

MVNO Game in Korea

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Abstract

Korea MVNO market is a multilayer game space where the government, MNOs, MVNOs and consumers affect each other. Here, game among MNOs and MVNOs will be mainly analyzed. Korea regulation authority tried to introduce MVNOs progressively when high communication cost had been a social issue for several years. The government could not help invigorate competition in the telecommunication market and curb monopoly. The necessity of MVNO introduction was recognized in early 2000s but MVNO launched in 2011 when the mobile telecommunication market was fully saturated in Korea. Korean government tried to improve business conditions for MVNOs and presents MVNO Activation Programs every year. But it may say paradoxically that the market is not fair still. MNOs have both network facilities and market power and negotiating power also. The major issues in MVNO game may be whole sale prices, phone supply, subsidy, monthly rate plans, and Mobile Distribution Act. MNOs and MVNOs vary in strategies according to their characteristics. The government has a role to maximize consumer surplus and social welfare through providing fair market condition with understanding the players of the market

Keywords: *MVNO, MNO, game, telecommunication, market, tying, regulation, Korea*

1. Introduction

Korea MVNO (mobile virtual network operators) was introduced in 2011 when high telecommunication cost had been a social issue for several years [1]. At that time mobile telephone penetration rate was 100 percent in Korea. MVNO entered into the mobile telecommunication market in Germany when the mobile telecommunication penetration rate was 59% in 2000 and in Great Britain the rate was 41% in 1999. It is more difficult to attract subscribers when the market is fully saturated than when the market is still open for new subscribers to come in. After introduction of MVNOs their market share increased very rapidly to pass 10% for less than 5 years in such unfavorable condition [2].

The necessity to introduce MVNO in Korea was recognized after developed countries began to introduce and when scholars asserted it also. But it took several years to officially discuss it and 6 more years for MVNO to eventually launch. It is because there are competing gains and losses for the market participants. MVNO market is a multilayer game space where MNOs (mobile network operator) and MVNOs compete and whose strategies are different and the government participates to regulate the market. MNOs are 3 companies of each biggest group such as SK, KT and LG in Korea and they have super power compared with MVNOs and consumers.

The government has a role to work as a referee to preserve fair trade in the market and consumers try to maximize their benefits compared to costs which they pay for mobile telecommunication services and to realize their preferences. In this paper the game among MNOs and MVNOs will be mainly analyzed. And also it will be analyzed somewhat whether the government is working properly as a fair referee in the game as well.

2. History of MVNO Introduction in Korea

In Korea the necessity of MVNO had been asserted continuously from about 2002. Introduction of MVNO was discussed concretely in the course of selecting wireless broadband internet licensee in 2005. Articles related to MVNO were included in the revision bill of Telecommunications Business Act in 2007 but the proposal was discarded automatically as the 17th term of Korea National Assembly ended in May 2008. But Korea Communications Commission (KCC) announced to resume MVNO introduction later as soon as possible in September of the same year. Here, we may find some hints that politicians did not pay much attention to the bill at that time but the government had a resolution to provide a field for MVNO.

Korean government introduced resale and wholesale system of telecommunication services by adding Article 38 in the revised Telecommunications Business Act on March 22, 2010[3]. Thus telecommunication companies had to offer their telecommunication service or network when other telecommunication companies ask to use. KCC provided MVNO task force with common carriers in April 2011 and agreed to provide support programs for MVNO launching in May. That program contains plans for mobile phone supply, supplementary services, facility relation between MNO and MVNO and cost share of facility establishment between MNO and MVNO.

On October 1, 2011, Telecommunications Business Act Enforcement Decree was revised for the government to designate mobile telecommunication company with the first market share as mandatory wholesale service provider and mandatory service and made the common carrier responsible for the whole licensee and service in order to protect subscribers from resale companies [4]. And 'Guidelines on compulsory wholesale service items of wholesale company, conditions, process, method and price calculation' was established on November 23th in the same year. From that time, other two common carriers also gradually came to allow network connection to the qualified MVNOs [5].

