

# A Study on the Digital Divide Analysis of the Older People from a Sociodemographic Perspective

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**Abstract:** *In the modern knowledge and information society, knowledge and ability to use information are becoming essential literacy of modern people. This information ability is becoming the driving force that allows people to enjoy a prosperous life and at the same time, it is becoming the competitiveness of an individual and society. However, there is a class in our society that cannot enjoy benefits from such information society, and the representative class is the older people. In this study, the current status of the digital divide among the older people in Korea is investigated and analyzed. For objective analysis, it was based on national statistical data conducted by the Korea Information Society Agency for the last three years. In addition, this study analyzes the digital divide of the older people in Korea by sub-factors of the digital informatization level, gender, age, and monthly income. As a result of the analysis, among the three sub-factors of the digital informatization level, the competency factor has the largest digital divide, and in terms of gender, the digital divide is greater for women. In addition, it was found that the higher the age by age and the lower the income by monthly income, the greater the digital divide. The results of this study are expected to serve as valuable basic data for preparing academic research and policies to resolve the digital divide of the older people in the future.*

**Keywords:** *digital divide; older people; digital informatization level; information and communication technology; digital technology*

## 1. Introduction

The modern information society provides convenience in our lives in many ways. In other words, various information technologies and smart technologies are making our lives more prosperous. Now, recent information and communication technologies are becoming essential knowledge of modern people, and these technologies are becoming a measure of competitiveness in modern people's lives. In other words, the good understanding and use of information and communication technology is upgrading a person's various lifestyles, such as jobs, hobbies, and leisure. In addition, these information and communication technologies are increasing the distribution of information in a society, leading to a fair and equal society, such as accusations of social corruption. Also at the national level, information and communication technology is a measure of a country's competitiveness, and various countries are making efforts to develop the information and communication industry.

On the other hand, despite the importance of information and communication technology, there may be classes that do not enjoy benefits in a society. These classes are called the information underprivileged, and the information underprivileged creates a so-called digital divide that has a lower level of informatization compared to the general public. According to the law, the digital divide refers to "differences in opportunities to access or use information and communication services through information and communication networks due to economic, regional, physical or social conditions" [1]. The digital divide is the

cause of preventing an individual from enjoying the benefits of an information society and can cause social and national problems as well as personal problems.

Currently, in Korea, as of 2023, there are six classes of the information underprivileged, including the disabled, the older people, the low-income class, farmers and fishermen, North Korean defectors, and marriage immigrants [2]. As of 2023, the class with the largest digital divide based on the general public is the older people. Korea's digital divide analysis is analyzed through the digital informatization level of the Korea Information Society Agency. The digital informatization level refers to the relative level of the information underprivileged, assuming that the general public's digital informatization level is 100.

The digital informatization level has three sub-factors as follows, and the ratio of each factor to the total digital informatization level is as follows [2,3,4].

-Digital Access Level (20%)

Internet access and possession of information devices

-Digital Competency Level (40%)

PC and mobile device use capabilities

-Digital Utilization Level (40%)

Whether to use the wired or wireless Internet and whether to use various Internet services

Compared to the general public, the digital informatization level of the older people is the largest compared to the other five information underprivileged groups [2]. In addition, the level of digital informatization is in the order of the highest, followed by the low-income class, marriage immigrants, North Korean defectors, the disabled, farmers and fishermen, and the older people.

This study analyzes and discusses the digital divide among the older people in Korea from a sociodemographic perspective. Specifically, we analyze the digital divide by sub-factor of the digital informatization level, gender, age, and monthly income for the older people. The composition of this paper is as follows. Chapter 2 introduces related studies. Chapter 3 introduces the data and analysis methods used for the analysis of the digital divide in the older people. Chapter 4 introduces the current status of the digital divide, the results of the analysis of the digital divide, and the implications of the analysis results of the older people. Chapter 5 presents conclusions

## 2. Related Research

This chapter introduces a previous study on the digital divide among the older people in Korea as follows.

Yoo confirmed that the problems of the older people who have difficulty collecting and using information are not just personal problems but basic human rights under the constitution, analyzed the problems caused by the digital divide of the older people, and suggested technical, social, and legal solutions to solve them. In particular, he argued that the right to remove information obstruction and the right to resolve the digital divide should be prepared in order to substantially

guarantee the nation's right to access information of the older people as a basic human right [5].

