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An Empirical Study on Korea's Telecommunication Policy: Focusing on the Effect of MVNO¹

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ABSTRACT

This study is an empirical study on the effect on the reduction of telecommunication charges of the introduction of MVNO in Korea. The dependent variable is the average monthly communication fee. The independent variables are whether or not to join the MVNO. The control variables are gender, age, education, income, occupation, mobile phone type, number of mobile phones, welfare plan, daily phone call time and daily mobile phone internet access time. As a result of the analysis, the effect of introduction of MVNO was not significant. We need a policy mix that makes it possible for government efforts to promote competition and innovative management strategies of MVNO operators to work synergistically together.

Keywords: MVNO, ICT policy, Telecommunication Policy, Telecomm Charge.

1. THE ARGUMENT

Information and Communication Technology (ICT) policy is the fastest changing area of policy environment. Changes in technology lead to changes in service and create new policy needs. In the ICT policy area where policy speed and timely policy are emphasized at the same time, securing policy credibility through continuity and predictability of policy is very difficult but also necessary. What is important for this is evidence-based policy efforts to plan, determine, enforce, and analyze policies based on objective evidence. Until now,

Korea's telecommunication policy has relatively lacked efforts to establish policies through the collection of objective data and to make them an important source of policy improvement through the analysis of the effect of policies implemented or implemented.

This study is an empirical study on the effect on the reduction of telecommunication charges of the introduction of MVNO in Korea. An MVNO (Mobile Virtual Network Operator) is a company that sells mobile phone service by making use of another company's existing network infrastructure like MNO (Mobile Network Operator). The MVNO was introduced in Korea in 2010 and has been in service since 2011. This study is an empirical study on the effect on the reduction of telecommunication charges of the introduction of MVNO in Korea. In Chapter 2, we introduce telecommunication policy and MVNO policy in Korea and examine factors affecting mobile telecom charge through previous studies. Chapter 3 explains the research analysis framework, data collection and analysis methods, and Chapter 4 shows the empirical analysis results. Chapter 5 proposes policy implications for MVNOs in Korea.

2. LITERATURE REVIEW

2.1. MVNO Policy in Korea

Telecommunication service business is a business that provides communication services to consumers by using communication facilities. It is classified into two types as wired communication service such as local/long distance/international telephone service, VoIP, broadband and wireless communication service and wireless communication service such as mobile communication service, portable internet service.

The telecommunication service business generally has the following five characteristics; public utilities of communication service, essential facilities and fixed cost, vertical integration and unfair practices, monopoly potential and artificial competition (first-mover advantage, level playing field), network effect and demand-side economies of scale. Therefore, the government needs to intervene in the telecommunication market to promote competition in the telecommunication competitive market and to protect the consumers.

A Mobile Virtual Network Operator (MVNO) is a company that sells mobile phone service by making use of another company's existing network infrastructure like MNO (Mobile Network Operator). MVNO earns revenue by reselling communication services or leasing existing networks to sell new services.

The MVNO system has advantages and disadvantages at the same time. Advantage of MVNO system can spread competition in the market through introduction of MVNO and increase consumer convenience through promotion of competition. On the other hand, the biggest disadvantage of the MVNO is that it can decreased investment incentive of existing operators.

MVNO policy is one of the major government policy tools for promoting market competition and protecting consumers. Therefore, MVNO policy is very important as government communications competition policy and consumer telecom pricing policy.

Korea's MVNO system was officially introduced with the enactment of the Telecommunications Business Act in February 2010 and has been in service since 2001. Changes in the number of MVNO subscribers in Korea are shown in Table 32.1.

Table 32.1
Number of mobile phone subscribers

	2014.12	2015.12	2016.01	2016.02	2016.03	2016.04	2016.05
SKT	866,044	746,262	754,959	750,466	871,894	825,136	810,440
KT	571,472	481,881	476,934	470,821	496,609	511,028	523,276
LGU+	438,211	447,972	405,831	399,262	453,162	465,638	475,948
MVNO	249,499	266,880	293,550	286,791	308,718	274,811	284,347
TOTAL	2,125,226	1,942,995	1,931,274	1,907,340	2,130,383	2,076,613	2,094,011

*Source: Ministry of Science, ICT and Future Planning (2016)

2.2. Previous Studies Related to MVNO

Previous studies related to MVNO have been carried out mainly on three research themes: basic introduction and understanding of MVNO system, introduction of foreign MVNO system, and estimation of economic effect of MVNO.

