

ทำความเข้าใจพลวัตของระบบเศรษฐกิจดิจิทัล ผ่านการศึกษาทักษะด้านดิจิทัลของครัวเรือนไทย

Understanding the Dynamic of Digital Economy in the Context of Digital Literacy of Thai Households

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จุฬาลงกรณ์มหาวิทยาลัย

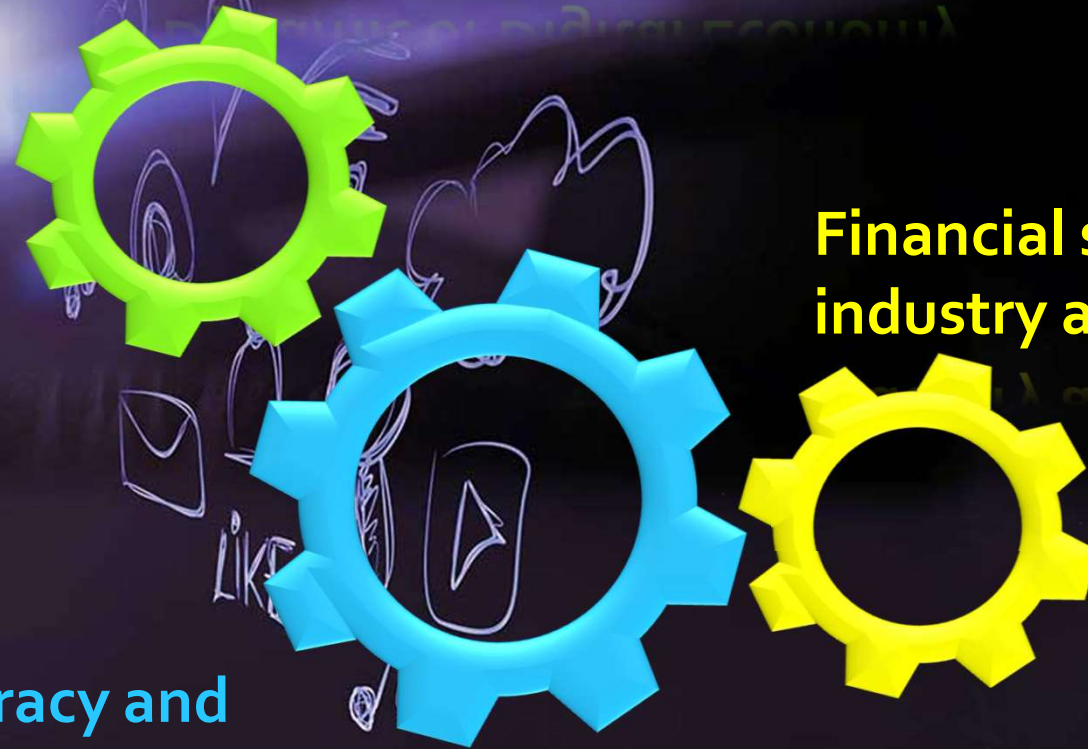
BOT SYMPOSIUM 2020
28 September 2020

Key agenda

Dynamic of Digital Economy

Financial services industry as a case study

Digital literacy and its implication



Understanding the Digital Economy

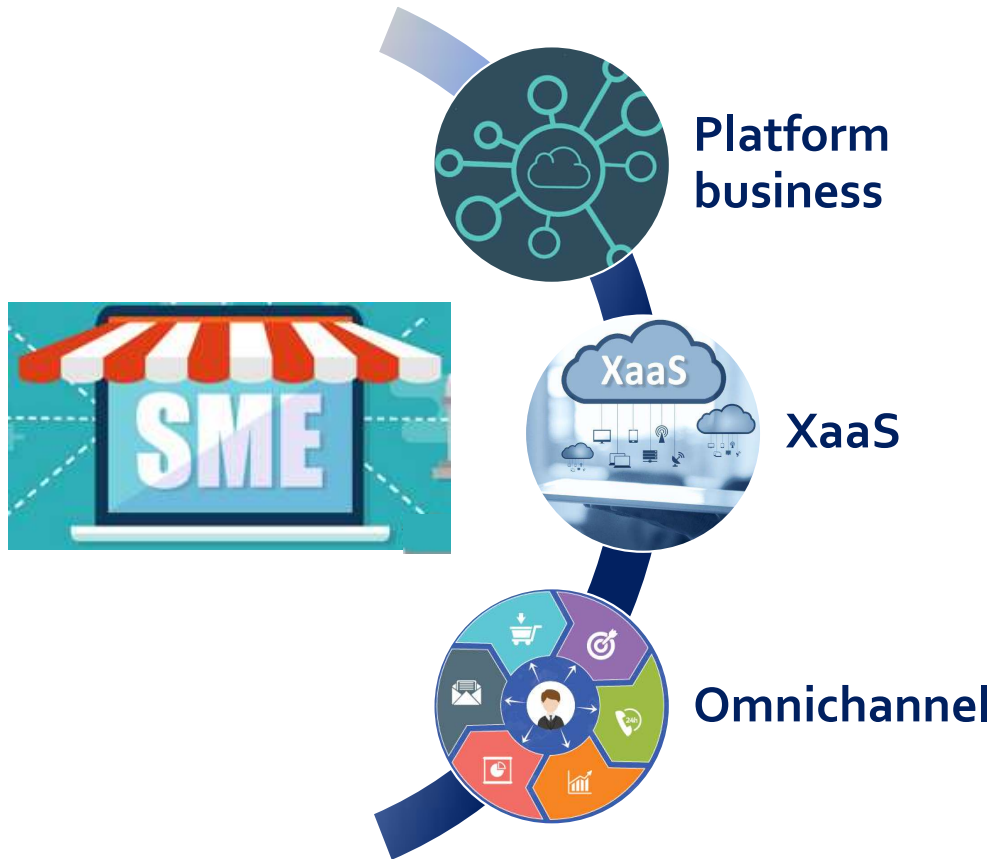
Digital Infrastructure

**Digital technologies and
new business model**

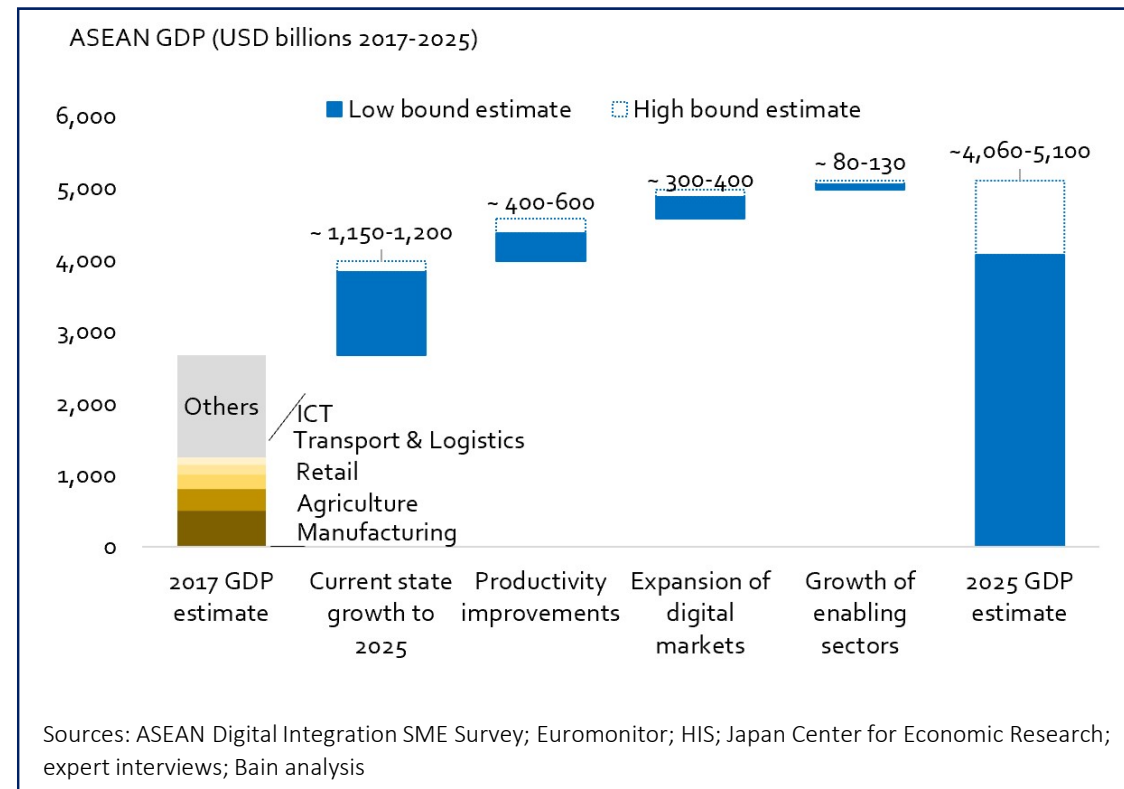
Industry 4.0

**Digital literacy as a foundation to
benefit from the digital economy**

Digital Economy: The new path of growth

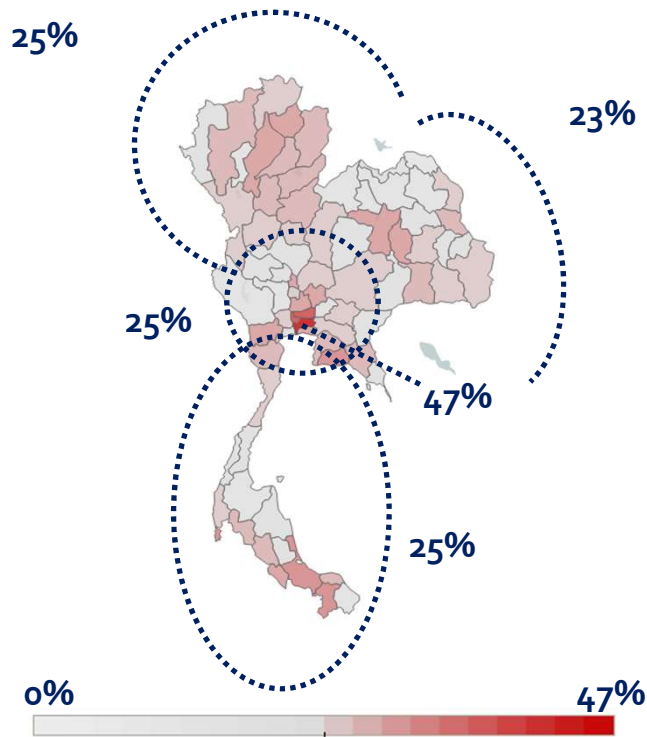


Estimated additional gains from the digital integration

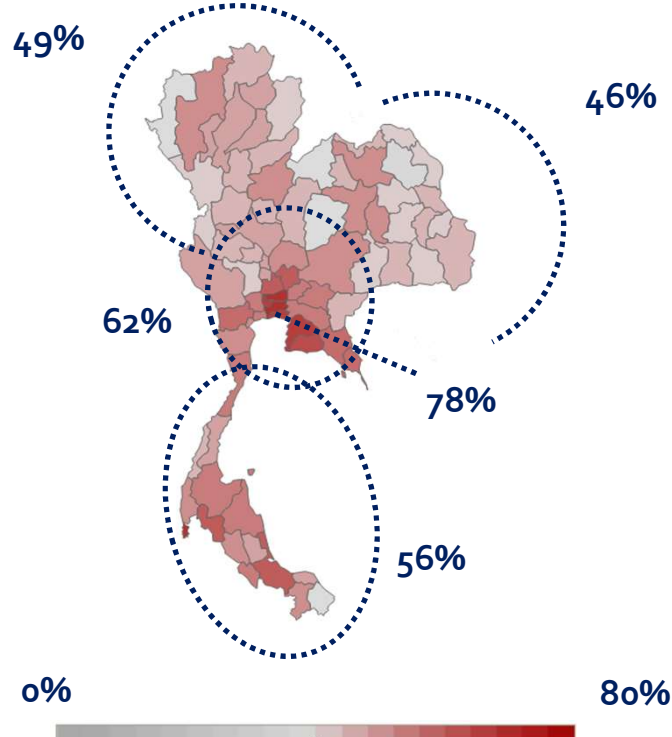


Stage of Thailand Digital Economy

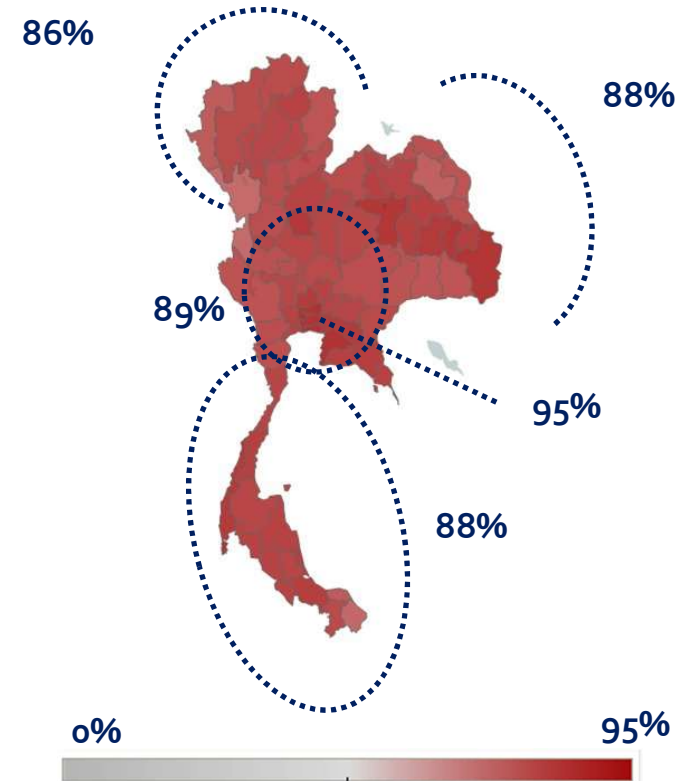
Computer penetration rates



Internet penetration rates



Mobile phone penetration rates





Data in 2018

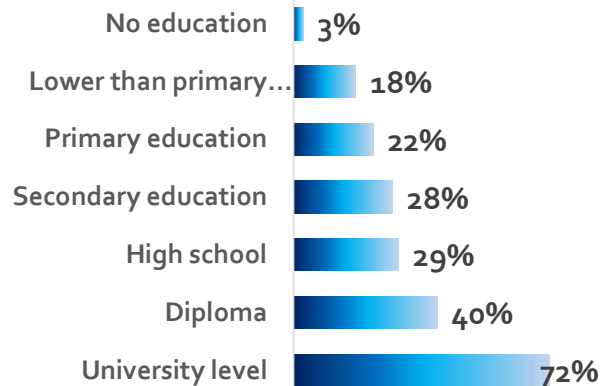
Sources: National Statistics Office

Stage of Thailand Digital Economy




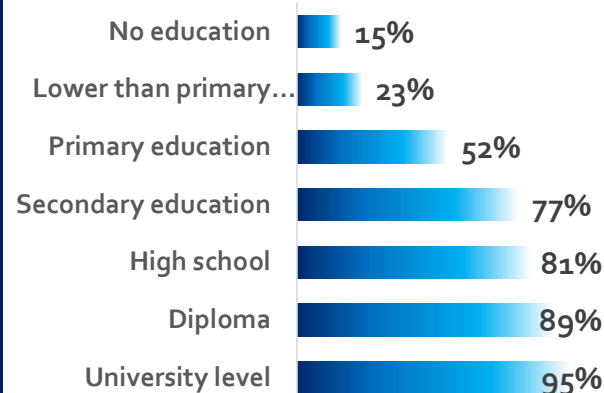
Computer

Male 27%   Female 29%





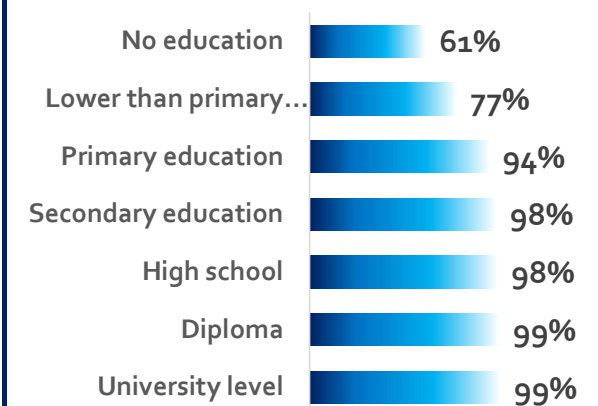