Park focused on the potential of smart mobile media to overcome the digital divide among the older people and explored its utility and limitations. In particular, with the emergence of the COVID-19 pandemic, non-face-to-face services have become commonplace in social fields, factors influencing smart media on digital economic activities of the older people population such as financial services and e-commerce have been identified, and argued that a differential approach is needed for each area of use to embrace the digital of the older people population [6].

In the study of Hwang and Jeon, the trend of the digital divide among the older people was analyzed through social network analysis. Specifically, the digital divide of the older people over 26 years was identified by dividing it into five categories: type of digital divide, support project, support environment, social problem, and other problem. In addition, academic and practical implications were proposed to bridge the digital divide among the older people that occurs in the current society as a whole [7].

Choi and Kim analyzed the effects of the digital divide on daily life, the patterns of changes in the quality of life in old age according to the digital divide, and the ability of the older people to use smart devices or digital information. In addition, various measures to reduce the digital divide for the older people were proposed [8].

Kim and Byun analyzed the interrelationship between digital information capabilities and information use of the older people. As a result of the analysis, psychological variables such as perceived usefulness, self-efficacy, and confidence were found to have a positive effect on information competency, and social factors such as digital assistance along with psychological factors such as self-efficacy and confidence were found to have a positive effect on information use, confirming that there was a difference in the influencing factors between information competency and information use [9].

Ko and Park categorized the method of using digital assistants to help the older people use information and analyzed the differences in the level of digital informatization between individual characteristics and types that distinguish the types of use. The use of digital assistants was divided into four groups: family dependence type, professional manpower use type, digital assistant use type, and high use type. As a result of examining how demographic characteristics and the level of digital informatization differ by four types, it was found that vulnerable groups according to demographic characteristics and socioeconomic characteristics, such as low income, low education, residents in military areas, and women, not only have low utilization in digital assistants, but also mainly use informal assistants such as families, and the level of digital informatization is low. This result was interpreted to show that inequality in the demographic aspect is repeatedly appearing in the use of digital assistants [10].

Park examined how the third-level digital divide(digital information utilization ability) of the middle and old aged, who are vulnerable to information in Korea, differs from the overall age group by Internet access medium. Specifically, the effect of Internet activities using PC and mobile on digital use performance was analyzed for the older people and all age groups. As a result, it was found that in the case of the entire age group, there was no difference between PC and mobile media, whereas in the case of the older people, two activities, such as mobile social relations services and information production sharing, affect usability [11].

### 3. Materials and Methods

#### 3.1. Data

In this study, statistical data of the Korea Information Society Agency were used to analyze the digital divide of the older people. The Korea Information Society Agency(<http://www.nia.or.kr>) has investigated the current status of digital divides at the national level since 2002. Early information underprivileged groups were farmers and fishermen, low-income class, the disabled, and the older people, but since 2012, marriage immigrants and North Korean defectors have been included.

Also, in this study, in order to accurately and objectively analyze the digital divide of the older people in Korea, the most recent statistical data for 2023, 2022 and 2021 were referenced. In this study, the older people mean 50 years of age or older. In addition, in this study, the digital divide was analyzed from four perspectives in order to analyze the digital divide of the older people socially and demographically. First, the analysis was performed in terms of three sub-factors of the digital informatization level: information access, information utilization, and information competency, respectively. Second, the digital divide was analyzed by gender. Third, the digital divide was analyzed by age. Age was analyzed based on three classification criteria: 50s, 60s, and 70s or older. Finally, the digital divide was analyzed by monthly income. Monthly income was classified into five categories. That is, it was classified into categories of 1 million won or less, 1 to 1.99 million won, 2 to 2.99 million won, 3 to 3.99 million won, and 4 million won or more.

#### 3.2. Study Methods

The collected data in this study were analyzed using the SPSS (Statistical Package for the Social Science) WIN 27.0 program. As an analysis method, ANOVA(variable analysis) and t-test(verification) were conducted to find out the digital informatization level of the older people. In addition, Scheffe verification was performed as a post-test.

In this study, the following four hypotheses were established by digital informatization level, gender, age, and income, respectively.