First, previous studies cover a wide range of topics such as MVNO definition, introduction, expectation effect, and retail price measurement (Byun, 2010; Song, 2012; Jeon et. al., 2012; Shin, 2001; Jung, 2014; KISDI, 2011; 2012; Jung, 2010; Choi, 2012).

Second, previous studies introduce foreign MVNO regulation and suggests implications (Kang, 2009; Gwak, 2011; Kim & Jang, 2012; Kim, 2002; Kim, 2006; Byun, 2001, Byun et. al., 2007).

Third, previous studies have been conducting studies on market competition effect, business strategy, economic effect, profitability estimation (Kim, 2004, Kim, 2006, Kim&Kwon, 2004; Kim, 2010, Seo, 2007; Yun, 2010; Jung, 2008) and Estimation of Consumer Benefits, telecom Rate Plan (Kim, 2009; Kim, 2004) by economic approach to MVNO.

2.3. Previous Studies on Factors Affecting Mobile Telecom Charges

However, there are still few studies to verify the effect of the MVNO system in terms of policy research. In this paper, we analyze the effects of MVNO policy on consumer communication expenses reduction from the perspective of evidence - based research.

Previous studies on mobile telecommunication charges generally divide influential factors into demographic factors, device factors, Internet access factors, content factors, and other factors (Ahn et. al., 2010; Seo et.al., 2007; Choi & Park, 2003). First, demographic factors include gender, age, education, income, occupation, and so on. Second, the device factor is divided into the type of the device and the performance of the device. Third, the Internet access environment is an important variable. This includes paid access data access (3G, 4G) and free access internet environments such as Wifi. Fourth, the various uses of digital contents are important factors in increasing the amount of data access. They include use paid content, use free content, information provision, transaction function, entertainment function, and communication function.

3. METHODOLOGY: RESEARCH FRAMEWORK, DATA, AND METHOD

3.1. Research Framework

This study aims at empirical analysis of the research question “How will the introduction of the MVNO system affect consumers’ telecommunication charges?” Therefore, the research hypothesis of this study is “The consumers’ adoption of the MVNO will lower the consumer’s telecommunication charges.”

Research question

How will the introduction of the MVNO system affect consumers’ telecommunication charges?

Research hypothesis

H1. The consumers’ adoption of the MVNO will lower the consumer’s telecommunication charges.

The research framework of this study is shown in Figure 32.1.

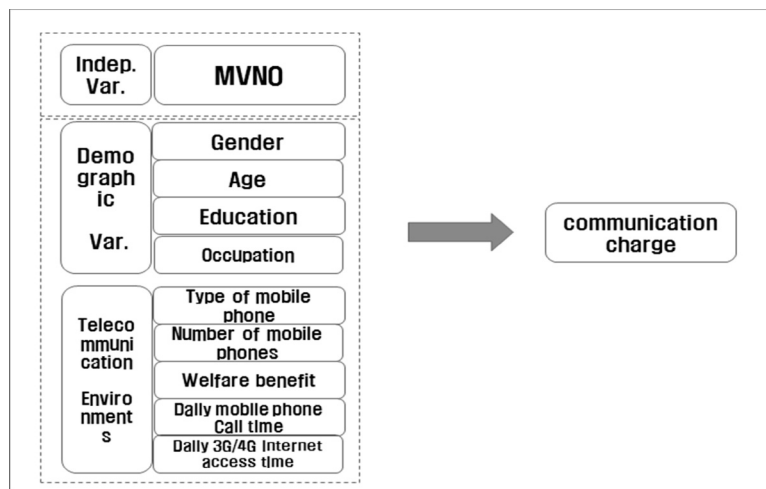


Figure 32.1: Research Framework

3.2. Data and Main Variables

The data are Korea Information Society Development Institute (KISDI) media panel survey from 2011-2014. These data are government official statistics (no.40501), which are produced by the Korean National Statistical Office.

