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Digital Divide and Life Satisfaction among Married Immigrant Women in Korea

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Abstract

The present study examines the determinants for married immigrant women to access mobile Internet, their skills and usage, and the effects of these factors on their life satisfaction. Using the Digital Divide Survey 2017, this study analyzes the demographic characteristics of married immigrant women, their attitude towards technology and the Internet, family support on the digital divide, and the effects of these factors on their life satisfaction. The results show that age, monthly household income, attitudes, and family support have significant effect on immigrant women's mobile Internet access. It is also indicated that age, country of origin, monthly household income, attitudes, and mobile Internet skills are significant factors influencing mobile Internet usage. Furthermore, married immigrant women's mobile Internet usage has a positive effect on their life satisfaction. Based on these results, this study suggests policy suggestions for improving mobile Internet access for women, skills, and usage, as well as their life satisfaction.

Key words

digital divide, mobile Internet, life satisfaction, married immigrant women

Introduction

Multiculturalism has accelerated the inflow of married immigrants, and foreign workers in the Korean society. The total number of married immigrant women increased from 87, 964 in 2007 to 160, 653 in 2017 (Statistics Korea, 2018). The

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transition to a multicultural society is an inevitable phenomenon, and an increase in the number of married immigrants could cause new social challenges. Data from the National Survey of Multicultural Families show that 85% of married immigrants, and naturalized citizens have been experiencing difficulties in their new lives in Korea (Ministry of Gender Equality and Family, 2016). The government has implemented various multicultural policies to help married immigrant women settle comfortably in Korean society. Many married immigrant women continue to encounter cultural differences, language problems, economic difficulties, and conflicts, especially concerning family and childcare. Such difficulties and conflicts can reduce satisfaction, and quality of life.

The life satisfaction of married immigrant women is closely related to their social adaptation, and social integration. Previous research on married immigrant women's life satisfaction generally focused on their Korean language skills, social and cultural adaptation, child-rearing practices, and marital relationships. This study focuses on the digital divide of married immigrant women, and its effects on their life satisfaction. The Digital Divide Survey shows that the digital informatization level of married immigrant women has been improving year on year. However, it is still lower than that of the overall society (National Information Society Agency, 2018). Differences in access to, and use of, digital technology between married immigrant women and the society could lead to the expansion and reproduction of several social structural inequalities (Helsper, 2012; Schiller, 1996; van Dijk, 2005). Inequality caused by the digital divide not only limits the socio-economic participation and opportunities of married immigrant women, but also negatively affects their individual life satisfaction (Williams & Mohammed, 2009).

The digital divide observed among married immigrant women can be attributed to various factors. Some scholars have emphasized that differences in Internet access and skills mainly depend on individuals' demographic and socio-economic levels (Hargittai & Hinnant, 2008; van Deursen & van Dijk, 2019; Zillien & Hargittai, 2009). As the debate regarding Internet usage and the digital divide continues, interest in the psychological motivations of Internet users have increased (Kalmus, Realo, & Siibak, 2011; van Deursen & van Dijk, 2014). This is because there is a difference in the level of qualitative use of digital technology as per the purpose and motivation of the users. Social support should be also emphasized because of the characteristics of married immigrant women (Helsper & van Deursen, 2017). Family support can have a positive effect on the life satisfaction of married immigrant women by facilitating the use of mobile Internet, and pro-

moting social and cultural adaptation. Analyzing the factors related to life satisfaction is important to understand how they take advantage of the opportunities afforded by the mobile Internet.

In this context, the purposes of this study are to examine the following research questions:

RQ 1: How do married immigrants' attitudes toward mobile Internet and family support for married immigrants' mobile Internet use relate to the mobile Internet access (first-level digital divide) and mobile Internet skills and usage (second-level digital divide)?

RQ2: How do mobile Internet access, skills and usage relate to the married immigrants' life satisfaction as outcomes of Internet use?

Background

Digital Divide and Its Multidimensionality

In general, the concept of digital divide refers to differences in the Internet access, technology, and use according to individual preferences. The discussion on digital divide has shifted its focus to digital access (Level 1), digital skills and use (Level 2), and outcomes (Level 3). This reflects the characteristics of the diffusion stages of digital technology. Molnár (2002) distinguishes the diffusion stages of digital technology into early adaptation, take-off, and saturation, and describes the characteristics of the digital divide at each stage. He discusses the existence of an access gap in early adaptation, which is the difference between those who can access digital technology, and those who cannot. Internet access difference refers to the material access gap that is determined by whether computers or mobile devices can access wired and wireless Internet (van Dijk, 1999). The take-off stage creates a quantitative gap in the use of information, which is the difference between digital users and non-users. In the saturation stage, the gap in the utilization of qualitative information among users is intensified. In this context, many studies have defined the difference in Internet skills that enable its use as a second-level digital divide (Correa, 2010; DiMaggio & Hargittai, 2001; Hargittai & Hinnant, 2008; Hargittai & Walejko, 2008).

The concept of qualitative use refers to the "meaningful use of information" (Selwyn, 2004). Quality of use reflects the use of information, and the diversity of activities. Many studies have argued that information pursuit, entertainment, social

communication, and economic activity occur in the form of digital technology usage (Büchi, Just, & Latzer, 2016; Helsper & Gerber, 2012; LaRose & Eastin, 2004). Rather than quantitative digital use, it is important to select, and utilize information that one finds meaningful. This is because there can be a difference between those who use digital devices for productive consumption, and those who simply use them (van Dijk, 2005). The differences in the quality of information production, socio-economic activities, or economic engagement through digital technology use among married immigrant women can determine the differences in their socio-economic capital (Lee, 2019).