Internet

Male 58%   Female 56%



Mobile phone

Male 80%   Female 80%



Sources: National Statistics Office

Data in 2018

Stage of Thailand Digital Economy

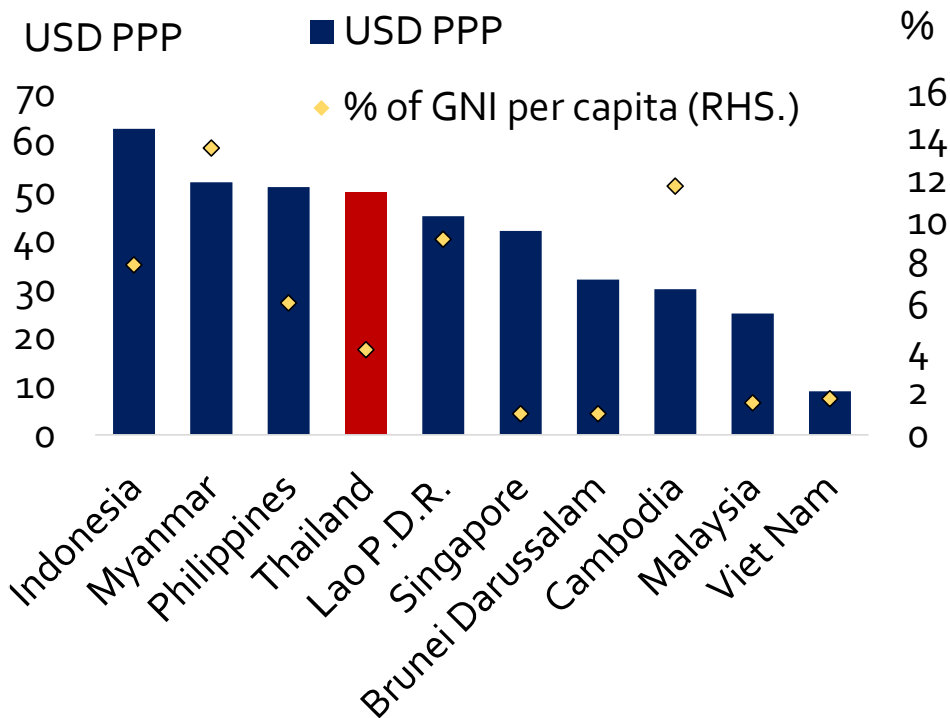
Technology penetration rates			
Occupation	Computer	Internet	Mobile phone
Managers	58.02%	87.59%	99.56%
Professionals	90.87%	98.52%	99.67%
Technicians and Associate professionals	76.70%	95.71%	99.67%
Clerical support workers	80.56%	96.80%	99.65%
Services and sales workers	16.62%	68.77%	97.84%
Skilled agricultural, forestry and fishery workers	1.95%	28.90%	93.65%
Craft and related trades workers	11.03%	61.63%	96.35%
Plant and machine operators and assemblers	7.58%	74.33%	98.26%
Elementary occupations	3.09%	45.20%	93.81%
Armed forces occupations	73.53%	94.97%	100.00%

Sources: National Statistics Office

Data in 2018

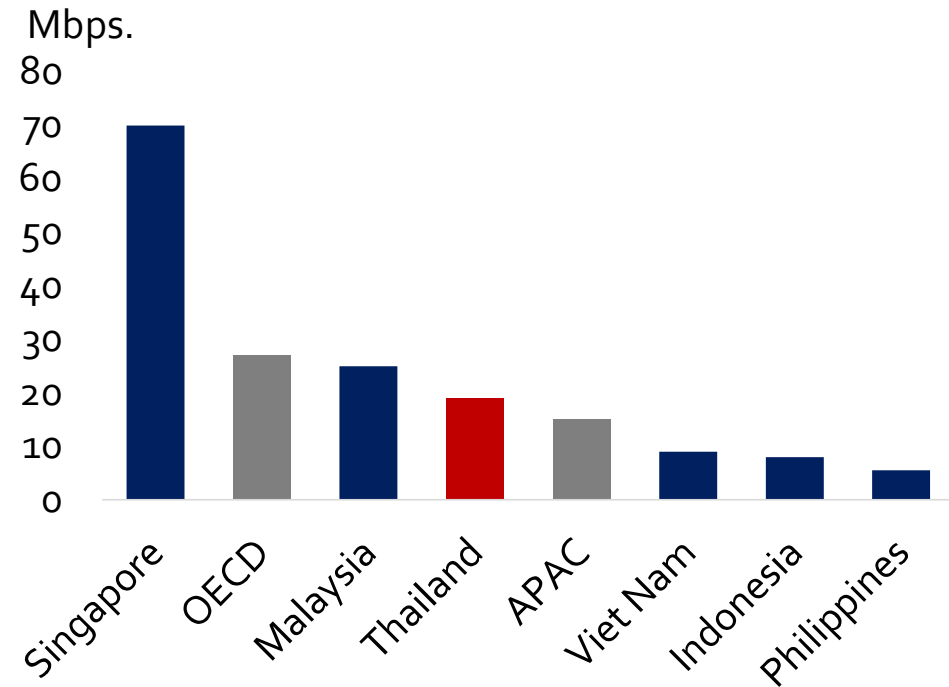
Stage of Thailand Digital Economy

Price of fixed broadband monthly subscriptions
in ASEAN (2017)



Source: ITU(2019), ITU World Telecommunication/ICT Indicators (database), <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>

Measurement of mean download speeds
(fixed broadband) - 2019

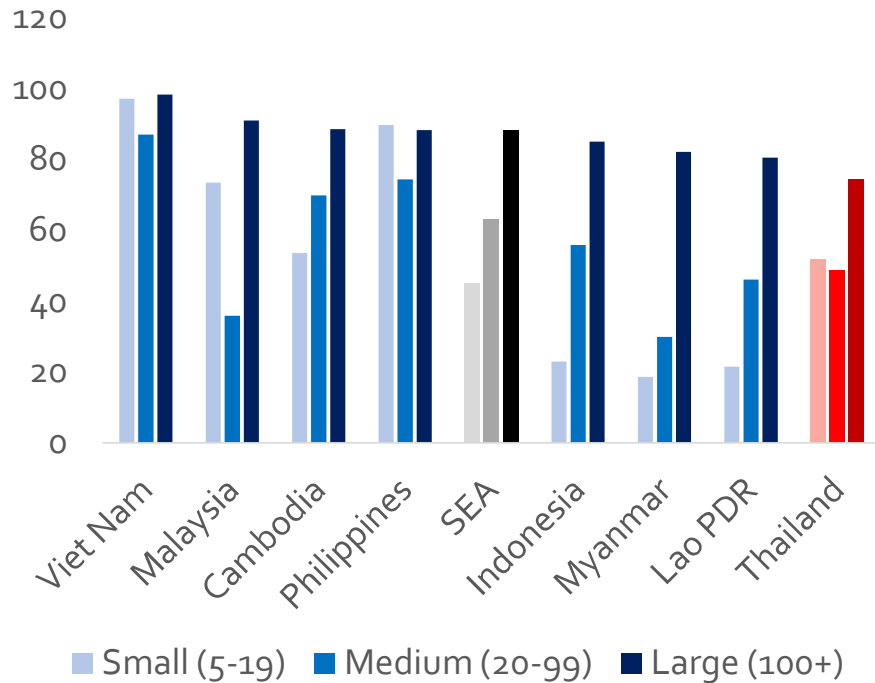


Source: Cable (2019), Worldwide Broadband Speed League 2019 (database) <http://www.cable.co.uk/broadband/speed/worldwide-speed-league>

