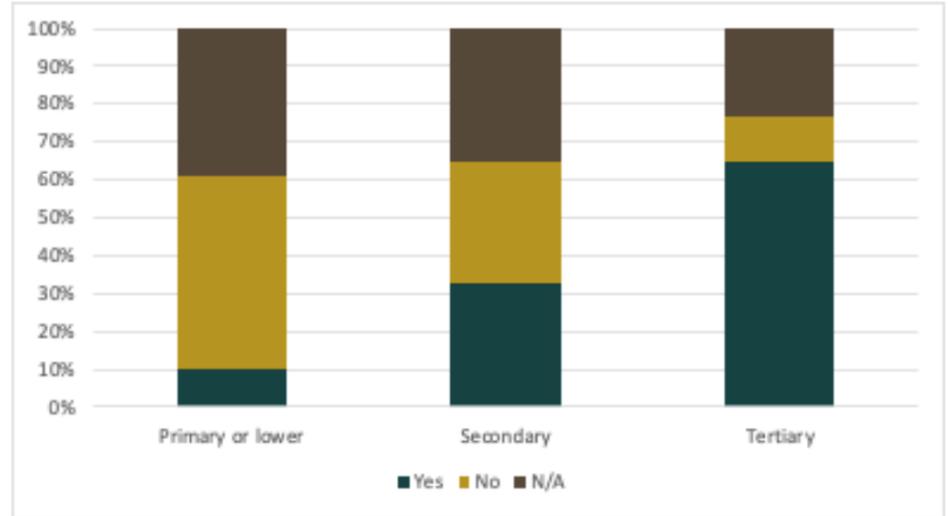
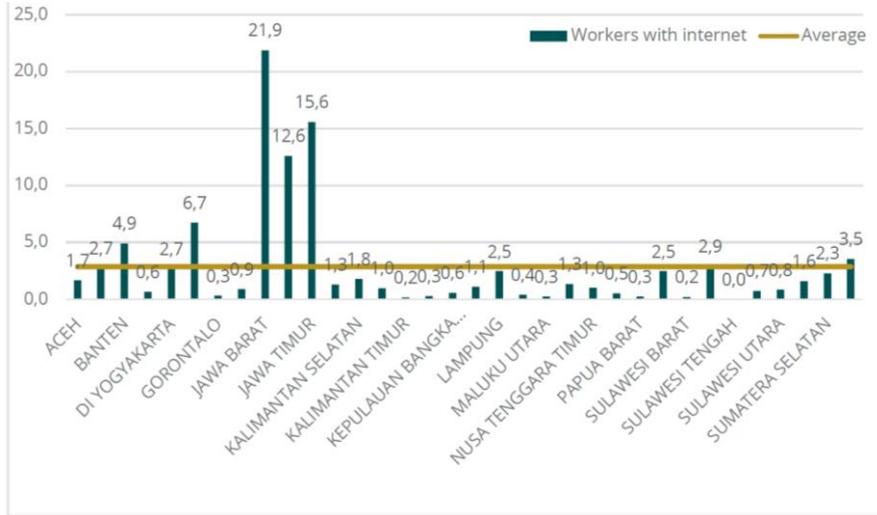
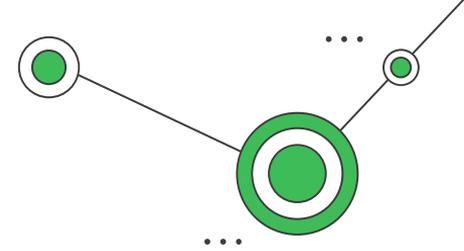
Intermediate digital skills: video creation and editing, graphics / photo imaging skills, accounting and financial analysis software skills, Sales Marketing, and CRM skills, Enterprise Resource Planning software skills, Business intelligence software skills.

Advanced digital skills: Analytical/scientific statistical software skills, Programming language skills, Application & web development skills.

Automation Perception and Routine Task Intensity



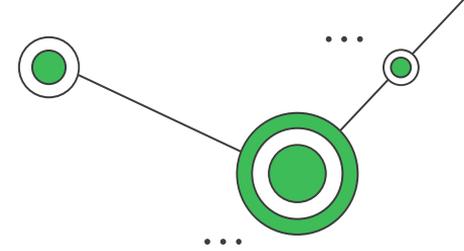
Workers using internet



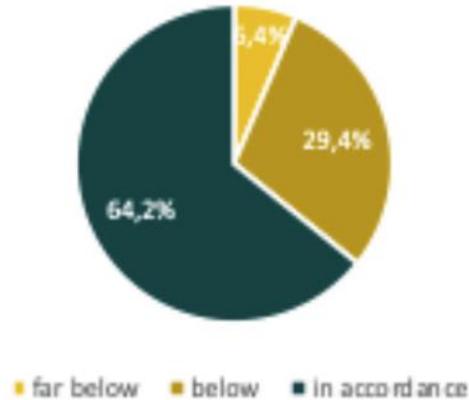
Job-related digital skills by age group

Digital Skills	15-25	26-35	36-45	46-55	>55
Office Application and Operating System	2.92	2.14	1.95	1.82	1.77
Internet Search, Email, and Calendar	3.43	2.79	2.73	2.01	2.10
Video, photograph, and graphic editing and making	2.15	1.76	1.76	1.39	1.32
Creating digital content	2.64	1.94	1.83	1.29	1.47
Accounting Software	1.29	1.20	1.17	1.13	1.15
Marketing, Sales, and Customer Management Software	1.22	1.17	1.23	1.16	1.23
Company planning and resources management software	1.09	1.16	1.12	1.14	1.12
Business intelligence and data analysis	1.06	1.08	1.12	1.10	1.17
Statistical and academic software	1.13	1.11	1.08	1.12	1.23
General programming	1.32	1.23	1.15	1.13	1.23
Web developing	1.19	1.18	1.11	1.06	1.11
Others	2.00	2.10	1.00	.	3.00
N	78	123	141	97	61

