Understanding Digital divide and its Policy Implications

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Introduction

The concept of digitalization

Digital technologies that have computer hardware, software and networks at their core are not new, but in break with the third industrial revolution, they are becoming more sophisticated and integrated and are, as a result, transforming societies and the global economy. (...) (the fourth industrial revolution) is the fusion of these technologies and their interaction across the physical, digital and biological domains. The fourth industrial revolution *Kloup* Solveb 2017, pp. 14.

- The fourth industrial revolution, Klaus Schwab, 2017, pp. 14

- Digitisation is the conversion of analogue data and processes into a machinereadable format. Digitalisation is the use of digital technologies and data as well as interconnection that results in new or changes to existing activities. Digital transformation refers to the economic and societal effects of digitisation and digitalisation.
 - Going Digital: Shaping Policies, Improving Lives, 2019, pp. 18



Introduction

Recent agenda of digital divide

Digital Dividend (World Bank, 2016)



The Digital Competence Framework for Citizens (EU, 2022)



To articulate information needs, to locate and retrieve digital data. information and content. To judge the relevance of the source and its content. To store, manage, and organise digital data, information and content.

collaborate through digital To improve and integrate

technologies while being aware of information and content into an cultural and generational diversity. To participate in society through public and private digital services and participatory citizenship. To manage one's digital presence, identity and reputation.

existing body of knowledge while understanding how copyright and licences are to be applied.

To know how to give understandable instructions for a computer system.

personal data and privacy in digital environments. To protect physical and psychological health, and to be aware of digital technologies for social well-being and social inclusion.

To be aware of the environmental impact of digital technologies and their use.

To identify needs and problems, and to resolve conceptual problems and problem situations in digital environments. To use digital tools to innovate processes and products. To keep up-to-date with the digital evolution.



3

Introduction

Recent agenda of digital divide

- Digital Skills Toolkit (ITU, 2024)



Digital capital theory

- Materialist perspective : economic *means* and the social *opportunities* people have to acquire digital media
- Capital theory of **Bourdieu (1986)** brought diverse capital variables such as economic capital (money, property and other assets), social capital (social relationships and network connections), and cultural capital (embodied, objectied, institutionalized)
- An inequality of digital capital which can be defined both as **embodied digital capital** (internalized habitus by means of digital skills, motivations, interests, and experiences), and as **objectified digital capital** (materialized capital by means of digital equipment, devices and other infrastructures) (Gómez, 2021)

Digital divide framework



Definition of the digital divide and its components

- 1. First-level digital divide
- Physical access is the key component in the early discourse (Dewan & Riggins, 2005)
- Social dividends of internet access and web use depending on demographic characteristics such as income, education, and race were investigated (Hoffman, et al., 2000)
- Importance of the **diversity of devises** (hardware, software, and subscriptions, etc.) (van Deursen and van Dijk, 2019)
- 2. Second-level digital divide
- Critique against the binary differences between the "haves" and "have nots" regarding use and access to the internet (Hargittai, 2002)
- The use of ICT technology depends on the one's level of **internet skill** which is positively related with digital experience (Howard, et al, 2001)
- "digital divide" beyond just the access issue and broadened the meaning into four categories – the access divide, skill divide, economic opportunity divide, and the democratic divide (Mossberger, et al, 2003)

Definition of the digital divide and its components

- 3. Third-level digital divide
- inequality in digital outcomes (Wei et al., 2011)
- Types of offline outcome arising from IT use can be categorized as economic uses (job-related outcome), social uses (social interactions), educational uses (educational information), political uses (political participation), and institutional uses (public service) (van Deursen & Helsper, 2015).
- Hargittai and Walejko (2008) found that creative activity (creating and sharing video, music, writing and artistic photography, etc.) is correlated with a person's socioeconomic status and internet user skills.

The digital divide exists in developed countries:



Map: RG • Source: PCRD • Get the data • Created with Datawrappe

Source: Purdue University (https://pcrd.purdue.edu/the-state-of-the-digital-divide-in-the-united-states/)

The digital divide exists in developed countries:



Chart: RG • Source: PCRD • Get the data • Created with Datawrapper









Source: Purdue University (https://pcrd.purdue.edu/the-state-of-the-digital-divide-in-the-united-states/)



National Intelligent Informatization White Paper (National Information Society Agency, 2022)





National Intelligent Informatization White Paper (National Information Society Agancy, 2022)

- Major issues of intelligent informatization
- The New Government and Digital-based Government Administration
- Digital Economy in the Endemic Era
- Competition for Global Hegemony and New Engine for Growth
- Digital Coexistence and Social Integration
- With the expansion of the digital transformation, the digital divide is expanded to a divide in opportunity for social activity and economic benefit. The difference in digital equipment and utilizing ability leads to income, competitiveness, and bipolarization of economic power.
- Effort should be made to adopt digital technology actively within the workplace and acquire digital technology by the existing human resources to enhance work. In long-term, a plan for work and labor reorganization of an enterprise should be established, employees should accept the transformation to work utilizing digital in steps and learn digital technology. The education and support regarding digital technology should be expanded for lifelong education and work education.