Stage of Thailand Digital Economy

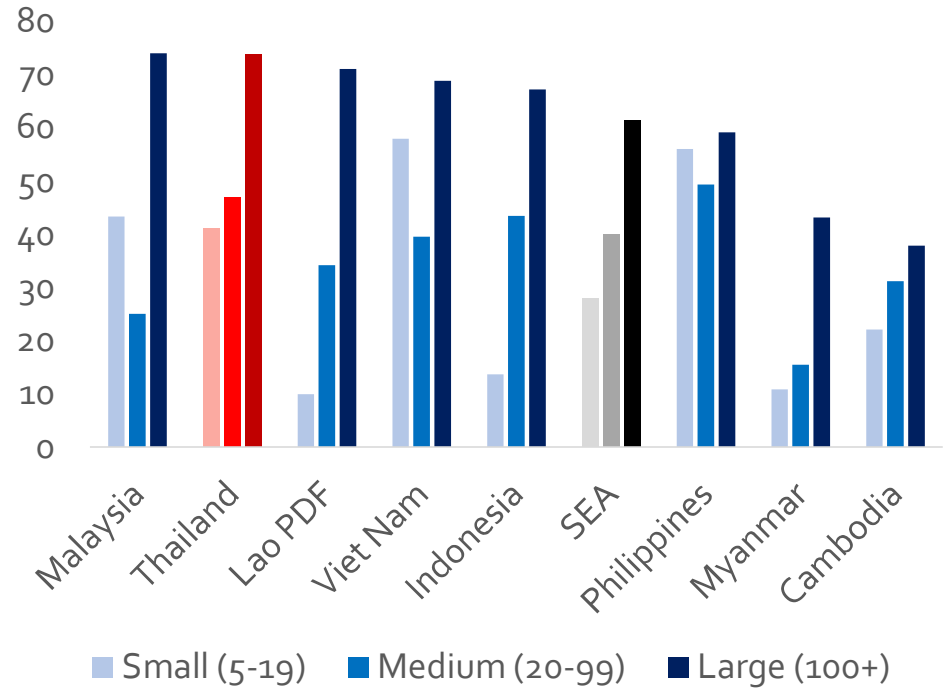
Firms using email to interact with clients/suppliers

(2015 and 2016)



Firms with their own website

(2015 and 2016)

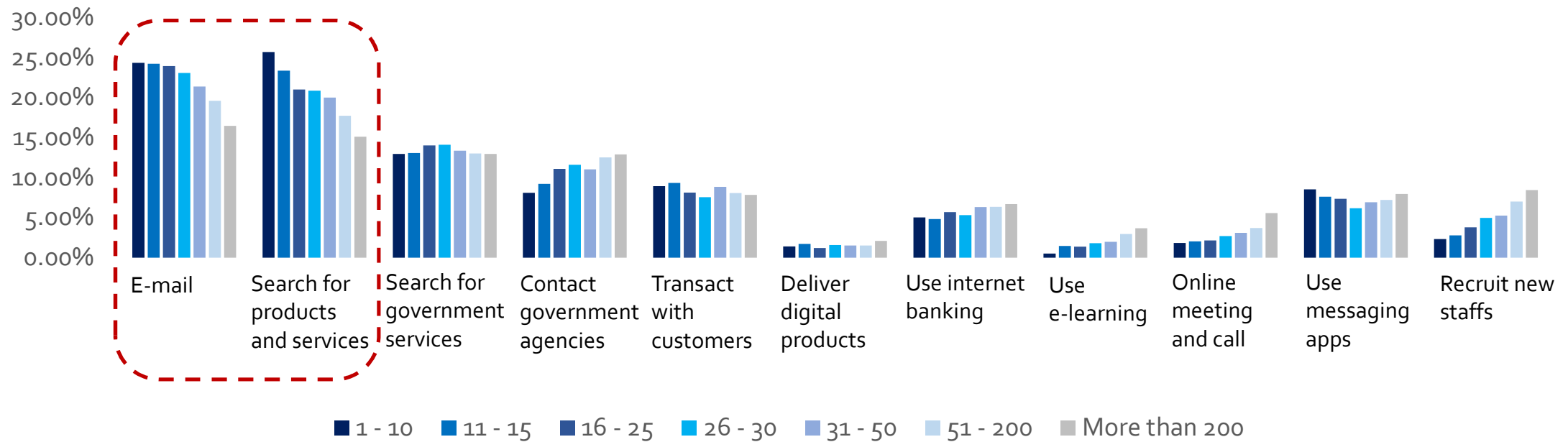


Source: World Bank (2019), Enterprise Surveys (database), www.enterprisesurveys.org

Source: Cable (2019), Worldwide Broadband Speed League 2019 (database)
<http://www.cable.co.uk/broadband/speed/worldwide-speed-league>

Stage of Thailand Digital Economy

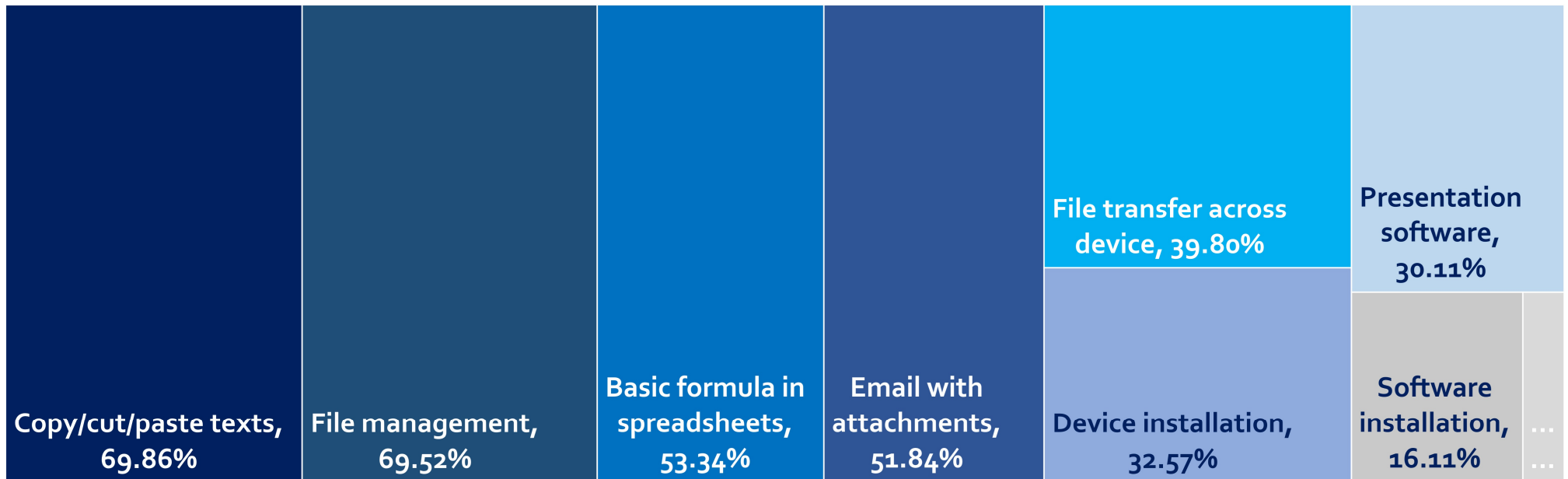
Internet usage of enterprises in Thailand across different sizes (number of staffs), 2018