In July, 2011 Korea Communications Commission established 'Wholesale Guidelines' which contains contents about mass purchase discounts, wholesale price of data only services, resale and self consumption [5]. MVNO Activation Comprehensive Plan was provided to improve resale business condition and consumer's condition of resale service in March, 2012 and the government provided MVNO activation plans every year afterward. This means that the Korea government is trying continuously to improve the business condition for MVNOs. But it also shows that the programs are not complete thus they should be supplemented again. Wholesale prices of voice and data decreased every year thus the price of voice in 2015 was decreased to 36.3% of 2012 and the price of data decreased to 69.4% during those years.

Table 1. Introduction Trial of MVNO in Korea

Time	Contents
2002.6	The necessity of MVNO introduction suggested in the improvement plan of telecommunication service and business classification system
2007.10	Compulsory MVNO introduction included in the revision bill of Telecommunications Business Act
2008.5	Telecommunications Business Act revision bill automatically scrapped with termination of 17th National Assembly
2008.9	KCC announced to resume MVNO introduction

Table 2. History of MVNO Introduction in Korea

Time	Action
2010.3.22	Article 38 Revision of Telecommunications Business Act
2010.10.1	Telecommunications Business Act Enforcement Decree was revised for the government to designate mobile telecommunication company with the first market share as responsible for the whole licensee and service in order to protect subscribers of resale companies
2010.11.15	'Guidelines on compulsory wholesale service items of wholesale company, conditions, process, method and price calculation' established
2011.3.9	Report of SK Telecommunication's wholesale standard terms and conditions
2011.5.16	Support programs for MVNO's early launch of services established
2011.7.20	'Wholesale Guidelines' established
2012.3	'MVNO Activation Comprehensive Plan' provided to improve resale business condition and consumer's condition of resale service.
2012.11	Revision of Telecommunications Business Act Enforcement Decree(radio spectrum charge exemption from Oct. 2012 to sept. 2015)

Data: KCC, Jin Shin (2015)

Table 3. Wholesale Guidelines (2011.7)

Category	Contents
Bulk purchase discounts Rates	<ul style="list-style-type: none"> ◆ More than 200 thousand subscribers: 1% ~ ◆ More than 1,200 thousand subscribers: 6% extra discount
Data only MVNO Wholesale Price	<ul style="list-style-type: none"> ◆ 50% extra discount from existing wholesale price
Resale	<ul style="list-style-type: none"> ◆ Resale only to enrolled MVNO

Data: KCC, Jin Shin (2015)

Table 4. MVNO Activation Policies in Korea

Time	Plans	Major Contents
2012.3.29	MVNO Activation Comprehensive Plan	<ul style="list-style-type: none"> ◆ Phone supply condition improvement ◆ Resale service expansion ◆ WiFi network resale ◆ Propagation fee exemption ◆ USIM mobility expansion ◆ Phone number transfer system improvement
2013.5.15	Mobile Telecommunication Service· Phone Competition Activation and Family Telecommunication Cost Reduction Plan	<ul style="list-style-type: none"> ◆ 2013 wholesale price reduction: <u>voice 22% (54.5won/min→42.3)</u>, <u>data 48% (21.6won/MB→11.2)</u> ◆ Bulk purchase discount limit reduction (22.50 mil. min→10) ◆ LTE service, color ring and MMS included a wholesale service regulation ◆ Limitless voice service pack wholesale included ◆ Post Offices wok as sales shop

2014.6.26	2014 MVNO Activation Plan	<ul style="list-style-type: none"> ◆ 2014 wholesale price reduction: voice (42.1won/min→39.33), data 48% (11.5won/MB→9.64) ◆ Revenue allocation rate change of medium and low price items (telecommunication company 50%: MVNO 50% → 45% : 55%) ◆ Telecommunication company related MVNO market share 50% less
2015.5.22	Third Activation Plan for Second Leap of MVNO	<ul style="list-style-type: none"> ◆ 2014 wholesale price reduction: <u>voice (39.33won/min→35.37), data 48% (9.64won/MB→6.62)</u> ◆ Revenue allocation rate change ◆ Propagation fee exemption extended 1year ◆ MVNO pack diversification