The qualitative use of information by married immigrant women may vary, depending on their digital abilities. This difference is because the use and scope of a given piece of information may differ qualitatively, based on digital skills (Hargittai & Hinnant, 2008; Livingstone & Helsper, 2007; van Dijk, 2005). Digital skills refer to the technical competencies required to use digital devices (van Deursen, Helsper, & Eynon, 2016). The following skills are required to use the Internet:

- The ability to manipulate digital devices and software (or application), including smartphones (operational and mobile skills)
- The ability to search, collect, share, and create online information (information navigation and creative skills)
- The ability to understand and exchange meaning through online communication and interaction (social skills)

The concept of the digital divide has now been expanded to include not only access to digital devices, but also concepts that encompass both frequency and variety of the Internet use (Correa, 2010; Hargittai & Hinnant, 2008; Hargittai & Walejko, 2008). This reflects the fact that the concept of the digital divide is now being expanded into social and cultural arenas, rather than being limited to technical fields. Recent studies have emphasized the multidimensional, and hierarchical structure of the digital divide. A higher rate of digital access is associated with a greater amount of usage, and a higher level of digital skills is associated with greater diversity in terms of Internet use. This implies that there is a hierarchical relationship between digital access, skills, and use. The digital divide of married immigrant women is analyzed as a multi-faceted phenomenon that occurs in the process of digital access, skills, and use.

Determinants of Digital Divides

Demographic Characteristics

Previous studies on digital divide have shown that the Internet access, skills, and use are unequally distributed among individuals with different demographic characteristics (e.g., Helsper, 2010; Scheerder, van Deursen, & van Dijk, 2017). Zillien and Hargittai (2009) show that people with higher education and employment are more likely to engage in capital-raising activities conducted via the Internet. Blank and Grošelj (2015) describe people with high social status as tending to benefit more from the Internet use. Hale, Cotton, Drentea, and Goldner (2010) explain the digital divide in residential areas by reporting that people living in rural areas have relatively low access to broadband Internet. Büchi, Just, and Latzer (2016) explore that socio-demographic variables, such as age, gender, education, and employment status, cause differences in the Internet use. van Deursen and van Dijk (2014) found that the Internet use is higher in males than females, in urban areas than rural areas, and that information-pursuit activities are higher in among the young, and among those with higher education and income levels. Internet games, however, are more actively pursued among women, younger age groups, less educated groups, and by those living in the urban areas.

Many studies have shown that immigration affects digital divide. Ono and Zavodny (2008) indicate that the people who came as immigrants to the U.S. have lower rates of computer ownership, and Internet access than immigrants' children born in the U.S. Haight, Quann-Hasse, and Corbett (2014) reveal that while new immigrants to Canada have lower rates of the Internet access, they have higher levels of online use than early immigrants. Kim (2018) examined specific differences in mobile Internet use among married immigrant women. The use rate of search services on mobile devices was the highest among women in their 20s and 30s, women in their 30s had the highest use of mobile life services, and those in their 20s were involved in information production and sharing. Oh (2013) reports that married immigrant women from China have a greater level of Internet access than women from Japan. Employed immigrant women also have a higher level of Internet use than unemployed women. Im (2013) found that married immigrant women in their 40s have higher levels of information access than other age groups. The Internet use rate of married immigrant women is reported to be higher among those in their 40s, those living in urban areas, and those from China. It is generally agreed that individual factors are determinants of the digital divide. Therefore, it is necessary to analyze the influence of demographic variables on mobile Internet ac-

cess, skills, and use. The following hypotheses were formulated to analyze the demographic factors that characterize married immigrant women, and their effects on mobile Internet access, skills, and usage.

[H-1] How do demographic factors (age, education, residence, nationality, residence period in Korea, employment, and income) affect mobile Internet access, skills, and use amongst married immigrant women?
Motivational factor: attitudes toward mobile Internet.

The digital divide focuses on Internet skills and use. Katz, Hadassah, and Gurevitch (1973) model such use and gratification as follows: media consumers are active actors who seek to satisfy their psychological needs, and choose, use, and achieve constant satisfaction to meet their needs. The use and gratification model emphasizes that the use of information by media literate individuals may be influenced by specific demographic or social factors, as well as motivating factors, such as individual desire and satisfaction. Thus, this model can provide a theoretical basis for explaining the use of the Internet. Based on the theory of use and gratification, previous studies related to digital technology diffusion have suggested that attitudes toward technology and the Internet could affect the ability to use information and content (Broos & Roe, 2006; Correa, 2010). McQuail, Blumer, and Brown (1972) suggest that the desire for media use can be divided into information pursuit, building social relationships for interacting and communicating with others, entertainment, self-development, and expression-related needs. Although different digital users may have different desires, all users use digital devices or information to meet their needs, and in the process, are satisfied with the content that they consume.

According to van Dijk's (2005) model of Internet access, the first level of access —motivational access—is primarily shaped by attitude towards technology. van Deursen and van Dijk (2014) also show that attitude towards technology and the Internet are closely related to the types of Internet use: information, news, self-development, social interaction, leisure, commercial transactions, and gaming. Based on these studies, attitude towards technology and the Internet are used as motivational variables to use the mobile Internet. Married immigrant women's attitudes toward technology and the Internet vary according to their respective characteristics, and this can be considered as a factor for determining the level of mobile Internet access, skills, and use. Therefore, this study establishes the following hypotheses on the relationship between married immigrant women's attitudes

toward technology and the Internet, mobile Internet access, skills, and use.

[H-2] The more positive the attitude toward technology and the Internet, the higher the level of mobile Internet access, skills, and use amongst married immigrant women. Social Support: Family Support.

Social capital has been considered an important factor in an individual's Internet access, skills, and use (DiMaggio & Hargittai, 2001; Selwyn, 2004). van Dijk (1999) emphasizes that physical access to technology requires skills, knowledge, and support to promote effective Internet use. Social resources (family, friends, neighbors, and peers) can influence the effective and continued use of the Internet (DiMaggio, Hargittai, Celeste, & Shafer, 2004; Murdock, Haartmann, & Gray, 1996, p. 273; Selwyn, 2004). Social support refers to the psychological and material resources provided by individuals through social networks (Cohen, 2004, p. 676). Social support has always been regarded as an essential aspect of a stable life and settlement because it serves to supplement the scarce resources of married immigrant women (Shin, 2016, p. 176). Social support helps to prevent and relieve stress for immigrant women, and ensures physical and mental health.