Sources: National Statistics Office

Stage of Thailand Digital Economy

Percentage of households having the abilities to do certain digital tasks, 2018



Sources: National Statistics Office

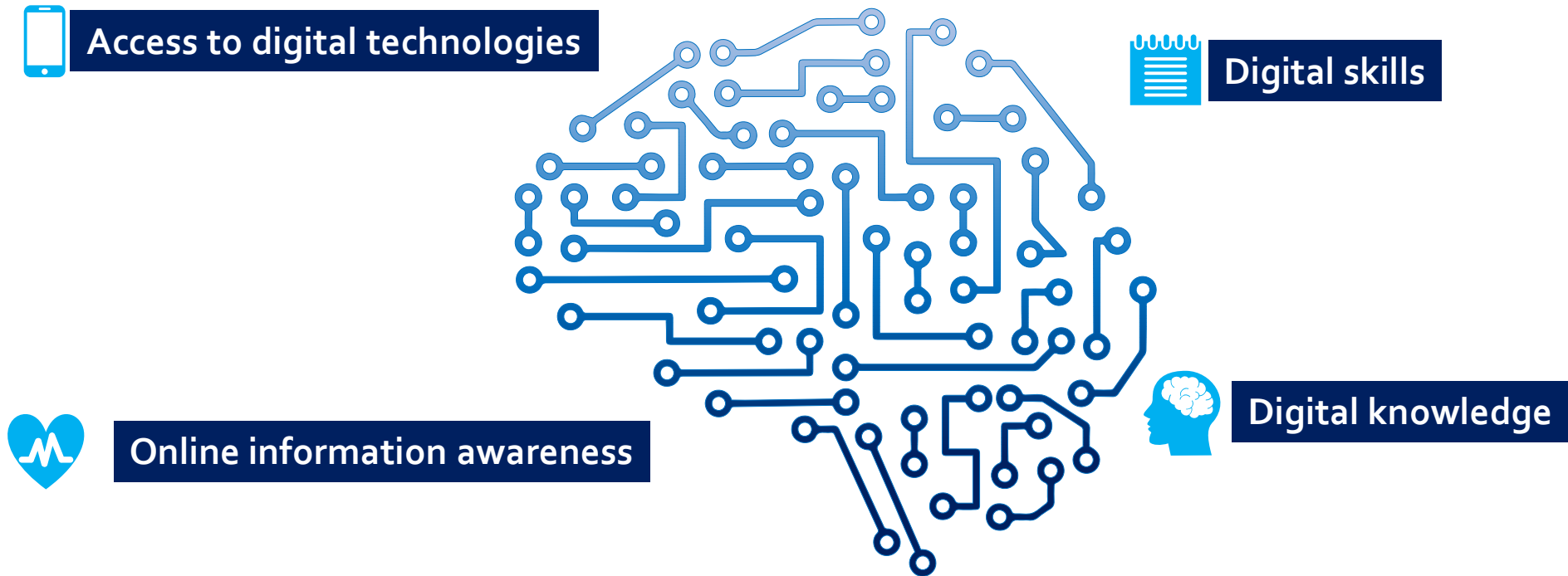
Stage of Thailand Digital Economy

Percentage of households using the internet across different activities, 2018

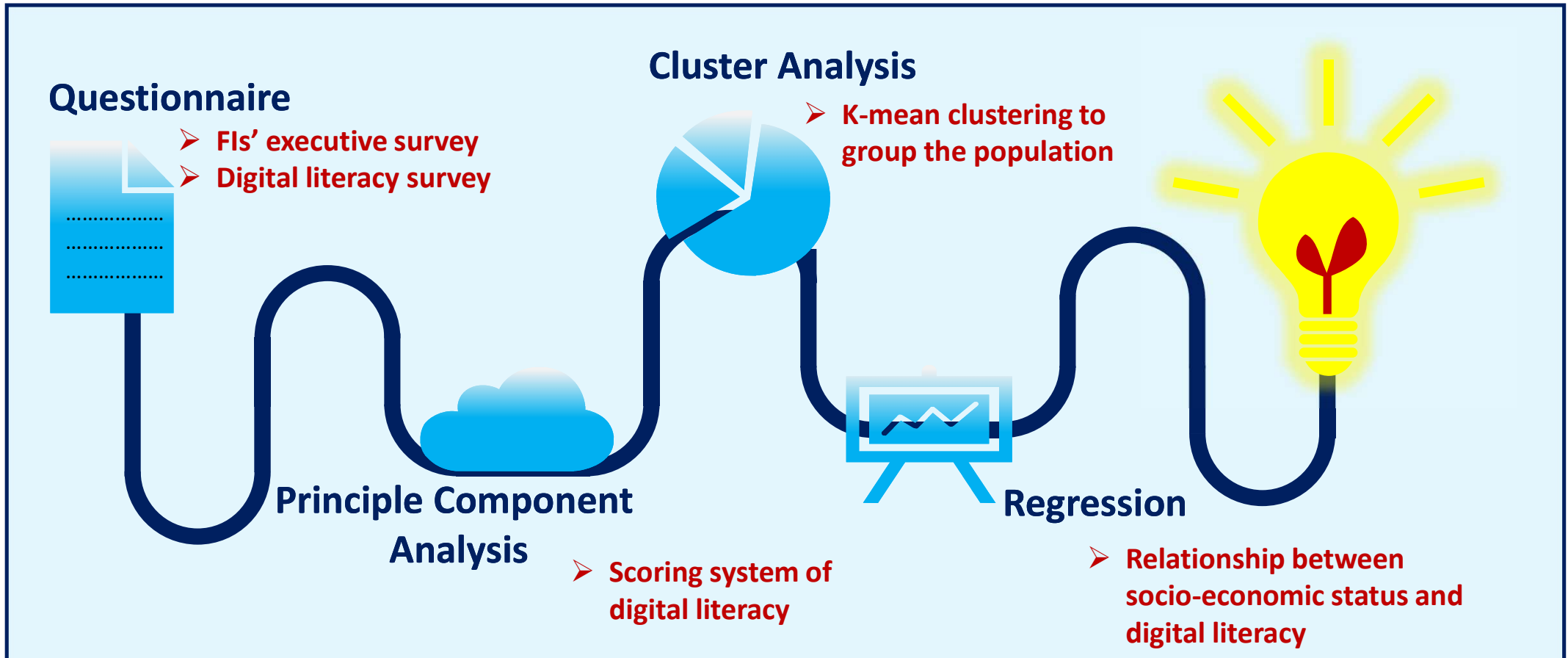
Social Network, 94.13%	Watch and download video/ music, 89.25%	Share media files, 56.98%	Read e-books and news, 42.84%	Video call and online meeting, 38.64%	Search for government information, 24.91%	Blog Web 2.0/ chat/instant message, 22.03%	
		Search for products/ services, 45.18%	Search for health- related products/ services, 38.82%	E-mail, 38.60%	Online learning, 19.74%	Buy prod... servic... onlin...	Inter... Mobile bank... 11.77%
					Download software, 18.62%	Contact gover... agency, 11.12%	Sell... Find...

Sources: National Statistics Office

Digital literacy measurement



Digital literacy measurement

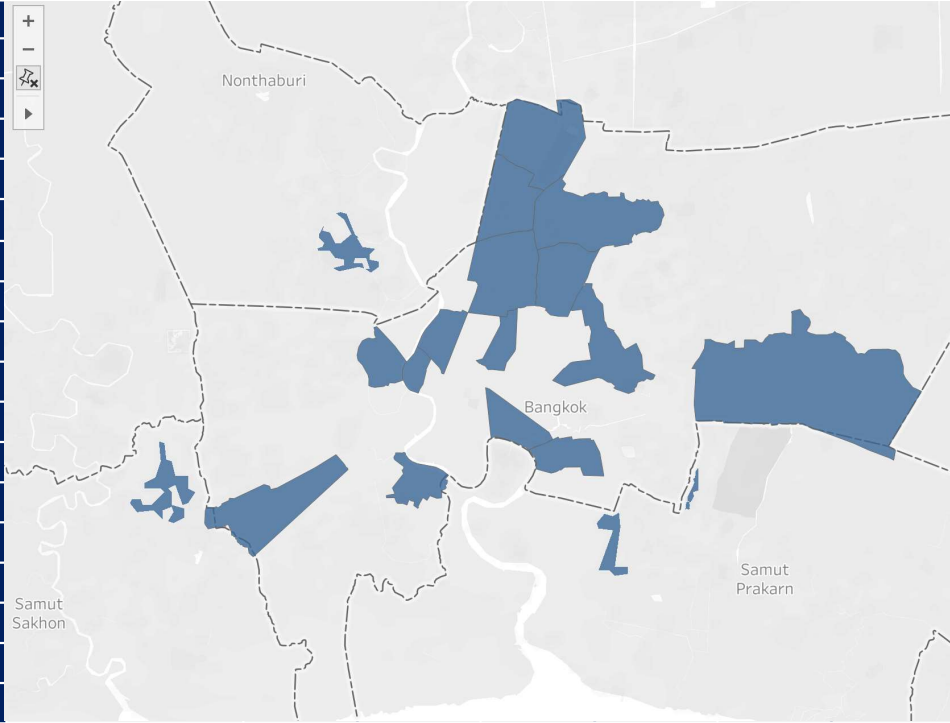


Data sampling methodology

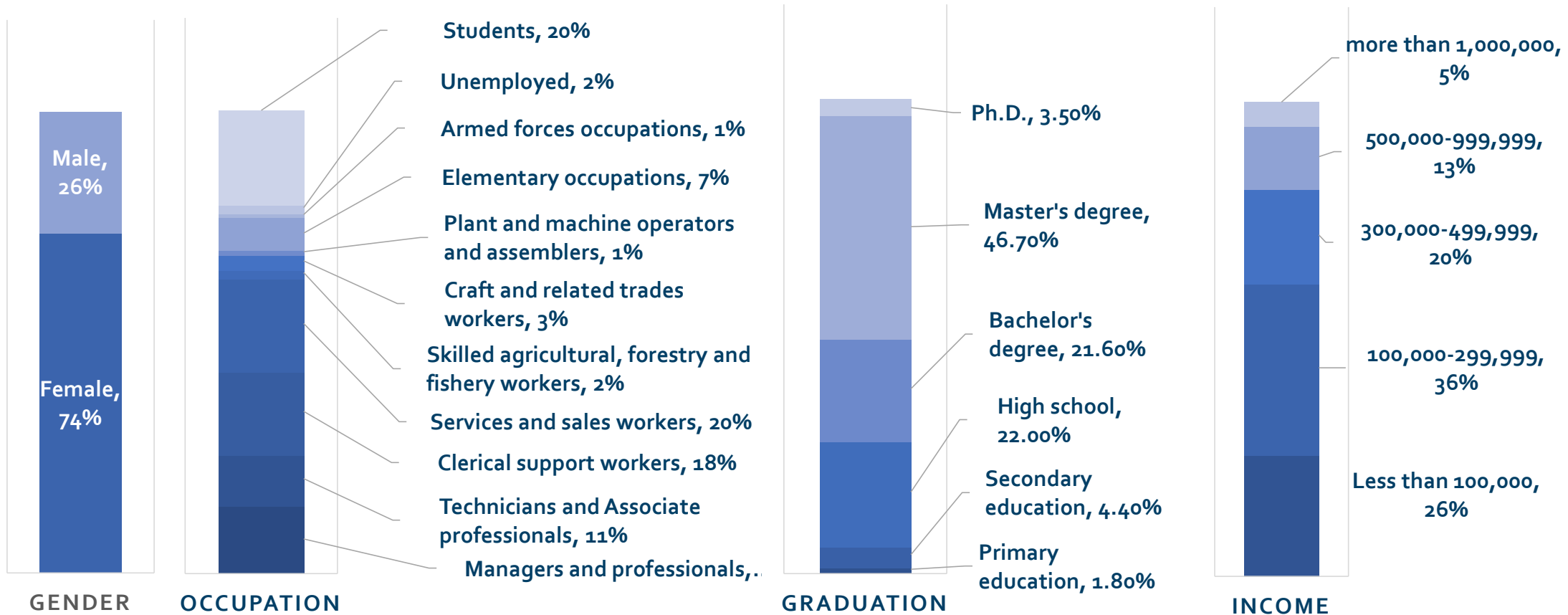
Generation	Birth years	Demographic structure in Thailand
Baby boomers	1946-1964	22.18%
Gen-X	1965-1980	28.81%
Millennials	1981-1996	26.43%
Gen-Z	1997-2012	22.58%

Generations	Age			
	Min	Max	Avg.	S.D.
Baby boomers	55	71	59.66	3.48
Generation X	39	54	45.62	4.64
Millennials	23	38	28.63	3.89
Generation Z	12	22	17.89	2.78

Area	Baby boomers	Gen-X	Millennials	Gen-Z	Total
Nonthaburi					33
Samut Sakhon					34
Samut Prakan					33
Phra Nakhon					27
Dusit					27
Bang Khen					27
Lak si					27
Bang Kapi					27
Phra Khanong					27
Lat Krabang					27
Din Daeng					27
Chatuchak					27
Khlong Toei					26
Lat Phrao					26
Don Mueang					26
Rat Burana					26
Bangkok Noi					26
Bang Bon					27
Total	111	144	132	113	500