Data: Ministry of Science, ICT and Future Planning, Jin Shin (2015)

3. MVNO Market in Korea

MVNO market has expanded very rapidly since it began to offer mobile telecommunication services from July 2011. In the first year market share was just 0.8 % but it became 2.4% next year, 4.4% the third year and 10.2% fifth year. During those years, government provided Guidelines and Activation Plans every year to prepare better operation conditions for MVNOs [5-10]. Thus MVNOs came to offer almost same telecommunication services with MNOs.

MVNOs may be classified by the firm independency and special relations with MNOs and firm sizes. The interactions among both MNOs and MVNOs and government policies are much different among countries. In some countries MNO established MVNO itself as a subsidiary company and in other countries MNOs has a negative stance against MVNOs [11]. In Korea the government initiated establishment of MVNOs. Thus we may say that there are three types of MVNOs such as MNO subsidiary MVNOs, other large company MVNOs, and small and medium MVNOs.

MVNOs related to large company group have 2,136 thousand subscribers and MVNO market share of 57.6%. Among them 3 MVNOs related to each MNOs have 1,130 thousand subscribers and market share of 22.4%. Other MVNOs have 2,136 thousand subscribers and market share of 42.4% among which 1,717 thousand subscribers belong to the MVNOs with Post Office sales support. Thus the other independent MVNOs have only 420 thousand subscribers and market share of 8.3% [12].

Table 5. Market Share of Mobile Telecommunication in Korea

		2011	2012	2013	2014	2015
Subscribers (1,000 persons)	MNO	5,211	5,234	5,468	5,263	5,016
	MVNO	40	128	249	458	592
	Total	5,251	5,362	5,717	5,721	5,794
Market Share	MNO	99.2%	97.8%	95.6%	92.0%	89.8%
	MVNO	0.8%	2.4%	4.4%	8.0%	10.2%

Data: Ministry of Science, ICT and Future Planning, Jin Shin (2015)

Table 6. Korean MVNOs Classified by MNO Networks (2016.1)

(1,000 persons)

MNO	MVNO	Subscribers (mkt. share)	
		2015. 4	2016. 1
SKT	SK Telink, Unicomz, KCT, KDLINK, Eyagi, eMart MOBILE, Smartel Mobile, Eyesvision, S1Net	2,335 (46%)	2,575 (42.6%)
KT	CJHelloVision, KTPowertel, Homeplus, CN COMMUNICATIONS, Enex Telecommunication, S1Net, Winner Stellenbosch, ACN Korea, Sejong Telecommunication, kt telecop, Free Telecommunication, Evergreen Mobile, KT M Mobile, N telecommunication	2,283 (45%)	2,815 (46.6%)
LG U+	MEDIALOG, Free Telecommunication, Merchant Korea, MTT Telecommunication, Homeplus, eMart MOBILE	422 (9%)	470 (7.8%)
	Total	5,041	6,042

Data: Ministry of Science, ICT and Future Planning

Table 7. Large Company Group MVNOs and MVNOs with Post Office Support (2015.4)

	MNO subsidiary and Subscribers	Large Company Group	Post Office Support
MVNO	SK Telink 818 (SK Telecommunication) KT M Mobile 181 (KT) MEDIALOG 130 (LGU+)	CJHelloVision 867 KCT S1Net eMart MOBILE	Unicomz 427 Eyesvision 397 Free Telecommunication 374 Evergreen Mobile 345 Enex Telecommunication 280 Merchant Korea, Sejong Telecommunication, Smartel, Winners Tel Great Human Software
Total (share)	1,130 (22.4%)	1,774 (35.2%)	1,717 (34.1%)