The dependent variable is the average monthly communication fee. The independent variables are whether or not to join the MVNO. The control variables are gender, age, education, income, occupation, mobile phone type, number of mobile phones, welfare plan, daily phone call time and daily mobile phone internet access time. The explanations and measurement methods of major variables are shown in Table 32.2.

3.3. Method

Panel data regression was performed for the analysis of this study. Because the Hausman test rejected the hypothesis, a random-effect model was used. The statistical program used for the analysis is STATA 13.0. The study model was as follows.

Table 2

	<i>Variable name</i>	<i>Variable description</i>	<i>Measuring Variables</i>
Dependent Variable	Mobile communication fee	Monthly mobile phone communication charges	1 = less than 10, 2 = 10 ~ 20 3 = 2 ~ 30, 4 = 30 ~ 40 5 = 40 ~ 50, 6 = 50 ~ 60 7 = 60 ~ 70, 8 = 70 ~ 80 9 = 80 ~ 90, 10 = 90 ~ 100 11 = over 100 (Unit: thousand won in Korea)
Demographic Variables	Gender	Male, Female	Female=0 Male,=1
	Age	1 = 10 or less, 2 = 20-39 years 3 = 40-59 years old, 4 = 60 years old or older	(Dummy variable) Reference group: 10 or less
	Education	Less than elementary school = 1 Lower than middle school level = 2 Less than high school = 3 College degree or higher = 4	(Dummy variable) Reference group: Less than elementary school
	Income	1 = less than 1 million won, 2 = 1-2 million won 3 = 2-3 million won, 4 = 3-4 million won, 5 = 4-5 million won, 6 = 5 million won, or more	(Dummy variable) Reference group: less than 1 million won
	Occupation	Unemployed, employed	Unemployed = 0 Employed = 1
ICT environment	Number of mobile phones	Number of mobile phones in use	
	Type of mobile phone	Type of mobile phone	0 = no smart phone 1 = smart phone
	Welfare benefit	Welfare Fee Benefit	0 = None 1 = Yes
	Daily mobile phone call time	Daily mobile phone call time	
	Daily 3G/4G internet access time	Access time using 3G/4G Internet (Except access via WiFi)	
Independent Variable	MVNO	Whether to join MVNO	0 = Do not join MVNO 1: Join MVNO

$$Y = \alpha_0 + \beta_1 \cdot X_1 + \beta_2 \cdot X_2 + \beta_3 \cdot X_3 + \beta_4 \cdot X_4 + \beta_5 \cdot X_5 + \beta_6 \cdot X_6 + \beta_7 \cdot X_7 + \beta_8 \cdot X_8 + \beta_9 \cdot X_9 + \beta_{10} \cdot X_{10} + \beta_{11} \cdot X_{11}$$

where the dependent measure (Y) is telecommunication charges; X1~X5 (gender, age, education, income, employment status) are sociodemographic variables; X6 is the number of smartphones; X7 is Types of mobile phone (feature phone, smartphone); X8 is welfare benefits of telecommunication charges; X9 is daily mobile phone call time' X10 is daily 3G/4G internet access time; X11 is whether to join MVNO.

4. ANALYSIS

4.1. Descriptive Statistics

A descriptive statistical analysis was conducted for the major variables used in this study from 2011 to 2014. Table 32.2 shows the frequency of major variables such as sex, age, education, income, and occupation. Among the subscribers related to MVNO, SKT (14853, 52.0%), KT (8170, 28.6%), LG U+ (5449, 19.1%) and MVNO (84, 0.3%).