Digital Learning Space (National Information Society Agency, NIA)

- "Digital Learning Space" is a place where all citizens can learn digital services necessary for everyday life near their homes. Over 1,000 of these spaces are operated annually.
- "Digital Experience Centers" are operated in 226 basic local governments, which are digital learning hubs. These centers are equipped with educational kiosks, online studios, tablets, AI speakers, and other devices to enhance digital experience, practice, and training.



Current Issues

- Negative Effects of Digital Technology: Digital Manipulated Information, Digital Expression of Hatred, Digital Sexual Crimes
- Exploring solutions based on public-private cooperation
- Development of **advanced technologies** such as deepfake detection and datadriven automated filtering
- Expansion of **prevention education** by targeting different social group
- Need for a control tower
- Capacity for Digital Right: the necessary abilities required to uphold the universal values of freedom, human rights, and solidarity in order to embrace and adapt to the transformative changes brought about by digital advancements
- (1) Capacity for Freely Utilizing and Understanding Information in the Digital Society; (2) Capacity to Protect and Safeguard One's Human Rights from Digital Harms; (3) Capacity for Collaboration with Others Based on Solidarity in the Digital Society



Data: Digital divide survey conducted by Korean government, National Information Society Agency (NIA) from year 2023.

For the 2023 survey, the number of observations are 7K for general public (including 2.3K senior citizens), around 2.2K for the disabled, lower-income group, farmers and fishermen, and 0.7K for North Korea defectors and married immigrants.

ТҮРЕ	FREQ.	PERCENT	CUM.
General Citizen	7,000	40.46	40.46
Farmers and Fishermen	2,200	12.72	53.18
Disabled	2,200	12.72	65.9
Low Income	2,200	12.72	78.61
North Korean Refugee	700	4.05	82.66
Married Immigrants	700	4.05	86.71
Senior Citizens	2,300	13.29	100
Total	17,300	100	

Digital capital framework – cross sectional study

Digital capital is defined as 'the accumulation of digital competencies (information, communication, safety, content-creation and problem-solving), and digital technology' Ragnedda and Ruiu (2020)



#	Categories	Survey item								
1	Technical skills	I can install/uninstall/upgrade programs on a PC and copy/delete/move/change files and folders								
		I can install/uninstall/update apps on smart devices.								
		I can use utility apps such as a calculator, scheduler (calendar), and address book on a smartphone.								
		I can utilize smart devices that are synchronized with a smartphone, such as smartwatches (Galaxy								
		Watch, Apple Watch), smart refrigerators, and Internet of Things (IoT) devices.								
		I can use online payment systems (Naver Pay, Kakao Pay, etc.) to purchase items								
2	Information skills	I can distinguish reliable information from search results by comparing it with other sources.								
		I can use reference materials or websites to discern misinformation (fake news).								
		I can modify settings (such as filtering features) to block harmful information.								
		I can find directions using navigation, online map services (Kakao Maps, Naver Maps, Google Maps, etc.)								
		and access traffic information.								
3	Communication	I can find and participate in online communities that align with my interests on the internet.								
	skills	I can engage in discussions about political and social issues or participate in activities such as signing								
		petitions and making appeals.								
		I can set the privacy settings when writing posts on social media or forums, determining the audience or								
		visibility of the content.								
		I know how to take temporary measures when there are instances of defamation or derogatory posts								
		about me online.								
		I know how to report when someone infringes upon my rights (such as defamation or copyright								
		infringement) on portals or social media platforms.								
4	Collaboration skills	I can collaborate with others on tasks or projects using online collaboration tools (such as Google Docs).								
		I can create and share documents using smart office suites (such as Evernote, Google Docs, Naver								
		Office, MS Office 365, etc.).								
		I can host/participate in meetings using remote conferencing apps (such as Google Meet, Zoom, etc.) for								
		virtual meetings.								

Note: survey items are answered in five scales from very negative(1) to very positive(5)



<Digital capital by age>



<Digital competence by age>



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 18

- Digital capital among the general public is primarily due to differences in digital competence rather than digital access.
- Younger individuals, men, those with higher incomes, and those living in urban areas tend to maintain higher levels of digital capital.



* Under 50 years old, male, monthly income of 4 million won or more, urban resident, with at least a university education.