Family support, a form of social support, can be an important factor in the use of social services by married immigrant women (Abu-Ras, 2007). It includes emotional comfort, cognitive information, advice, and material support provided by family members, along with the emotional and social resources that can be gained from family relationships. For married immigrant women, family support is an important resource to overcome the difficulties that they face as they adjust to the Korean society and culture.

According to the Digital Divide Survey 2017, 88.9% of "involuntary non-users," who are willing to use the Internet but do not have the qualifications, "do not know how to use it or find it difficult to use" (NIA, 2018). This is a common phenomenon experienced by married immigrant women, regardless of their nationality. For such women, support from family members can be a very effective alternative to learning, and adapting to digital access and use. Family members are often primary helpers for married immigrant women who struggle with digital device use (Kim, 2018; Lee, 2013). Since most married immigrant women do not speak Korean fluently, their families can effectively help with the use of digital information. Family support can also provide the necessary information to married immigrant women for their daily lives, social services, and economic activities, which can positively improve the use of digital information. The following hypoth-

eses are formulated on the relationship between family support, and the digital divide experienced by married immigrant women.

[H-3] The more positive the attitude toward technology and the Internet, the higher the mobile Internet access, skills, and use amongst married immigrant women. Life Satisfaction

Differences in the access and use of information devices can worsen social inequality (Ragnedda & Kreitem, 2018). Recent studies on the digital divide have focused on not only what is information, how much of it is used, and how it is used, but also on the outcomes of information use (Lee, 2019; Ragnedda, 2017; van Deursen & Helsper, 2015). There are differences between groups in terms of the effects obtained through digital information access, skills, and utilization (Stern, Adams, & Elsasser, 2009; van Deursen, Courtois, & van Dijk, 2014). Selwyn (2004) points out that many studies on digital divide focus on means of information access rather than information access and its usage. He emphasizes that information access, and usage-related outcomes, impacts, and consequences should be at the center of the discussion on digital divides.

What are the potential results of accessing and using such information? This study focuses on life satisfaction. Life satisfaction refers to a subjective judgment or feeling about how satisfied one is with one's life (Campbell, 1998). Previous studies have argued that information level can have a positive effect on the quality of life or life satisfaction. Hargittai and Hinnant (2008) confirm that Internet skills can enhance human, economic, and social capital. Prior (2007) indicates that diversity in information use can influence content production, political and social participation, and socio-cultural gaps. Gezduci and d'Haenens (2007) also emphasize that the Internet can contribute to improved life satisfaction by providing immigrant users with opportunities to communicate and interact with others. Several studies indicate that the gap in the qualitative use of digital information can affect the quality of life (Min, 2011; Song, 2014). These studies have shown that higher level of digital information access, skills, and utilization can positively affect the quality of life by enhancing an individual's political, economic, and socio-cultural capital activities.

Several socio-demographic variables, including psychological and family support, can explain individual differences in life satisfaction. Previous studies have shown that economic and social capital, and socio-demographic variables can affect life satisfaction (Moon, 2016; Park & Lee, 2005). Psychological and social fac-

tors of married immigrant women can have significant effects on their life satisfaction. Married immigrant women's daily life satisfaction can vary, depending on how well their needs and expectations are met, and realized. Family support, including support from husbands and other family members, family advice, and emotional bonding can have positive effects on the quality of life of these women (Moon, 2016). The individual characteristics of married immigrant women, and access to digital information, skills, and utilization are expected to improve the socio-economic capital. Women can achieve them by participating in various fields, which, in turn, will positively affect their life satisfaction. Therefore, the hypothesis on the relationship between the determinants underlying the digital divide, and the resulting factors among married immigrant women is proposed as follows.

[H-4] How does the digital divide (accessibility, skill, utilization) of married immigrant women affect their precedents in relation to life satisfaction?

Method

Data

This study utilized data from the Digital Divide Survey 2017 of the National Information Society Agency (NIA). In the survey, the population of married immigrants is defined as foreigners aged 18 or more who are married to Korean citizens, and with civil unions registered under the Multicultural Families Support Acts of August 1, 2017. A total of 700 samples were analyzed, according to gender, age, nationality, and proportional allocation by region. Data were collected through face-to-face interviews, based on a structured survey (National Information Society Agency, 2017) conducted from September to December 2017. Among the 700 married immigrant women included in the study sample, 681 were women and 19 were men. The data of 681 women were first extracted. 63 respondents were also deleted, including non-response on residence period (41) and non-response on average monthly income (22). The data of 618 were used for the final analysis. Table 1 lists the characteristics of the samples. The collected data were analyzed using STATA for descriptive statistics, internal consistency analysis for reliability verification, and exploratory factor analysis for validity verification. Logistic regression and hierarchical multiple regression analyses were also performed to analyze the determinants of the digital divide, and life satisfaction experienced by married immigrant women.

Table 1
Descriptive Statistics

Demographics	Variable	Frequency	%	Demographics	Variable	Frequency	%
Age	20s or less	181	29.29	Country of origin	Vietnam/ Philippine	219	35.44
	30s	232	37.54		China	132	21.36
	40s	185	29.94		Ethic Koreans living in China	104	16.83
	50s and more	20	3.24		Other	163	26.38
	Total	618	100.0		Total	618	100.0
Education	Middle school or less	107	17.31	Resident years	Less than 5 years	188	30.42
	High school	345	55.83		5–9 years	215	34.79
	Bachelor or more	166	26.86		10 years or more	215	34.79
	Total	618	100.0		Total	618	100.0
Residence	Rural area	72	11.65	Household Income (Unit: million KRW)	Less than 1	91	14.72
	Urban area	546	88.35		1–1.99	114	18.45
	Total	618	100.0		2–2.99	257	41.59
Employment	Unemployed	405	65.53		3–3.99	110	17.80
	Employed	213	34.47		4 or more	46	7.44
	Total	618	100.0		Total	618	100.0

Measures

The digital access available to married immigrant women depends on their possession of digital devices, and their use of the Internet. Whether married immigrant women own digital devices and Internet access are dummy variables coded as 1 = *having a smartphone or smart pad*, 0 = *not having a smartphone or smart pad*, and 1 = *having Internet access at home*, and 0 = *not having Internet access at home*. Logistic regression analyzes the interaction between digital devices and the Internet use (digital device possession × Internet usage).