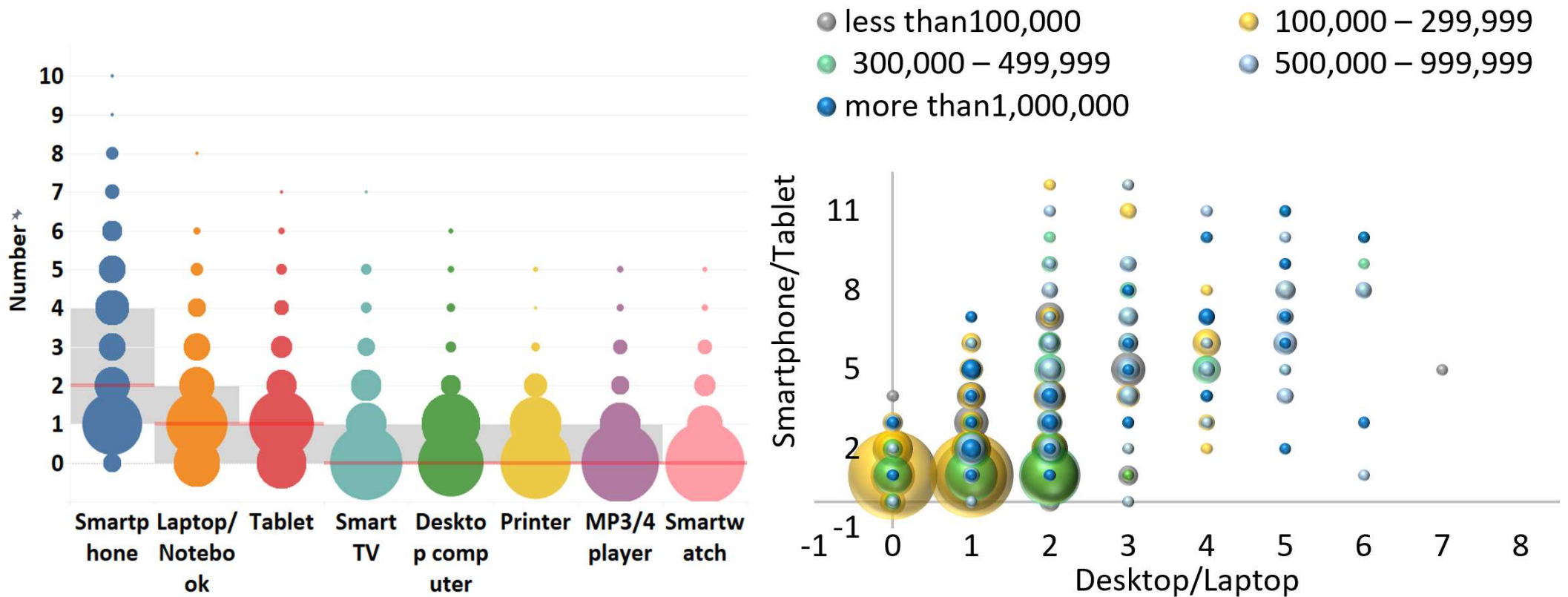


Characteristics of the sample



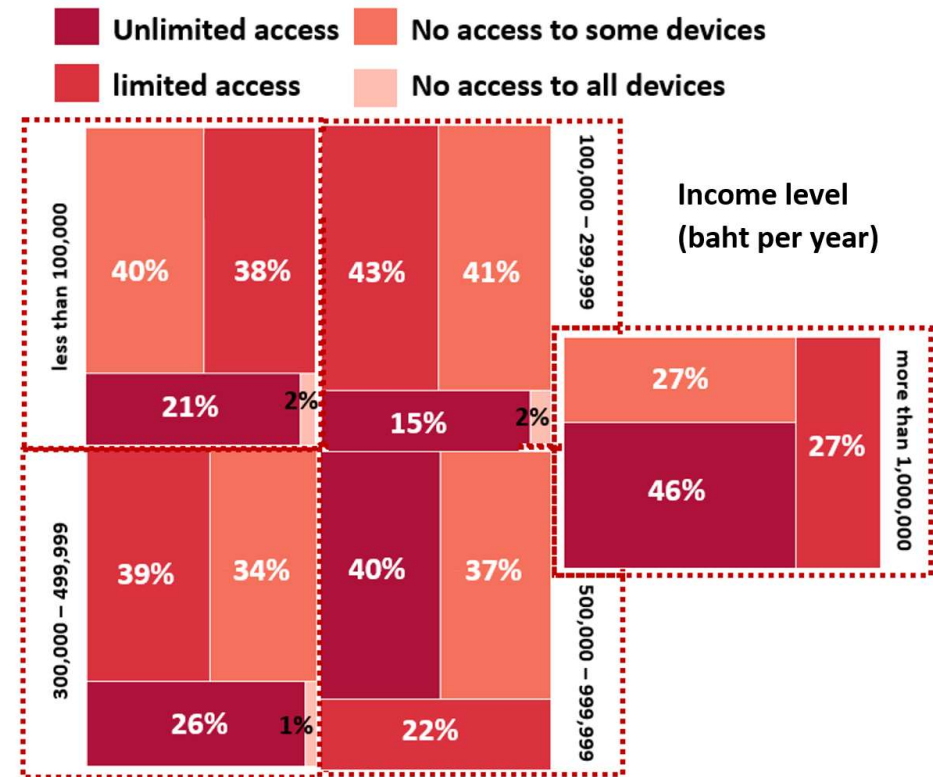
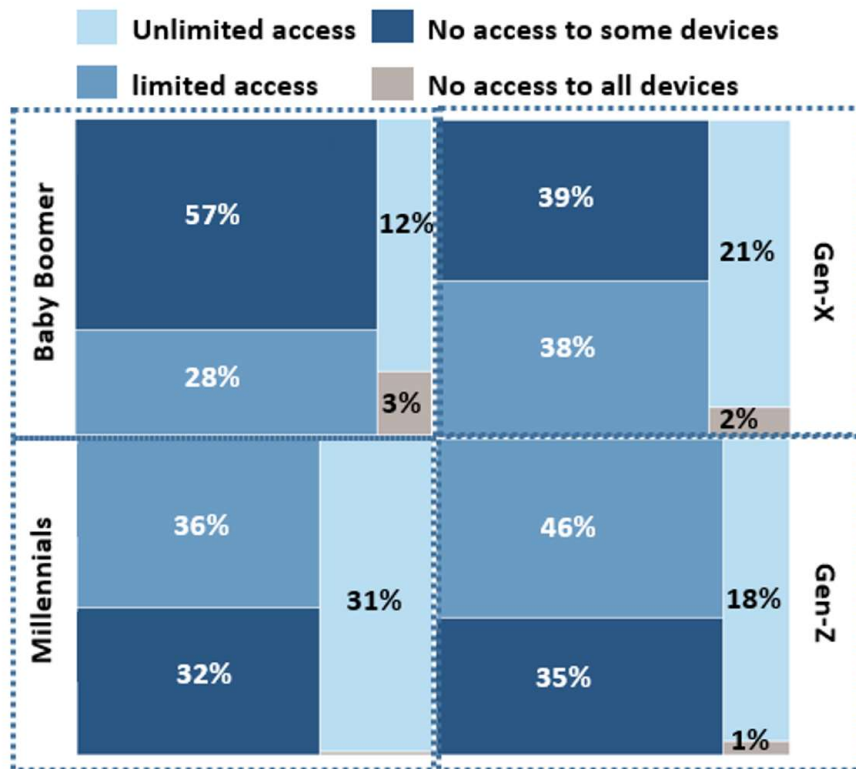
Research findings

Number of devices accessed by Thai households



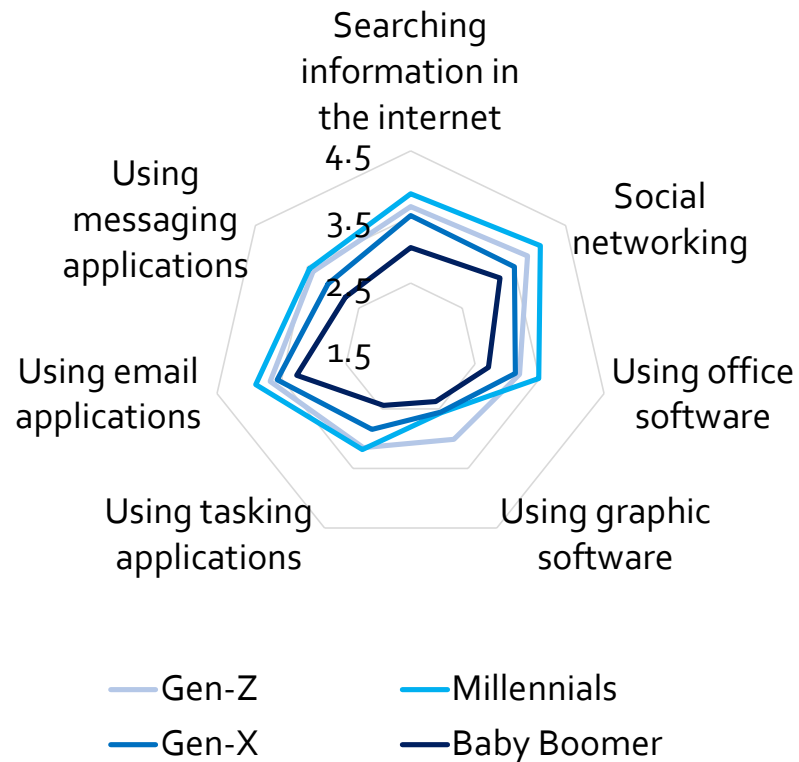
Research findings

Characteristics of the ability to access digital technology

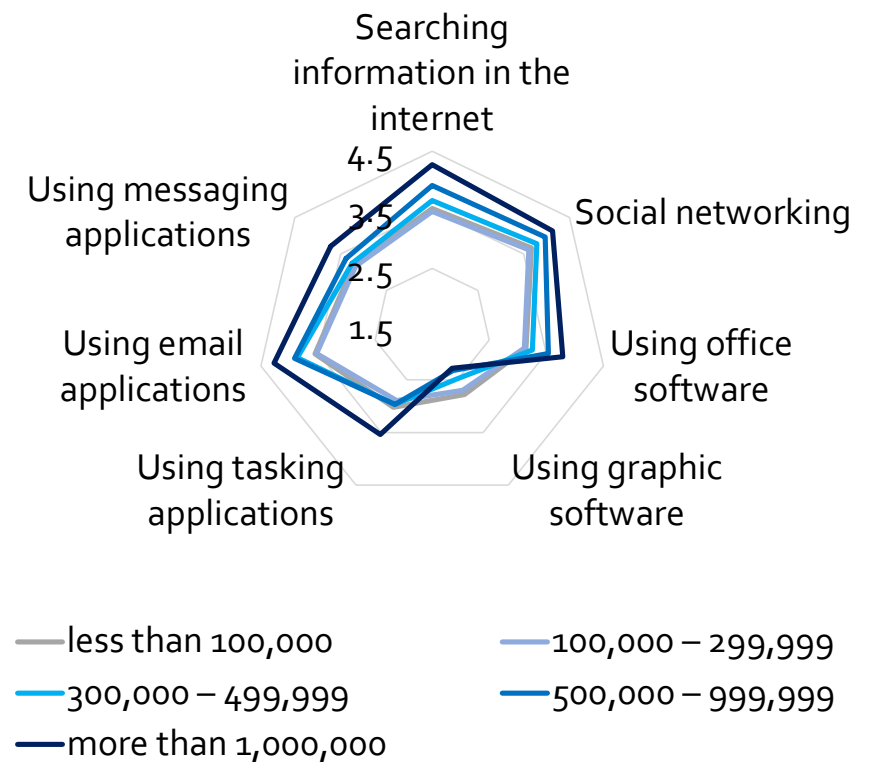


Research findings

Likert scores measuring the level of digital skills of the samples in different generations

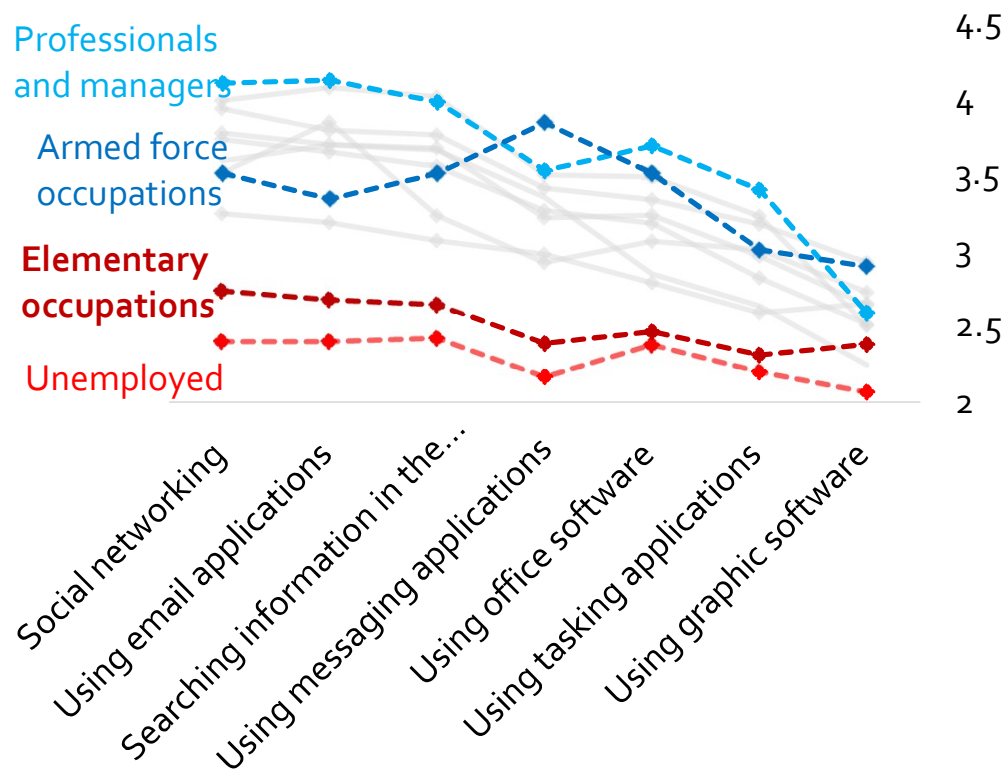


Likert scores measuring the level of digital skills of the samples in different income groups