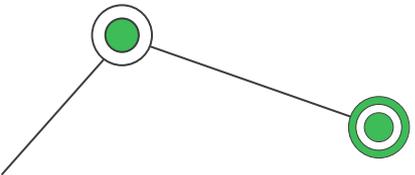
Digital Skills Gap within Firms

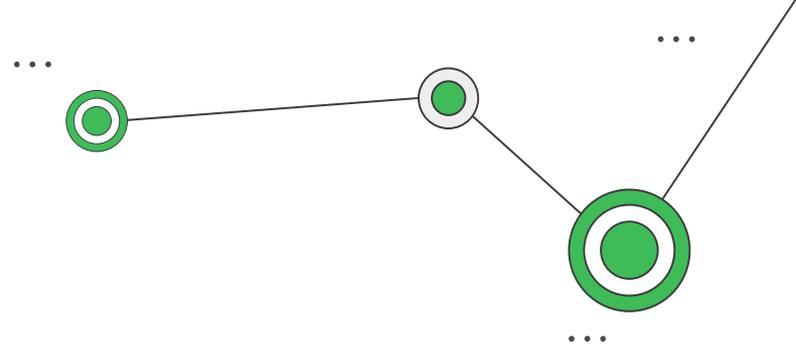


Digital skills assessment of existing workers

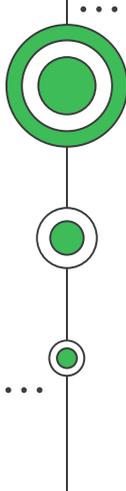


Strategy to address digital skills gap

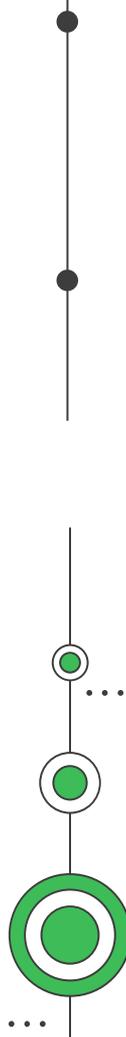


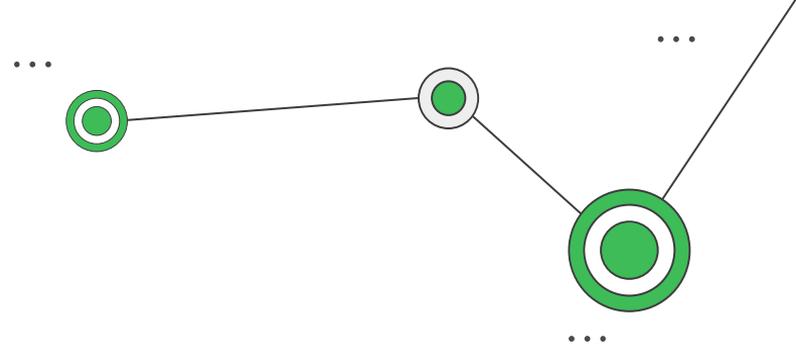


Lesson Learned



Lesson Learned from Digital Skills Toolkit Implementation

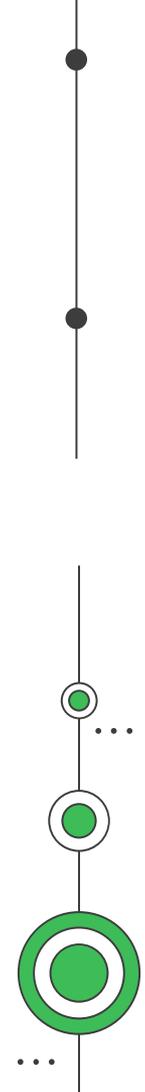
- Broad vs Narrow Definition of Digital Skills Toolkit
 - Flow vs Stock Variables
 - Major vs Detailed Occupation Lists
 - Firms Self-Assessment may not be accurate in measuring digital skills gap
- 

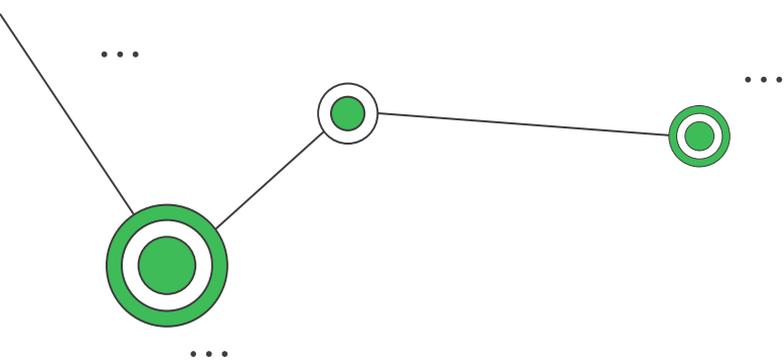


Indeks Masyarakat Digital: Toolkit Implementation Digital Skills Toolkit



Indeks Masyarakat Digital (IMD)

- Indonesia's commitment in implementing the toolkit in the forms of Indeks Masyarakat Digital (IMD)
 - IMD can be tailored to Indonesia's digital economy competitiveness development goals.
 - DSLT intends to build a measurement framework, whereas IMD seeks to determine the degree of literacy and digital competency of the Indonesian population. In addition, IMD is necessary to promote inclusiveness in the digital economy.
 - DSLT -> country vs IMD -> District/city
- 



Thank you!