Digital ability is defined as the ability of married immigrant women to use digital devices, and was determined according to the following criteria:

- Ability to configure preference settings such as display/sound/security/alarm/input method, etc. on digital devices
- Ability to establish a wireless network connection
- Ability to transfer physical files to a computer
- Ability to transfer files/pictures to others
- Required app installation/deletion/updates
- Malicious code (virus, spyware, etc.) scanning/repairing ability
- Document or data (memo, word document, etc.) writing ability

Each item was measured on a 4-point Likert scale. The mean was 2.41. The reliability of the measurement items was 0.963.

Mobile Internet use is defined as the extent to which married immigrant women use mobile devices for social participation and economic activities. It consisted of the following eight items:

- Have you expressed any opinions on social issues (public comments, bulletin board postings, discussions, etc.)?
- Have you ever submitted a policy proposal, policy evaluation, or complaint to the government/local government/public institution?
- Have you ever donated (money/talent) or volunteered?
- Have you ever participated in online voting, polls, and signatures?
- Have you ever engaged in an activity that could help increase employment or turnover?
- Do you have experience in marketing activities (PR, advertisement, promotion, etc.) that are helpful for companies or start-ups?
- Have you ever searched or obtained relevant information to increase or maintain your income?
- Have you ever engaged in cost-saving activities (e.g., group purchases, overseas direct purchases, price comparisons, etc.)?

Each item was measured on a 4-point Likert scale. The mean was 1.55, and the internal consistency index (α) was 0.953.

Life satisfaction is defined as the degree of overall satisfaction that married immigrant women experience in their everyday lives. Five questions addressing this aspect were as follows:

- In most cases, my life is close to the image of an ideal life.
- My living conditions are very good.
- I am satisfied with my life.
- Have I got the important things that I want in my life?
- If I were to live my life again, I would hardly change anything.

Each question was measured on a 7-point Likert scale. The mean was 4.30. The internal consistency index (α) was 0.924.

The major demographic factors were age, education, residential area, original nationality, period of residence in Korea, employment status, and monthly household income. Age was measured using responses from individuals as 1 = *in their*

20s, 2 = *in their 30s*, 3 = *in their 40s*, and 4 = *in their 50s*. Education was measured as 1 = *middle school or lower*, 2 = *high school graduation*, and 3 = *college graduation*. Original nationality was assessed as 1 = *Vietnam/Filipinos*, 2 = *China (Han)*, 3 = *China (Ethnic Koreans living in China)*, and 4 = *Others*. Monthly household income was measured as 1 = *less than 1 million won*, 2 = *2 million won*, 3 = *3 million won*, 4 = *4 million won*, and 5 = *more than 4 million won*. The residence period was 1 = *less than 5 years*, 2 = *5 to 9 years*, and 3 = *more than 10 years*. The questionnaire also included whether they lived in a rural area (= 0) or an urban area (= 1). Employment status was evaluated using the following dummy variables: 0 = *unemployed*, and 1 = *employed*. Among these dummy variables, age (20s), education (under middle school), nationality (Vietnam/Philippines), average monthly household income (less than 1 million won), and period of residence in Korea (less than five years) were set as reference variables.

The attitudes and psychological factors used in this study are defined as the usefulness of digital devices for married immigrant women. The items about attitude towards technology and the Internet were as follows:

- The intention to obtain a lot of information
- The intention to make many friends
- The intention of getting fun and entertainment
- The intention to develop oneself
- The intention to express one's opinion to another

Each of these items was measured on a 4-point Likert scale. The mean was 2.66, and the internal consistency index value (α) was 0.909.

Family support, a social factor, is defined as the degree to which married immigrant women receive support from their families in relation to decision-making. Questions about family support were as follows:

- My family is trying to help me.
- Is my family providing emotional help and support?
- I can talk with my family when I have a hard time.
- The family's intention to support decision-making.

Each item was measured on a 4-point Likert scale. The mean was 3.13, and the internal consistency index value (α) was 0.856.

Analyses and Results

Factor Analysis

To verify the validity of the measurement used in this study, an exploratory factor analysis was performed with the application of varimax rotation. The eigenvalue was set to one or more. Table 2 shows the five factors that accounted for 76.837% of the total variance.

Table 2
Exploratory Factor Analysis

Variable	Mobile Internet Usage	Mobile Internet Skills	Attitudes	Life Satisfaction	Family Support
AMI 1	.153	.406	.667	.171	.244
AMI 2	.207	.239	.771	.140	.074
AMI 3	.142	.224	.771	.145	.143
AMI 4	.185	.317	.772	.160	.150
AMI 5	.171	.300	.791	.172	.104
FS 1	.022	.063	.069	.164	.814
FS 2	.012	.099	.146	.229	.777
FS 3	.049	.070	.106	.173	.799
FS 4	.037	.074	.155	.220	.801
MIS 1	.187	.859	.239	.078	.067
MIS 2	.164	.884	.196	.091	.061
MIS 3	.199	.854	.202	.069	.102
MIS 4	.150	.852	.255	.057	.076
MIS 5	.232	.866	.200	.119	.082
MIS 6	.232	.806	.144	.082	.064
MIS 7	.209	.835	.219	.104	.024
MIU 1	.832	.187	.160	.101	.008
MIU 2	.863	.156	.097	.103	.032
MIU 3	.901	.134	.079	.102	-.001
MIU 4	.846	.127	.099	.150	.026
MIU 5	.808	.179	.171	.028	.041
MIU 6	.849	.160	.109	.078	-.018
MIU 7	.855	.182	.111	.051	.040
MIU 8	.770	.229	.118	.077	.119
LS 1	.170	.132	.191	.815	.181
LS 2	.138	.110	.161	.824	.285
LS 3	.120	.136	.197	.803	.294
LS 4	.104	.071	.107	.835	.184
Eigen value	6.162	5.850	3.458	3.091	2.954
% Of variance	22.007	20.891	12.348	11.039	10.551
Cumulative (%)	22.007	42.898	55.247	66.285	76.837

Determinants Underlying Mobile Internet Access

Hierarchical logistic regression analyses, consisting of two models, were, conducted to analyze the underlying determinants of married immigrant women's mobile Internet access.