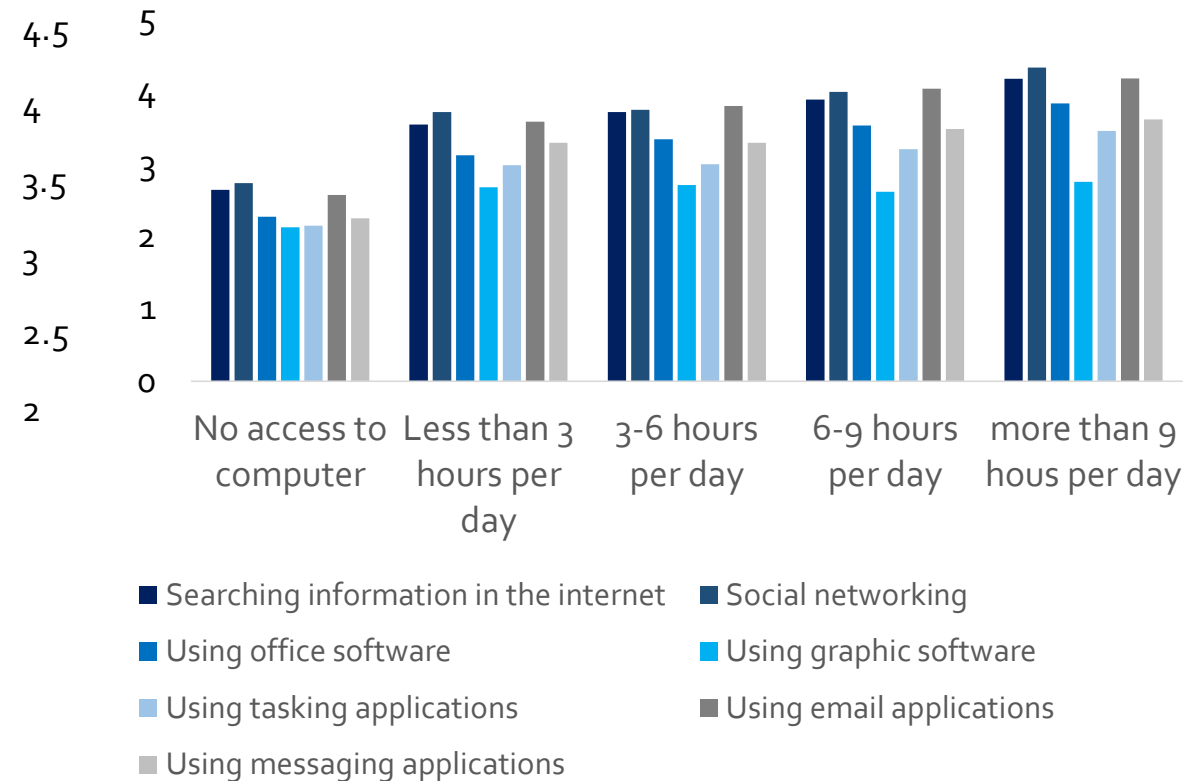


Research findings

Likert scores measuring the level of digital skills of the samples in different occupation types