Hypothesis 1:

Access level, utilization level, and competency level are in the highest order for each sub-factor of digital informatization level

Hypothesis 2:

Men have a higher level of digital informatization level than women

Hypothesis 3:

As the age increases, the digital informatization level decreases

Hypothesis 4:

As monthly income increases, the digital informatization level increases.

### 4. Analysis Results and Discussion

#### 4.1. The Current Status of the Digital Divide of the Older People

The followings show the current status of the digital divide among the older people in the last three years.

First, Table 1 shows the digital informatization level by three sub-factors. It was assumed that the digital informatization level of the general public was 100.

**Table 1. Digital Informatization Level by 3 Sub-factors**

Year	Access Level	Competency Level	Utilization Level
2021	93.1	53.9	72.3
2022	95.1	54.5	72.6
2023	95.3	55.3	73.8

Table 2 shows the digital informatization level by gender in the last 3 years. It was assumed that the digital informatization level of the general public was 100.

**Table 2. Digital Informatization Level by Gender**

Year	Man	Woman
2021	79.4	65.0
2022	77.1	68.6
2023	79.6	67.8

Table 3 shows the digital informatization level by age over the last three years. It was assumed that the digital informatization level of the general public was 100.

**Table 3. Digital Information Level by Age**

Year	50s	60s	70s and older
2021	96.8	77.1	46.5
2022	92.1	75.5	55.6
2023	96.8	78.6	51.5

Table 4 shows the digital informatization level by monthly income over the past three years. It was assumed that the digital informatization level of the general public was 100.

**Table 4. Digital Informatization Level by Monthly Income**

Year	Less Than 1	1 ~ 1.99	2 ~ 2.99	3 ~ 3.99	More Than 4
2021	34.6	52.4	65.1	79.8	92.9
2022	41.9	55.6	71.1	75.0	87.7
2023	40.3	50.2	64.3	78.7	92.4

(Unit of Average Monthly Income: Million Won)

#### 4.2. The Analysis Results

Table 5 shows the results of examining the digital informatization level by 3 sub-factors of the older people.

**Table 5. Analysis Results by subfactors of digital informatization level**

Subfactor	Mean	Standard Deviation	F	p	Scheffe
Access Level <sup>a</sup>	94.50	1.22	1381.31***	0.0000	a>b,c b<c
Competency Level <sup>b</sup>	54.57	0.70			
Utilization Level <sup>c</sup>	72.90	0.79			

\*\*\* p<0.001

Looking at each subfactor of digital informatization level of the older people, the average access level was the highest at 94.50, followed by the utilization level of 72.90 and the competency level of 54.57 and statistically significant differences were shown (F=1381.31, p<0.001). In addition, as a result of post-verification, there were significant differences in access level and competency level, access level and utilization level, competency level and utilization level. Therefore, it can be seen that the access level of the older people is the highest among digital informatization.

Table 6 shows the results of examining the digital informatization level by gender of the older people.

**Table 6. Analysis Results of Digital informatization level by Gender**

Gender	Mean	Standard Deviation	F	p
Man	78.70	1.39	8.54**	0.001
Woman	67.13	1.89		

\*\* p<0.01

In terms of gender, the average of men was 78.70, higher than the average of 67.13 for women, and there was a statistically significant difference (t=8.54, p<0.01). Therefore, it can be seen that the elderly male has a higher level of digital informatization than the elderly female.

Table 7 shows the results of examining the digital informatization level by age of the older people.

**Table 7. Analysis Results of Digital informatization level by Age**

Age	Mean	Standard Deviation	F	p	Scheffe
50s <sup>a</sup>	95.23	2.71	144.32	0.000	a>b,c b>c
60s <sup>b</sup>	77.07	1.55			
70s and Older <sup>c</sup>	51.20	4.56			

\*\*\* p<0.001

By age, the average of the older people in their 50s was the highest at 95.23, followed by 77.07 in their 60s and 51.20 in their 70s and older, showing a statistically significant difference (F=144.32, p<0.001). In addition, as a result of post-verification, there were significant differences among those in their 50s and

60s, 60s and 70s and older, and 60s and 70s and older. Therefore, it can be seen that the older the older people, the lower the digital informatization level.

Table 8 shows the results of examining the digital informatization level according to the average monthly income of the older people.