Table 3
Determinants Underlying Mobile Internet Access

Variable	Model 1-1			Model 1-2		
	Odds ratio	S.E.	z	Odds ratio	S.E.	z
Age (ref. 20s or less)						
30s	0.572	0.204	-1.56	0.838	0.388	-0.38
40s	0.114	0.045	-5.46***	0.123	0.059	-4.34***
50s	0.099	0.071	-3.22**	0.113	0.086	-2.86**
Education (ref. middle school or less)						
High School	0.806	0.264	-0.66	0.932	0.401	-0.16
Bachelor or more	2.271	0.891	2.09*	1.945	0.912	1.42
Residence (ref. Rural area)						
Urban area	1.540	0.479	1.39	1.017	0.376	0.05
Country of origin (ref. Vietnam & Philippine)						
China	0.960	0.318	-0.12	0.975	0.412	-0.06
Ethic Koreans living in China	1.193	0.450	0.47	0.837	0.363	-0.41
Other	0.677	0.202	-1.31	0.462	0.185	-1.93
Resident years (ref. Less than 5 years)						
5-9 years	1.032	0.311	0.11	1.304	0.513	0.67
10 years or more	2.491	0.987	2.30*	2.554	1.290	1.86
Employment (ref. Unemployed)						
Employed	0.776	0.201	-0.98	0.817	0.291	-0.57
Household income (ref. Less than 1)						
1-1.99	2.659	0.952	2.73**	2.376	1.087	1.89
2-2.99	5.377	1.708	5.30***	5.105	2.256	3.69***
3-3.99	9.488	3.944	5.41***	7.413	4.346	3.42**
4 or more	19.786	15.700	3.76***	16.694	13.321	3.53***
Desire to digital information use				12.763	3.614	8.99***
Families support				0.399	0.130	-2.81**
Constant	1.837	0.920	1.21	0.115	0.118	-2.11*
Log pseudolikelihood		-241.228			-152.924	
Wald chi-square		91.51***			121.04***	
Pseudo R^2		0.207			0.497	

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

[Model 1-1] indicates the influencing factors for mobile Internet access by considering the demographic factors of married immigrant women. R^2 is 20.7%. Among the personal factors of married immigrant women, age, education, period of residence in Korea, and average monthly household income had significant effects on mobile Internet access. Those in their 40s and 50s were less likely to own digital devices than those in their 20s or younger. It was found that participants with a college degree or higher education were more likely to possess digital devices than those with an educational background below middle school. The probability of owning digital devices was higher in the group with a residence period of 10 years or more, compared to the group with a residence period of less than five years. The odds ratio also increased for the groups with average monthly household incomes of 1 million won or more, compared to the groups with an average monthly income of less than 1 million won.

[Model 1-2] shows the determinants of mobile Internet access by including demographic factors, attitude towards technology and the Internet, and family support. R^2 is 49.7%, which is significantly improved compared to [Model 1-1]. Age, household income, desire to use digital information, and family support had significant effects on mobile Internet access. Households with an average monthly income of 2 to 4 million won or more, better attitude towards technology and the Internet, and higher family support were more likely to own digital devices (see Table 3). The results reveal that attitude towards technology and the Internet, and family support are important variables that interact with age and household income.

Determinants of Mobile Internet Skills

To identify the factors affecting the digital ability of married immigrant women, three models were constructed, and hierarchical regression analyses were performed. [Model 2-1] shows the effect of demographic variables on mobile Internet skills. R^2 is 22.6%. Age, education, residence area, period of residence in Korea, and average monthly household income of married immigrant women have significant effects on mobile Internet skills. The older they are, the less mobile Internet skills they have. Married immigrant women with higher education (college or higher), urban residence, and residence in Korea for more than 10 years are also found to have higher mobile Internet usage ability.

[Model 2-2] analyzes the factors affecting mobile Internet skills by considering demographic variables, attitude towards technology and the Internet, and family support. R^2 was 44.8%, approximately 22.2% higher than [Model 2-1]. Age, educa-

tion, attitude towards technology and the Internet, length of residence in Korea, and average monthly household income of married immigrant women significantly influence their ability to use the mobile Internet. Participants who were in their 20s or younger, the group that had a college degree or higher education, the group that belonged to households earning 4 million won or more, and those who had more positive attitude towards technology and the Internet had higher levels of mobile Internet skills.

In [Model 2-3], the digital divide factor, mobile Internet access, is input into [Model 2-2]. R^2 is 65.1%, a significant improvement compared to [Model 2-1] and [Model 2-2]. The results indicate that age, education, nationality, employment status, attitude towards technology and the Internet, family support, and mobile Internet access have significant effect on the mobile Internet skills of married immigrant women. Participants in their 20s and younger, those with higher education, those from China (ethnic Koreans) and other countries, and those who were employed, had higher mobile Internet skills. The results also showed that positive attitude towards technology and the Internet, along with family support, made mobile Internet access easier, indicating higher mobile Internet skills among married immigrant women. On the other hand, Table 4 indicates that the effect of attitude towards technology and the Internet decreased mobile Internet skills (β [Model 2-2] = 0.515) → β [Model 2-3] = 0.182). The influence of family support increased (β [Model 2-2] = -0.012 → β [Model 2-3] = 0.066]). These results reveal that pre-determined demographic variables, attitude towards technology and the Internet, and family support are important predictors of mobile Internet skills. Mobile Internet access is another important variable for explaining mobile Internet skills.