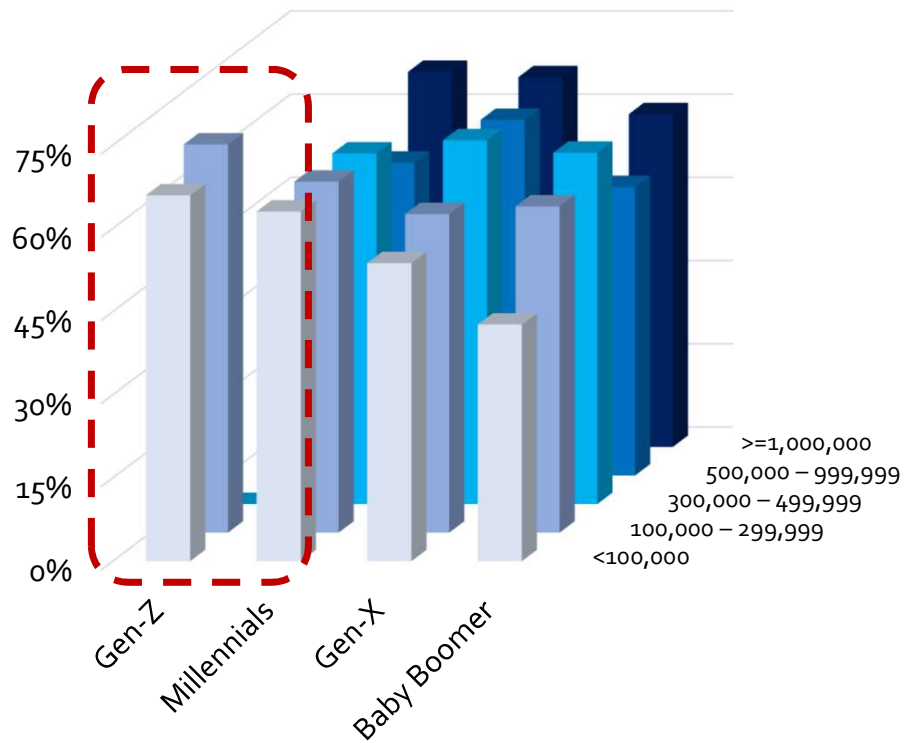


Relationship between the length of time in using computers and digital skills

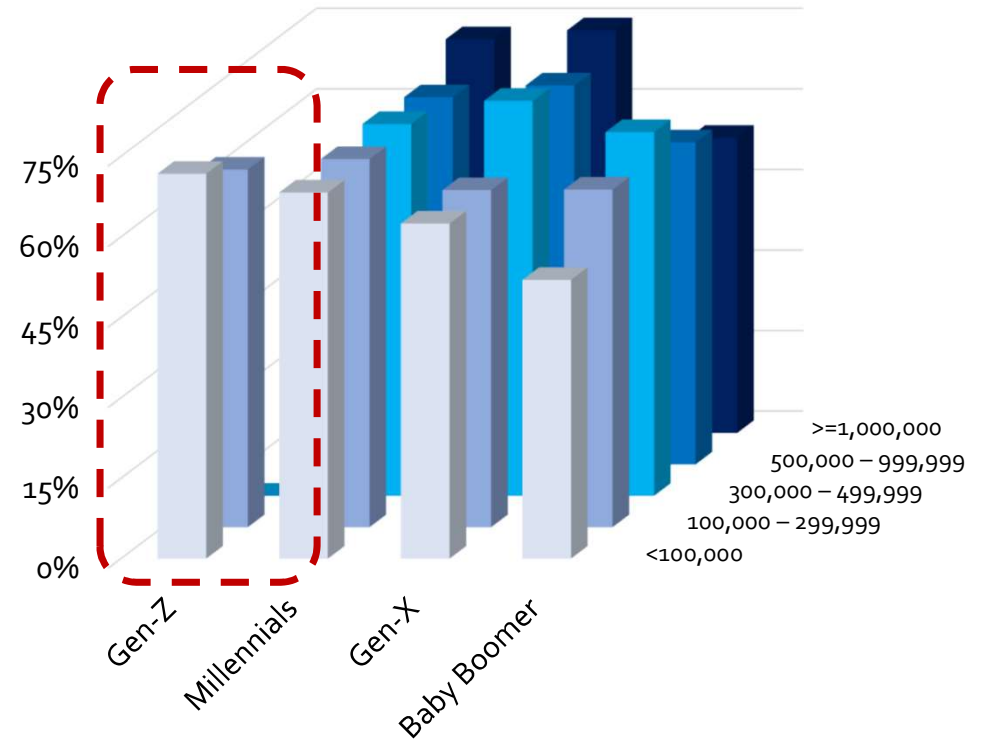


Research findings

Self-assessment knowledge of computer hardware

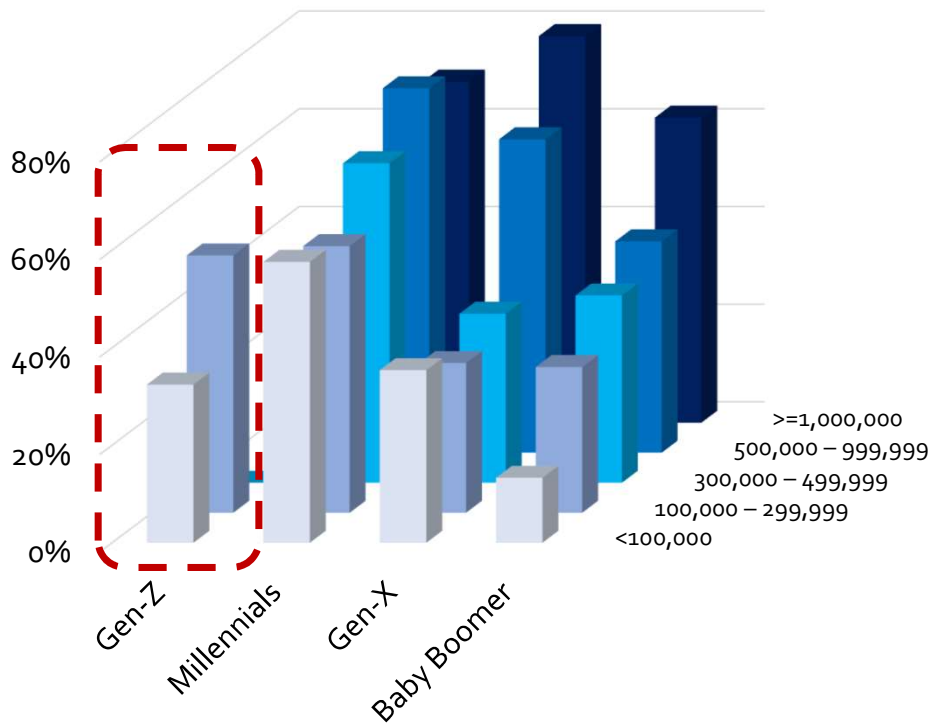


Self-assessment knowledge of internet network

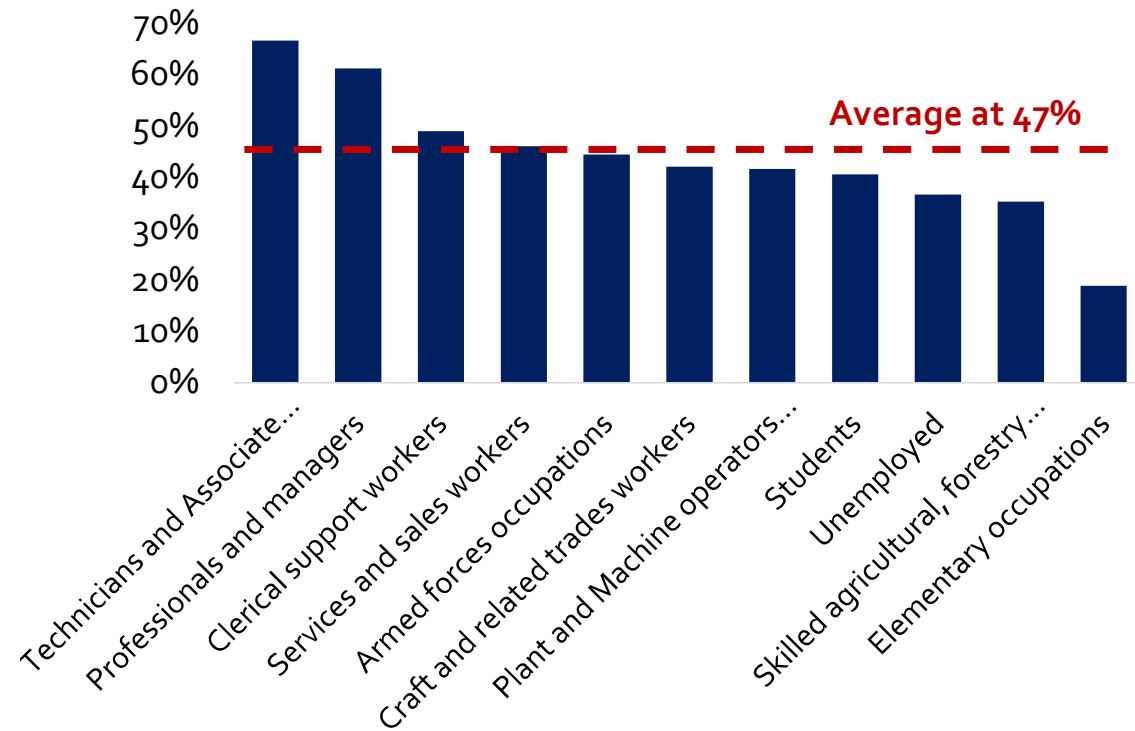


Research findings

Digital knowledge measured by the test



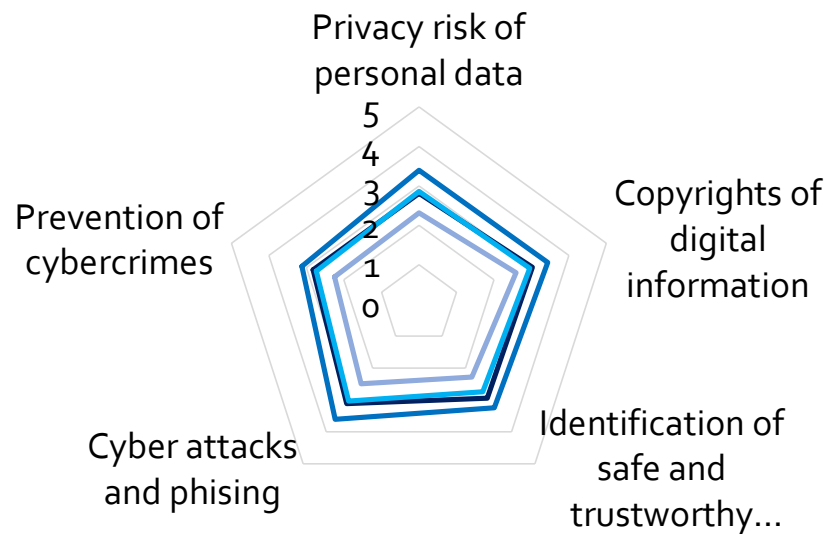
Self-assessment knowledge of internet network



Research findings

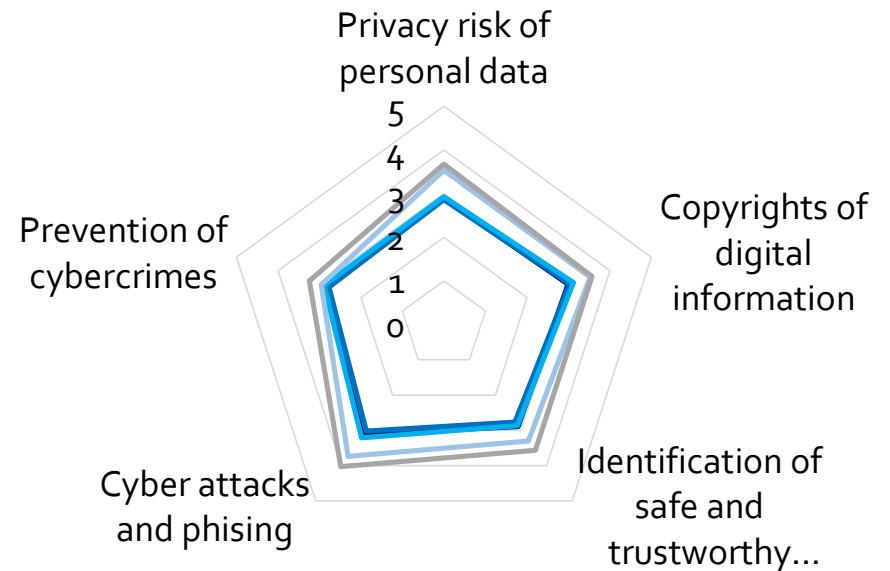
Digital information awareness by generations

— Gen-Z — Millennials — Gen-X — Baby Boomer



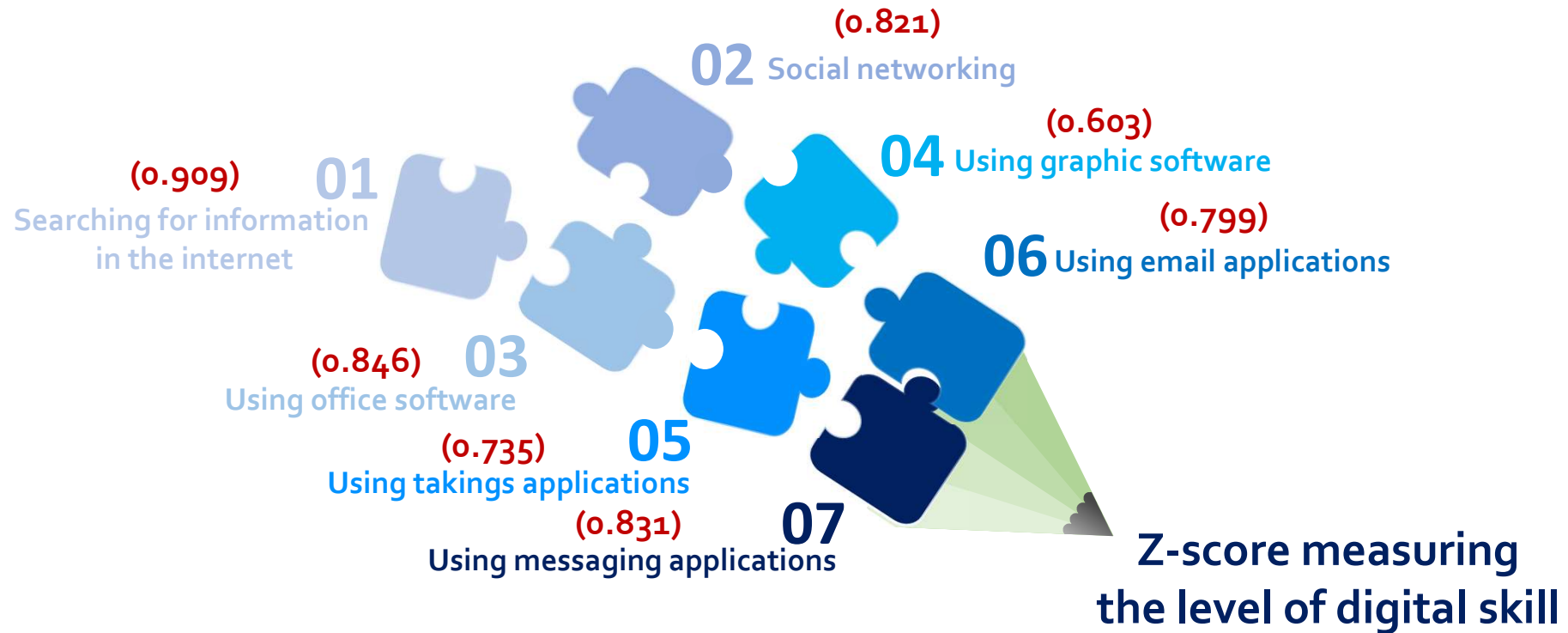
Digital information awareness by income levels

— less than 100,000 — 100,000 – 299,999
 — 300,000 – 499,999 — 500,000 – 999,999
 — more than 1,000,000

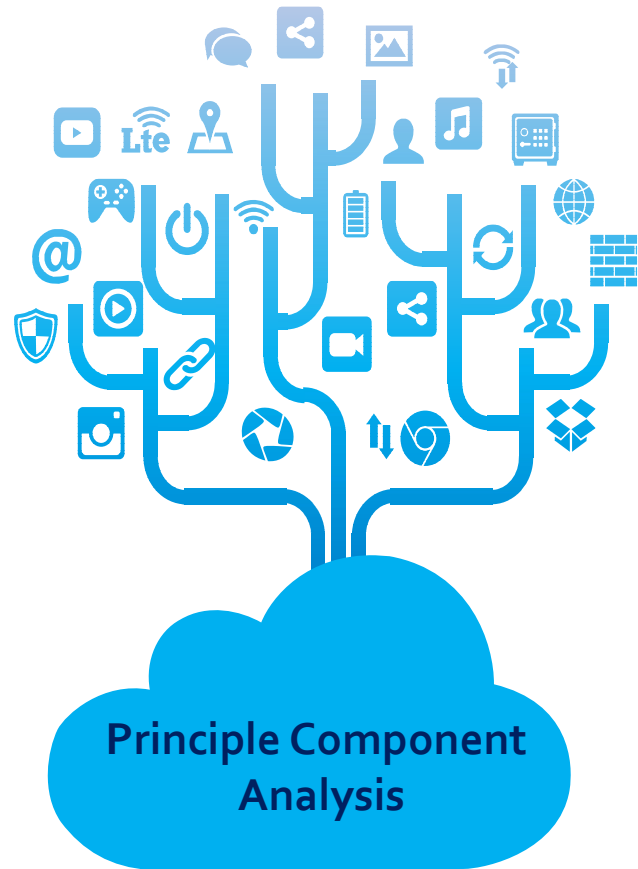


Principle Component Analysis

The loadings that best capture the information and variation contained in each observable variables.