Data and Descriptive Statistics from ROK case

<Mean comparison between general population and age>50, digital utilization>





Data and Descriptive Statistics from ROK case



<Using financial transaction services>





<Using social media>

<Using public services>



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 21

Comparison between South and North Korea



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22

Comparison between South and North Korea

	S. Korea general citizens (2023)			N.Korean refugees (2023)			N.Korea general citizens (2018)		
	Female (3,484)	Male (3,516)	All (7,000)	Female (532)	Male (168)	All (700)	Female (8,763)	Male (4,179)	All (12,942)
Computer									
Ever used	100.0	100.0	100.0	100.0	100.0	100.0	41.7	51.0	44.7
Use occasionally	56.1	41.6	48.8	63.4	48.2	59.7	32.8	44.2	36.5
Use frequently	43.9	58.4	51.2	36.7	51.8	40.3	21.4	33.0	25.1
Mobile phone									
Own a phone	100.0	100.0	100.0	100.0	100.0	100.0	47.9	55.7	50.4
Use occasionally	9.5	5.1	7.3	13.2	10.1	12.4	82.5	88.8	84.5
Use frequently	90.5	94.9	92.7	86.8	89.9	87.6	64.4	69.9	66.2
Internet									
Ever used	94.3	97.6	96.0	99.6	98.8	99.4	6.2	13.9	8.7
Use occasionally	2.7	1.9	2.3	12.5	7.2	11.2	5.2	11.6	7.3
Use frequently	97.3	98.1	97.7	87.6	92.8	88.8	3.7	7.9	5.1

Note: For the sample of North Korean residents, "used occasionally" refers to having used it at least once in the last three months; "used frequently" is measured as usage at least once a week over the last three months. For South Korean residents and North Korean defectors, "used occasionally" refers to using it four days or less in the last month, while "used frequently" refers to using it more than four days in the last month. The internet usage of South Korean residents and North Korean defectors is measured such that "used occasionally" means not using it in the past month, while "used frequently" refers to having used it within the last month. **Source**: The North Korean survey is cited from the report by Lee Jong-kyu et al. (2019), which references the results of the UNICEF MICS (2018) survey; the South Korean survey is from the NIA Digital Information Gap Survey (2023).

23

Comparison between South and North Korea

	S. Korea general citizens (2023)			N.Korean refugees (2023)			N.Korea general citizens (2018)		
	By age	By region	By income	By age	By region	By income	By age	By region	By income
Computer									
Ever used	-	-	-	-	-	-	37.5	30.4	42.7
Use occasionally	26.4	15.5	40.0	29.8	-	-	42.6	37.1	52.2
Use frequently	11.5	15.3	45.4	22.8	-	-	46.3	51.6	61.6
Mobile phone									
Own a phone	-	-	-	-	-	-	23.4	25.6	57.2
Use occasionally	52.0	31.1	131.1	82.3	-	-	5.5	11.7	19.1
Use frequently	0.5	2.5	14.2	6.2	-	-	11.2	19.5	38.5
Internet									
Ever used	0.1	1.9	9.2	0.0	-	-	41.9	99.8	90.8
Use occasionally	41.2	46.8	117.5	84.9	-	-	43.8	113.6	93
Use frequently	0.3	1.1	3.9	5.8	-	-	46	136.1	102.8

<Coefficient of variation>

Note: For the sample of North Korean residents, "used occasionally" refers to having used it at least once in the last three months; "used frequently" is measured as usage at least once a week over the last three months. For South Korean residents and North Korean defectors, "used occasionally" refers to using it four days or less in the last month, while "used frequently" refers to using it more than four days in the last month. The internet usage of South Korean residents and North Korean defectors is measured such that "used occasionally" means not using it in the past month, while "used frequently" refers to having used it within the last month.

(Age groups) 15–19 years; 20–24 years; 25–29 years; 30–34 years; 35–39 years; 40–44 years; 45–49 years. The regional classifications used are based on the respective classifications of North Korea and South Korea.

(Income groups) Divided into the bottom 20%, middle 40%, and top 40% by wealth. In the case of South Korea, it is classified by household monthly income into less than 3 million won, 3 million won to less than 5 million won, and 5 million won or more.

Source: The North Korean survey is cited from the report by Lee Jong-kyu et al. (2019), which references the results of the UNICEF MICS (2018) survey; the South Korean survey is from the NIA Digital Information Gap Survey (2023).



Policy Implications

- 1. The level of digital capital varies among different social groups, highlighting the greater need for capacity building in digital competences rather than focusing solely on digital infrastructure development.
- 2. Senior citizens group exhibit a lower level of digital capital, digital competence and utilization. Although the South Korean government's digitalization policy has progressed from building infrastructure and promoting informatization to developing AI, and now includes digital learning spaces and digital experience centers, support for senior citizens should be enhanced.
- 3. North Korean refugees demonstrate a comparable level of digital capital, including both access and competence. Their use of computers, mobile phones, and the internet is significantly higher than that of citizens in North Korea, but remains lower than that of South Korean citizens.
- 4. When calculating the coefficient of variation by age, North Korean refugees show a high variation in occasional use of digital equipment, but a lower variation in frequent use.



Thank you