Table 4

Determinants Underlying Mobile Internet Skills

Variable	Model 2-1				Model 2-2				Model 2-3			
	B	S.E.	β	*t*	B	S.E.	β	*t*	B	S.E.	β	*t*
Age (ref. 20s or less)												
30s	-0.236	0.088	-0.128	-2.67**	-0.137	0.075	-0.074	-1.83	-0.065	0.060	-0.035	-1.09
40s	-0.714	0.102	-0.365	-7.03***	-0.498	0.087	-0.255	-5.72***	-0.200	0.071	-0.102	-2.80**
50s	-0.545	0.199	-0.108	-2.74**	-0.288	0.169	-0.057	-1.70	0.024	0.136	0.005	0.18
Education (ref. Middle school or less)												
High School	0.106	0.090	0.059	1.17	0.129	0.076	0.071	1.69	0.163	0.061	0.090	2.69**
Bachelor or more	0.589	0.104	0.292	5.69***	0.405	0.088	0.201	4.58***	0.389	0.070	0.192	5.52***

Residence (ref. Rural area)												
Urban area	0.220	0.103	0.079	2.14*	0.036	0.088	0.013	0.41	0.027	0.070	0.010	0.38
Country of origin (ref. Vietnam & Philippine)												
China	0.104	0.091	0.047	1.14	0.111	0.077	0.051	1.44	0.109	0.061	0.050	1.79
Ethic Koreans living in China	0.174	0.098	0.073	1.77	0.156	0.083	0.065	1.87	0.133	0.066	0.055	2.00*
Other	0.033	0.085	0.016	0.39	0.088	0.072	0.044	1.22	0.143	0.058	0.071	2.48*
Resident years (ref. Less than 5 years)												
5–9 years	0.039	0.086	0.021	0.46	0.039	0.072	0.021	0.54	0.046	0.058	0.024	0.80
10 years or more	0.263	0.100	0.140	2.63**	0.136	0.086	0.072	1.58	0.032	0.069	0.017	0.47
Employment (ref. Unemployed)												
Employed	0.033	0.073	0.018	0.46	0.086	0.062	0.045	1.39	0.103	0.049	0.055	2.10*
Household income (ref. Less than 1)												
1–1.99	0.136	0.115	0.059	1.19	0.049	0.097	0.021	0.51	-0.134	0.078	-0.058	-1.71
2–2.99	0.338	0.099	0.186	3.40**	0.166	0.085	0.092	1.96	-0.126	0.069	-0.069	-1.81
3–3.99	0.477	0.118	0.204	4.06***	0.183	0.102	0.078	1.80	-0.118	0.083	-0.050	-1.43
4 or more	0.852	0.151	0.250	5.64***	0.516	0.131	0.151	3.93***	0.190	0.106	0.056	1.80
Desire to digital information use					0.576	0.039	0.515	14.82***	0.203	0.037	0.182	5.51***
Families support					-0.020	0.054	-0.012	-0.37	0.106	0.043	0.066	2.44*
Mobile Internet access									1.363	0.073	0.602	18.63***
Constant	1.828	0.150		12.17**	0.622	0.201		3.09**	0.242	0.161		1.50
F		10.98***				26.98***				58.58***		
R^2		0.226				0.448				0.651		

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Determinants of Mobile Internet Usage

Three hierarchical models were used to analyze the factors that determine the Internet use of married immigrant women. [Model 3-1] analyzes the underlying factors of Internet use by considering demographic factors. R^2 is 10.9%. The results show that the use of mobile Internet by married immigrant women with college degrees and urban residences has increased.

[Model 3-2] analyzes the factors, including attitude towards technology and the Internet, and family support, in addition to demographic variables. R^2 was 22.9%, approximately 12.9% higher than [Model 3-1]. Compared to participants under 20

years of age, married immigrant women in urban areas with higher levels of college education had higher mobile Internet use. The mobile Internet usage rate of the group with an average monthly household income of 2 to 3 million won decreased. A positive attitude towards technology and the Internet are also associated with higher mobile Internet usage.

[Model 3-3] adds mobile Internet access and skills to [Model 3-2]. R^2 is 27.8%, which is slightly better than [Model 3-2]. The results show that a higher age, an urban area of residence, a lower household income, higher positive attitude towards technology and the Internet, and a higher level of mobile Internet skills are associated with a higher amount of mobile Internet usage. Comparing [Model 3-2] to [Model 3-3], the effect of attitude toward technology and the Internet on mobile Internet usage decreases (β [Model 3-2] = 0.377 → β [Model 3-3] = 0.220). Education was not a significant factor in [Model 3-3] (see Table 5). These findings indicate that the explanatory power of demographic variables for mobile Internet usage is lower than that of mobile Internet access and skills, while attitude towards technology has an increasing influence.

Table 5
Determinants of Mobile Internet Usage

Variable	Model 3-1				Model 3-2				Model 3-3			
	B	S.E.	β	*t*	B	S.E.	β	*t*	B	S.E.	β	*t*
Age (ref. 20s or less)												
30s	0.090	0.082	0.057	1.11	0.153	0.076	0.096	2.00*	0.189	0.074	0.119	2.54*
40s	-0.157	0.094	-0.093	-1.67	-0.020	0.089	-0.012	-0.23	0.110	0.089	0.066	1.25
50s	0.243	0.184	0.056	1.32	0.406	0.172	0.093	2.36*	0.485	0.168	0.111	2.88**
Education (ref. Middle school or less)												
High School	-0.053	0.083	-0.034	-0.64	-0.038	0.077	-0.025	-0.50	-0.069	0.075	-0.045	-0.92
Bachelor or more	0.313	0.096	0.180	3.28**	0.197	0.090	0.113	2.19*	0.096	0.089	0.055	1.08
Residence (ref. Rural area)												
Urban area	0.345	0.095	0.144	3.63***	0.229	0.089	0.095	2.56*	0.220	0.087	0.091	2.53*
Country of origin (ref. Vietnam & Philippine)												
China	0.091	0.084	0.048	1.08	0.095	0.078	0.051	1.22	0.068	0.076	0.036	0.89
Ethic Koreans living in China	0.140	0.091	0.068	1.54	0.129	0.085	0.063	1.52	0.090	0.082	0.044	1.09
Other	-0.038	0.079	-0.022	-0.49	-0.003	0.074	-0.002	-0.04	-0.024	0.072	-0.014	-0.33
Resident years (ref. Less than 5 years)												
5-9 years	0.058	0.079	0.036	0.74	0.058	0.074	0.036	0.79	0.048	0.071	0.030	0.68
10 years or more	0.121	0.092	0.075	1.31	0.039	0.087	0.024	0.45	0.003	0.085	0.002	0.04
Employment (ref. Unemployed)												
Employed	-0.006	0.067	-0.004	-0.08	0.027	0.063	0.017	0.44	0.007	0.061	0.004	0.11