Research findings



Pearson's correlation coefficients across digital literacy sub-dimensions

	Digital access	Digital Skills	Digital knowledge	Digital Information awareness
Digital access	1			
Digital Skills	0.163**	1		
Digital knowledge	0.084*	0.640**	1	
Digital Information awareness	0.207**	0.587**	0.508**	1

Research findings

Millennial

- ✓ Digital access
- ✓ Digital skills
- ✓ Digital knowledge
- ✓ Information awareness

Professionals

- ✓ Digital skills
- ✓ Digital knowledge
- ✓ Information awareness



Gen-X

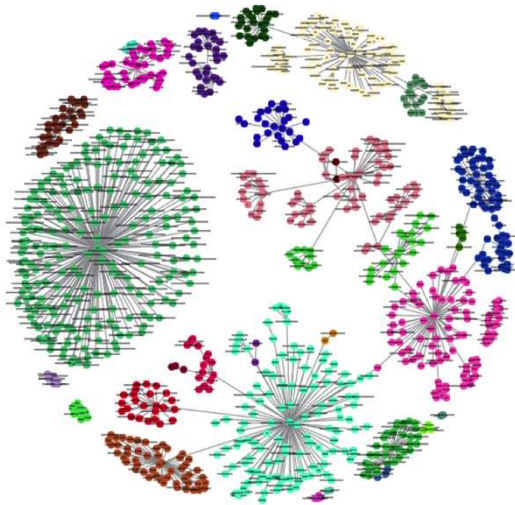
- ✓ Digital access
- ✓ Digital skills
- ✓ Information awareness

Income higher than 500,000 baht per year

- ✓ Digital access
- ✓ Information awareness

Baby boomers who are males, unemployed and receive income of less than 100,000 baht per year are the reference group.

Cluster analysis



Cluster	Digital access	Digital skills	Digital knowledge	Digital Information awareness	Proportions of samples
1 – Digital fluency	0.55	2.05	0.99	2.37	26.31%
2 – Digital neutral	-0.22	0.18	0.03	-0.43	54.96%
3 – Digital illiterate	-0.53	-3.40	-1.48	-2.05	18.73%

Multinomial regression analysis

Using the digital illiterate group as the reference.



Millennial, Gen-Z, Gen-X



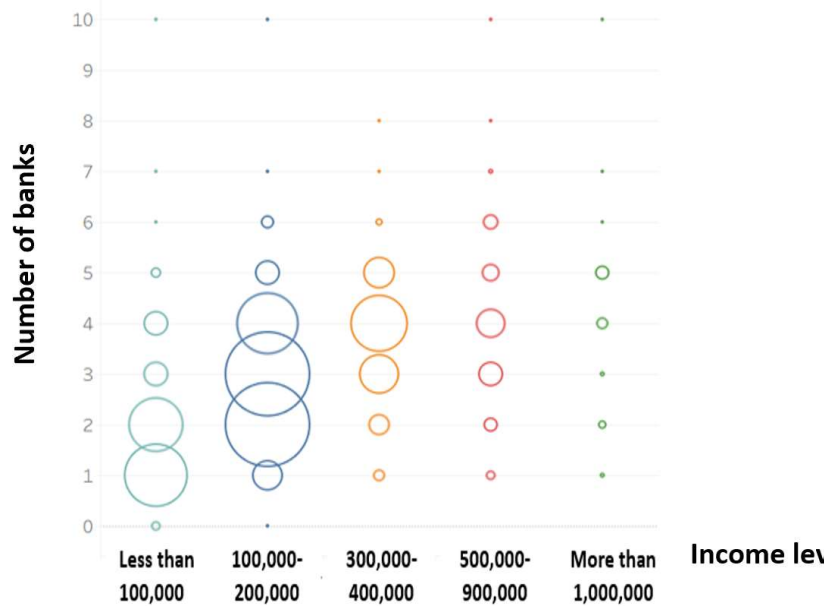
Professionals



Income higher than 2m per year

Case study: financial services

Number of banks that the samples in different income levels are customers



ATM usage behavior of the samples in different generations

Generation	1-2 times	2-4 times	4-8 times	> 8 times
Gen-Z	63.3%	21.7%	8.3%	6.7%
Millennials	18.2%	34.8%	29.2%	17.9%
Gen-X	29.7%	42.3%	17.0%	11.0%
Baby Boomers	35.4%	37.4%	19.2%	8.1%

Key reasons in choosing banks across different generations

Influencing reasons	Gen-Z	Millennials	Gen-X	Baby boomers
Similar banks with family and friends	45%	24%	19%	18%
Attractive saving rates	24%	36%	34%	31%
Attractive borrowing rates	7%	14%	15%	22%
Attractive fee levels	28%	27%	25%	24%
Convenience of ATMs	24%	38%	33%	41%
Mobile banking features	28%	57%	30%	20%
Convenience of branches	27%	39%	34%	36%

Starting age accessing a bank account

	Gen-Z	Millennials	Gen-X	Baby boomers
Average starting age	13	18	24	33

Case study: financial services

Access of banking products across different digital literacy groups

Banking products	Cluster		
	Digital fluency	Digital neutral	Digital illiterate
Deposits	97.38%	95.24%	92.65%
Credit card*	70.68%	45.61%	39.71%
Insurance Product*	25.65%	25.81%	13.97%
Investment in mutual funds*	36.13%	15.79%	15.44%
Loan*	26.18%	15.54%	25.00%
Check*	5.24%	0.75%	2.21%
Number of services and banks	Digital fluency	Digital neutral	Digital illiterate
No. of services	2.61	1.99	1.89
No. of banks	3.49	3.11	2.82

Note: *Significant at 5% level (Pearson's Chi Square) and the different shades of each cell represent the statistical tests of whether the estimated values of certain cells are significantly different from the values of adjacent cells at the 95% confidence level.

Case study: financial services

Customers' opinions about the image that commercial banks should have in the next decades

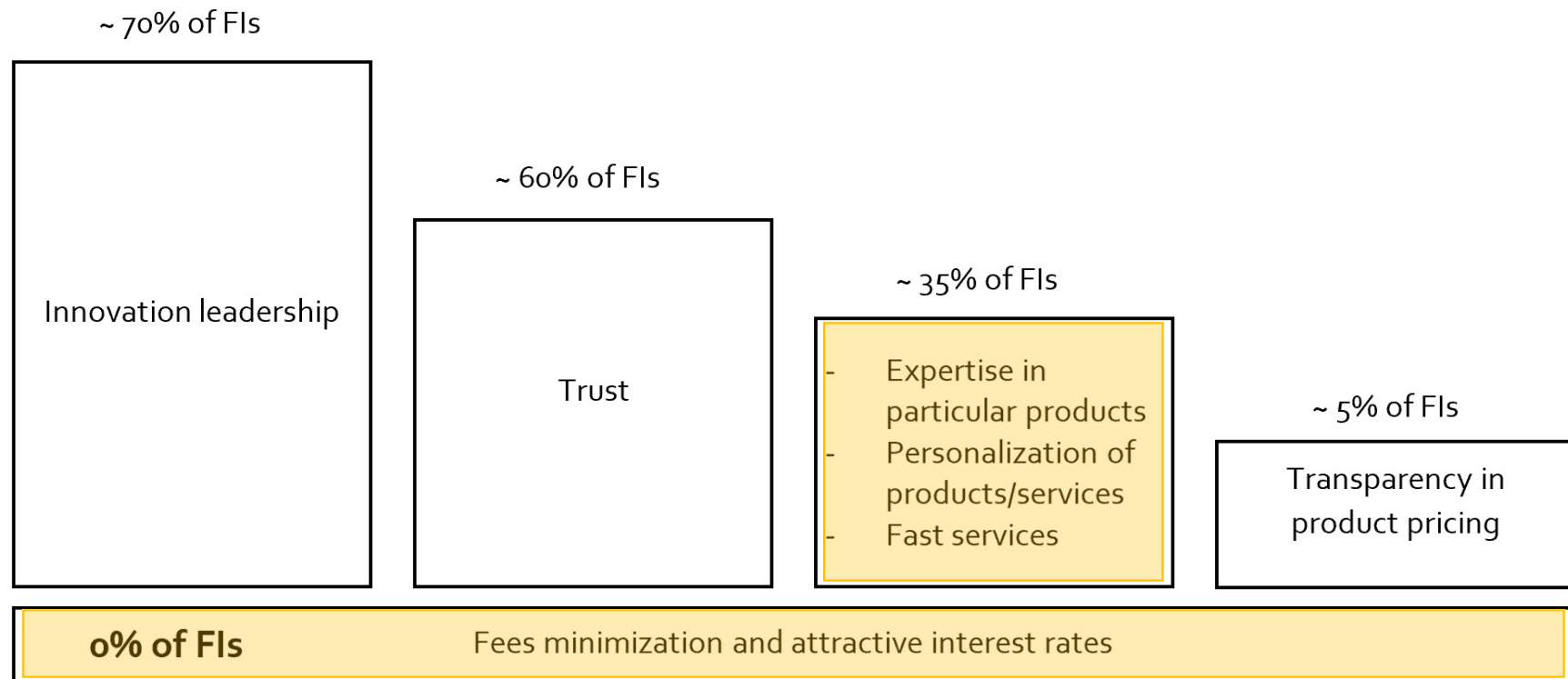
Ranking	Digital fluency	Digital neutral	Digital illiterate
1 st	Innovation leaderships	Lowest fees	Trust
2 nd	Trust	Innovation leaderships	Lowest fees
3 rd	Lowest fees	Trust	Friendly staffs



Personalization of products and services
(only 10-15% of the sample prefers this option)

Case study: financial services

Executives' opinion about the image that commercial banks should have in the next decades



Case study: financial services

Most preferable banking services across different levels of digital literacy

The top 3 preferable services	Cluster		
	Digital fluency	Digital neutral	Digital illiterate
1 st	<ul style="list-style-type: none"> - Universal mobile banking services - Smart notification services 	Convenience of branch banking in the aspect of <ul style="list-style-type: none"> - Branch location - Fast service - All-in-one Automatic machines 	Convenience of branch banking in the aspect of <ul style="list-style-type: none"> - Branch location - Fast service - All-in-one Automatic machines
2 nd	Convenience of branch banking in the aspect of <ul style="list-style-type: none"> - All-in-one Automatic machines 	<ul style="list-style-type: none"> - Universal mobile banking services - Smart notification services 	<ul style="list-style-type: none"> - Innovative marketing campaign and promotions with partnered merchants - Easy to search products/services information online.
3 rd	<ul style="list-style-type: none"> - Innovative marketing campaign and promotions with partnered merchants - Easy to search products/services information online. 	<ul style="list-style-type: none"> - Innovative marketing campaign and promotions with partnered merchants 	<ul style="list-style-type: none"> - Integration of services across offline, online, mobile, chat and call. - Incorporating services in social network and messaging platforms.

Case study: financial services

Banking services that financial institutions in Thailand plan to focus in the next 5 years

	The top 3 services of interests		
	1 st	2 nd	3 rd
Financial institutions	<ul style="list-style-type: none"> - Universal mobile banking services - Integration of services across offline, online, mobile, chat and call. 	<ul style="list-style-type: none"> - Smart notification - Big data analytic to personalize products and services - Incorporating services in social network and messaging platforms. 	<ul style="list-style-type: none"> - Innovative marketing campaign and promotions with partnered merchants - Easy to search products/services information online.



All-in-one automatic machines and fast services in the branch banking.

Case study: financial services

Technology investment plan of financial institutions in Thailand

Types of technology	Proportions of FIs invest today	Proportions of FIs expect to invest in the next 5 years
Cyber security	88.89	100.00
Data analytics	72.22	93.33
Public cloud infrastructure	66.67	80.00
Robotic process automation	44.44	66.67
Artificial intelligence	33.33	60.00
Biometrics and identity management	33.33	66.67
Distributed ledger technology (Blockchain)	16.67	66.67
Extended reality	11.11	20.00
Quantum	0.00	26.67

Open banking concepts

Key takeaways



Digital economy empowers **micro enterprises and individuals** through new business models.

Digital native (young generations) with high levels of **digital literacy** does not actually exist.

Key policies to strengthen the digital literacy of Thai households are needed.

Banking industry acts as the backbone of digital economy and needs to use big data analytic in order to select appropriate **standardized and easy-to-understand products** for customers.