**Table 8. Analysis Results of Digital informatization level by Monthly Income**

Monthly Income	Mean	Standard Deviation	F	p	Scheffe
Less than 1 <sup>a</sup>	38.93	3.84	124.32***	0.000	a<b,c,d,e b<c.d.e c<d.e d<e
1 ~ 1.99 <sup>b</sup>	52.73	2.72			
2 ~ 2.99 <sup>c</sup>	66.83	3.72			
3 ~ 3.99 <sup>d</sup>	77.83	2.51			
More than 4 <sup>e</sup>	91.00	2.87			

\*\*\* p<0.001

In terms of average monthly income, the average of more than 4 million won was the highest at 91.00, followed by 3 to 3.99 million won at 77.83, 2 to 2.99 million won at 66.83, 1 to 1.99 million won at 52.73 and less than 1 million won at 38.93 and statistically significant differences were shown (F=124.32, p<0.001). In addition, as a result of post-verification, there were significant differences: less than 1 million won and less than 1 to 1.99 million won, less than 1 million won and less than 2 to 2.99 million won, less than 1 million won and more than 3 to 3.99 million won, less than 1 million won and more than 4 million won, less than 1 million won and more than 4 million won and less than 2 to 1.99 million won and more than 3 to 3.99 million won, more than 100 to 1.99 million won and more than 4 million won, more than 200 to 2.99 million won and more than 3 to 3.99 million won, more than 200 to 2.99 million won and more than 4 million won. Therefore, it can be seen that the higher the average monthly income, the lower the digital informatization level of the older people.

#### 4.3. Implications

The results of the digital divide analysis of the older people in Korea introduced in Section 4.2 can be interpreted as follows.

First, as a result of the analysis in Table 5, among the three sub-factors that make up the digital divide, the access level was the highest, followed by the utilization level and the competency level. This can be interpreted as that the older people have good access to information devices and the Internet and can use various digital information services well, but the ability to use PC and mobile devices is relatively low. Based on these analysis results, a system that can promote or systematically educate the older people about their ability to use information devices will be needed in the future.

Second, as a result of the analysis in Table 6, the digital divide is larger in women than in men. In other words, the digital informatization level can be seen as higher in men than in women. This is a study that requires a detailed analysis, and the reason why men have a higher level of digital informatization than women require an in-depth analysis in the future. Conceptually, the reason why men are more active and need to live more social life than women result in that men need to be more actively familiar with information life and use information services and information devices more.

Third, as can be seen from Table 7, as a result of analyzing the digital divide for the older people in their 50s or older, it can be seen that the higher the age, the larger the digital divide. In order to analyze the cause of the digital divide by age, in-depth research is needed by analyzing various factors. However, it can be interpreted that as the age increases, access to information devices and information services decreases, and the ability to use naturally decreases. In the reality that various countries around the world are entering an aging society, it can be seen that informatization education for the older people is more necessary.

Finally, as shown in Table 8, as a result of analyzing the digital divide of the older people by average monthly income, the smaller the monthly income, the larger the digital divide. In other words, the higher the monthly income, the higher the level of digital informatization. This means that the higher the monthly income, the higher the access to information devices and information services, and the higher the ability to use them. Therefore, among the various measures to solve the digital divide of the older people, economic support measures should also be considered.

## 5. Conclusions

In order to live a rich life in the modern society, everyone needs to understand and utilize information. In addition, as various information devices and information services flood, the ability to judge information properly is required. It is expected that the life of dependence on such information will deepen in the future. However, there are classes that cannot benefit from such informatization for various reasons, such as economic poverty and physical defects. These classes are called the information underprivileged and need support at the national level.

In this study, the digital divide of the older people in Korea was analyzed from a sociodemographic perspective. Specifically, the digital divide of the older people was analyzed by sub-factors of the digital informatization level, which is a measure of the digital divide, gender, age, and average monthly income. For a more objective analysis, the survey data on the digital divide in the last three years of the Korea Information Society Agency, that is, from 2021 to 2023, were used. The analysis results are as follows. First, among the three sub-factors of the digital informatization level, it is lowered in the order of access level, utilization level, and competency level. By gender, women have a larger digital divide than men, and by age, the larger the digital divide as the age increases. In addition, it was shown that by average monthly income, the lower the income, the larger the digital divide. Based on these analysis results, more in-depth measures to reduce the digital divide of the older people should be prepared in the future, and systematic and long-term informatization education for the older people is needed.

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