Household income (ref. Less than 1)												
1-1.99	-0.055	0.106	-0.028	-0.52	-0.110	0.099	-0.055	-1.11	-0.126	0.097	-0.064	-1.30
2-2.99	-0.134	0.092	-0.086	-1.47	-0.243	0.086	-0.156	-2.82**	-0.292	0.086	-0.187	-3.38**
3-3.99	-0.022	0.109	-0.011	-0.21	-0.209	0.103	-0.104	-2.02*	-0.261	0.102	-0.130	-2.56*
4 or more	-0.025	0.140	-0.009	-0.18	-0.239	0.133	-0.082	-1.79	-0.375	0.131	-0.128	-2.85**
Desire to digital information use					0.364	0.040	0.377	9.19***	0.212	0.047	0.220	4.53***
Families support					-0.008	0.055	-0.006	-0.15	0.000	0.054	0.000	-0.01
Mobile Internet access									0.033	0.114	0.017	0.29
Mobile Internet Skills									0.247	0.051	0.287	4.89***
Constant	1.174	0.139		8.47***	0.402	0.205		1.97	0.239	0.200		1.19
F		4.59***				9.86***				11.47***		
R^2		0.109				0.229				0.278		

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Relationship between Digital Divide and Life Satisfaction

Hierarchical regression analyses were performed to examine the relationship between the determinants of the digital divide, and the perception of life satisfaction among married immigrant women. [Model 4-1] analyzes life satisfaction as a dependent variable, with demographic factors as independent variables. R^2 is 10.1%. Age, area of residence, and average monthly income had significant effects on life satisfaction. Women in their 40s have a lower quality of life than those in their 20s. Life satisfaction is higher when they reside in urban areas, and have higher monthly household incomes.

Table 6

The Relationship between Digital Divide and Life Satisfaction

Variable	Model 4-1				Model 4-2				Model 4-3			
	B	S.E.	β	*t*	B	S.E.	β	*t*	B	S.E.	β	*t*
Age (ref. 20s or less)												
30s	-0.145	0.119	-0.063	-1.22	-0.005	0.104	-0.002	-0.05	-0.013	0.102	-0.006	-0.13
40s	-0.332	0.137	-0.136	-2.42*	-0.219	0.120	-0.090	-1.83	-0.096	0.121	-0.039	-0.79
50s	0.046	0.268	0.007	0.17	0.281	0.234	0.044	1.20	0.274	0.230	0.043	1.19
Education (ref. Middle school or less)												
High School	-0.013	0.121	-0.006	-0.11	-0.010	0.106	-0.004	-0.09	0.002	0.103	0.001	0.02
Bachelor or more	0.185	0.140	0.073	1.32	0.097	0.122	0.039	0.80	-0.038	0.122	-0.015	-0.31

Residence (ref. Rural area)												
Urban area	0.296	0.139	0.085	2.14*	0.276	0.121	0.079	2.28*	0.152	0.118	0.044	1.29
Country of origin (ref. Vietnam & Philippine)												
China	-0.149	0.122	-0.055	-1.22	-0.137	0.107	-0.050	-1.29	-0.171	0.103	-0.063	-1.66
Ethic Koreans living in China	0.157	0.133	0.052	1.18	0.225	0.116	0.075	1.95	0.166	0.112	0.055	1.48
Other	-0.101	0.115	-0.040	-0.88	0.018	0.101	0.007	0.18	0.026	0.098	0.010	0.27
Resident years (ref. Less than 5 years)												
5–9 years	-0.103	0.115	-0.044	-0.89	-0.159	0.101	-0.068	-1.58	-0.173	0.097	-0.074	-1.78
10 years or more	0.153	0.135	0.065	1.13	-0.108	0.119	-0.046	-0.91	-0.158	0.115	-0.067	-1.37
Employment (ref. Unemployed)												
Employed	-0.087	0.098	-0.037	-0.89	-0.074	0.085	-0.031	-0.86	-0.071	0.083	-0.030	-0.86
Household income (ref. Less than 1)												
1–1.99	0.140	0.155	0.048	0.90	0.122	0.135	0.042	0.90	0.109	0.132	0.038	0.82
2–2.99	0.312	0.134	0.138	2.33*	0.157	0.117	0.069	1.34	0.148	0.118	0.065	1.25
3–3.99	0.521	0.159	0.178	3.29**	0.291	0.139	0.100	2.09*	0.239	0.140	0.082	1.71
4 or more	1.070	0.204	0.251	5.25***	0.604	0.181	0.142	3.34**	0.540	0.180	0.127	3.00**
Families support					0.976	0.071	0.489	13.77***	0.915	0.070	0.458	13.12***
Mobile Internet access									0.120	0.148	0.042	0.81
Mobile Internet skills									0.068	0.069	0.055	0.99
Mobile Internet usage									0.285	0.055	0.196	5.21***
Constant	3.861	0.202		19.08***	0.955	0.275		3.47**	0.608	0.272		2.23*
F		4.20***				16.34***				17.35***		
R^2		0.101				0.316				0.368		

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

[Model 4-2] adds family support to [Model 4-1]. R^2 is 31.6%, approximately 21.5% higher than [Model 4-1]. Residential area, average monthly household income, and family support have positive effects on life satisfaction. For women living in urban areas, the higher the average monthly household income and family support, the higher the life satisfaction.