Table 32.3

	<i>Variable name</i>	<i>Frequency (percent)</i>	<i>Cumulative Percent</i>
Gender	Female	17976 (56.2%)	56.2%
	Male	14008 (43.8%)	100.0%
	Total	31984 (100.0%)	
Age	10 or less	4650 (14.5%)	14.5%
	20-39 years	7257 (22.7%)	37.2%
	40-59 years old	11511 (36.0%)	73.2%
	60 years old or older	8566 (26.8%)	100.0%
	Total	31984 (100.0%)	
Education	Less than elementary school	7920 (24.8%)	24.8%
	Lower than middle school level	4018 (12.6%)	37.3%
	Less than high school	10959 (34.3%)	71.6%
	College degree or higher	9086 (28.4%)	100.0%
	Total	31983 (100.0%)	
Income	Less than 1 million won	19555 (61.2%)	61%
	1-2 million won	5055 (15.8%)	77.0%
	2-3 million won	3895 (12.2%)	89.2%
	3-4 million won	2130 (6.7%)	95.8%
	4-5 million won	752 (2.4%)	98.2%
	5 million won, or more1	580 (1.8%)	100.0%
	Total	31967 (100.0%)	
Occupation	Unemployed	16425 (51.4%)	51.4%
	Employed	15559 (48.6%)	100.0%
	Total	31984 (100.0%)	
Welfare benefit	None	27382 (95.9%)	95.9%
	Yes	1182 (4.1%)	1.0%
	Total	28564 (100.0%)	
Telecommunication provider	SKT	14853 (52.0%)	52.0%
	KT	8170 (28.6%)	28.6%
	LG U+	5449 (19.1%)	99.7%
	MVNO	84 (0.3%)	100.0%
	Total	28556 (100.0%)	

4.2. Panel Data Multi Regression

For the analysis, we conducted panel data multiple regression. The statistics program used is STATA 13.0. We used the random-effects model to reflect the results of the Hausman test.

As a result of the analysis, it was the education and voice talk time which had a significant influence on the communication cost. However, MVNO policy, which was the focus of this study, did not have a significant effect on communication cost reduction.

Table 32.4

		<i>Coef.</i>	<i>Std. Err.</i>
Gender		-11.44*	6.78
Age	20-39 years	-4.29	11.36
(Reference group: teenagers)	40-59 years old	-7.27	10.74
	60 years old or older	16.97	10.69
Education	Middle school	-35.48***	10.32
(Reference group: Under the Elementary School)	High school	-35.05***	10.11
	College	-32.01***	11.68
Income	100-200	-3.03	9.00
(Reference group: ~100)	200-300	-1.88	10.39
	300-400	-4.90	12.57
	400-500	-3.55	17.24
	500-	-4.08	19.96
Job	Employed	10.62	8.07
Number of mobile phones		-4.17	37.42
Type of mobile phone		-7.62	5.53
Welfare benefit		0.65	11.92
Daily mobile phone call time		0.56**	0.28
Daily 3G/4G internet access time		-0.01	0.31
MVNO		-4.26	147.84

5. CONCLUSION

This study is an empirical study on the effect on the reduction of telecommunication charges of the introduction of MVNO in Korea. The dependent variable is the average monthly communication fee. The independent variables are whether or not to join the MVNO. The control variables are gender, age, education, income, occupation, mobile phone type, number of mobile phones, welfare plan, daily phone call time and daily mobile phone internet access time. As a result of the analysis, the effect of introduction of MVNO was not significant.

We propose several things to enhance the effectiveness of the MVNO policy. First, it is necessary to strengthen the actual competition by eliminating discrimination and barriers to entry by MNOs, and to provide differentiated services and pricing policies by MVNOs. Theoretically, MVNO has two success factors: (1) Establishment of wholesale rate level and connection condition between MNO and MVNO, (2) Development of MVNO's differential communication service (Combined service such as double/

Triple service) and communication plan. Second, we need to look more at the MVNO system. MVNOs have been growing quantitatively in recent years, which will also lead to qualitative changes in effectiveness. Also, In order for the MVNO system to be settled away from existing practices, it may take time for both operators and consumers. It is encouraging that MVNO's business strategy and consumer mind-set about MVNO have changed recently. We need a policy mix that makes it possible for government efforts to promote competition and innovative management strategies of MVNO operators to work synergistically together.

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