[Model 4-3] adds mobile Internet access, skills, and usage to [Model 4-2]. R^2 is 36.8%, which is slightly better than [Model 4-2]. The higher the average monthly household income, family support, and mobile Internet usage, the higher the life satisfaction. Comparing [Model 4-2] and [Model 4-3], (β [Model 4-3] = 0.489 → β [Model 4-3] = 0.458), the influence of family support on life satisfaction is

slightly decreased. These findings indicate that economic and social capital, and mobile Internet usage are important factors in explaining the life satisfaction of married immigrant women.

Discussion and Conclusions

This study analyzes the effects of various demographic variables, attitude towards technology and the Internet, and family support on mobile Internet access, skills, and usage of married immigrant women, and their life satisfaction. The findings are summarized below.

First, age, average monthly household income, attitude towards technology and the Internet, and family support were found to be important determinants of mobile Internet access. The average monthly household income of married immigrant women in their 20s or younger was between 2 to 4 million won. These women are more likely to own digital devices when the family support is less. On the other hand, women in their 40s and 50s, with an average monthly income of less than 1 million won, are less likely to own digital devices. The findings suggest that age, household income, attitude toward technology and the Internet, and family support are important factors for mobile Internet access.

Second, age, education, nationality, employment status, attitude toward technology and the Internet, family support, and mobile Internet access have significant effects on mobile Internet usage. Women in their 40s, who are highly educated, and hail from China (ethnic Koreans living in China) and other countries, show high abilities to use mobile Internet. Women possessing these digital skills also show positive attitude toward technology and the Internet, receive support from their families, and have improved mobile Internet access.

Third, Internet usage is significantly impacted by age, residence area, average monthly household income, attitude toward technology and the Internet, and mobile Internet skills. Women with high mobile Internet skills have shown an increase in their use of mobile Internet.

Fourth, average monthly household income, attitude toward technology and the Internet, family support, and mobile Internet usage have significant effects on life satisfaction. Women with an average monthly income of 4 million won or more, high family support, and high mobile Internet usage improved their life satisfaction.

The results of these analyses present the following suggestions for policies. First, the determinants of mobile Internet access, skills, and usage are analyzed by

considering the multidimensional characteristics of digital divides. The scope of this concept and its determinants can be expanded by understanding the influence of motivational and social factors. The explanatory power of demographic variables for digital divides was more than 20% for mobile Internet access and skills, whereas the explanatory power for mobile Internet usage decreased to 10%. This implies that while demographic variables are not sufficient conditions, they are still important factors in explaining, and predicting mobile Internet access, skills, and usage. Unlike demographic variables, attitude towards technology and the Internet, and family support have a relatively high explanatory power regarding mobile Internet skills and usage. In particular, the influence and explanatory power of attitude toward technology and the Internet are stable under the influence of mobile Internet access, skills, and use. This suggests that it is important to consider the influence of psychological motivation in the study of digital divides on marginalized demographics in relation to mobile Internet access.

Second, an empirical basis is provided to investigate the relationship between mobile Internet access, skills, usage, and life satisfaction. Although the digital divide is not a sufficient condition to predict life satisfaction, the empirical results imply that the positive effects of mobile Internet usage on life satisfaction may provide important insights for future research. For studies on digital divides, life satisfaction can be considered an important outcome factor related to Internet usage. Digital divides can also be considered as important predictive variables.

Third, support for improving mobile Internet access should be expanded. Although access to mobile Internet continues to improve, there are difficulties in using mobile Internet because of the burden of mobile Internet usage fees. Economic level (especially low income) can act as an obstacle to digital access. Therefore, to effectively bridge the digital divide, in terms of mobile Internet access, the government or local bodies should increase the retention rates of digital devices through the distribution of green PCs, and smartphone support projects for involuntary Internet users. It is also necessary to ensure that mobile Internet access fees are not excluded from digital access schemes by providing adequate support for Internet usage fees.

Fourth, the suitability of informatization education for married immigrant women should be improved. The content of information education can be reviewed, and the target of education can be selected. It is also important to support the implementation of information education with the help of families. As for information service education content, along with the ability to use digital devices, women should be educated on the effective use of information. It is necessary to

select "involuntary non-users" among married immigrant women, who are willing to, but cannot use the Internet, to enhance the educational effect. Unemployed and/or people in their 30s and 40s should be selected to increase the effectiveness of the education. Since married immigrant women often ask for help from their families when using mobile devices, family support is an important factor in improving their mobile Internet skills. The spouses and/or children also need education-related support, especially support for the ability to use mobile devices.

Fifth, it is important to prepare a plan to support various mobile Internet uses. As mentioned above, the use of mobile Internet by married immigrant women can positively affect their life satisfaction. To raise the level of mobile Internet usage amongst married immigrant women, it is necessary to develop high-quality multicultural content. The levels of mobile Internet usage and life satisfaction can be improved by providing information that could support women in their self-development, education, and learning efforts as they adapt to the Korean society and culture. Through self-development, education, and learning, the provision of information on the Korean society or culture, and participation in socio-economic activities, the use of digital information, capital, and life satisfaction will be improved.

Sixth, it is necessary to develop, and implement a customized solution strategy to improve the mobile Internet access, skills, and usage level amongst married immigrant women. While some married immigrant women may have lower or higher levels of mobile Internet access, skills, and usage, others have higher access but lower skills. Therefore, the government should develop appropriate policy designs that consider the digital divides experienced by married immigrant women, and increase the effectiveness of the policies.

Furthermore, academic research on the digital divide among married immigrant women is needed. Many previous studies have reported that women have lower internet access, skills, and use than men. Immigrants are reported to have lower internet access, skills, and use than natives, and differences according to nationality are also reported. In this context, married immigrant women can be recognized as a vulnerable class. The digital divide has important meaning not only for individual life satisfaction, but also for successful adaptation and social integration in Korean society. To resolve the digital divide of married immigrant women, research using various methodologies should be conducted by comprehensively considering demographic characteristics, personal needs, and social characteristics.

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