Note: numbers attached next to MVNOs are number of subscribers
Data: Ministry of Science, ICT and Future Planning Science

4. Game in Korea MVNO Market

In Korea the MONO market was not formulated naturally but the government provided the system to control the uprising telecommunication costs. If the government did not intervene MNOs would not have allowed independent MVNOs to enter the MVNO market even with the current condition. MNOs always try to maximize their gain and do not want to share those to others. Thus MNO and government have power to play main role in the Korea MVNO game and MVNOs try to find niches to play for possible gain. Consumers want to maximize consumer surplus but usually choose services without exact information in this MVNO game.

Table 8. Players in Korea MVNO Game

Player	Role
Government	<ul style="list-style-type: none"> ◆ Create efficient economic structure. ◆ Provide fair game rule. ◆ Preserve fair competition condition in the MVNO market
Consumers	<ul style="list-style-type: none"> ◆ Choose proper telecommunication companies and rate schedules ◆ Allocate telecommunication budget. ◆ Maximize consumer surplus given budget constraint.
MNO	<ul style="list-style-type: none"> ◆ Build and maintain mobile telecommunication facilities. ◆ Bargain with government to set MVNO market regulation rules. ◆ Offer mobile telecommunication services to MVNOs ◆ Manage subsidiary MVNOs ◆ Compete with MVNO for market share.
MVNO	<ul style="list-style-type: none"> ◆ Contract with MNOs in conditions given by the government and MNOs. ◆ Offer services to consumers.

4.1. MNO Subsidiaries

The largest MNO, SKT tried to merge CJHello Vision from 2015. In July 2016, Korea Fair Trade Commission did not permit the acquisition of CJHello Vision, which is the MVNO with market share of 17% in April 2015. If the acquisition succeeded, total market share of the two SKT group MVNOs would have increased to more than 33% in the MVNO market. In April 2015 KT also launched MVNO subsidiary KT M Mobile with capital 200 billion won. LG U+ has MEDIALOG as subsidiary also. Equity capital of KT M Mobile and MEDIALOG are around 200 billion won. The MVNO market share of them was 3.6% and 2.6% in April 2015 but will increase continuously. As MVNO market expands MNOs are trying to catch up the market and they have market power and develop new strategies. They are prepared to pick up share but somewhat try to read countenance of public opinions and regulators. There exists political economy. MVNOs depend seriously on the fair trade condition which government may provide.

4.2. Phone Supply and Phone Subsidies

MNOs have a lot of authorized dealers and agents. There are more than 20 thousand retail stores which sell mobile phones and connect subscription to each MNO in Korea. Generally retail stores include large national chains such as Hi-mart, E mart and so many online shopping malls such as G market, Auction, Inter-park and Eleven street. They sell mobile phones and connect subscription for all the three MNOs at the same time. There are also many authorized agents controlled directly by each MNO. MVNOs do not have any agents which will work for them excluding 651 Post Offices in the country [13].

Another problem is that smart phone producers do not sell some new high end phones to MVNOs. Subscribers of MVNOs cannot buy new high end phones from MVNOs. MVNOs also cannot offer subsidies to the upfront high end smart phones on the contrary that MNOs do. Thus consumers who want to use new high end phones rarely choose MVNOs. It is suspected that there are some unfair relations between MNOs and smart phone producers. And also MNOs may make MVNOs who use their mobile network avoid selling the new high end phones. And smart phone producers such as Samsung and Apple supply phone units much cheaper than the price which telecommunication companies offer to the consumers. But they generally do not supply them to MVNOs with the same conditions. It is not fair. Everyone has the right to use any phones they choose without discrimination and it should be supported strictly in the country. But this rule does not work in Korea.

Three mobile network operators announced their subsidy plans for the new Galaxy S7 series on March 11, 2016 to attract new subscribers. The amount varies depending on the type of monthly plans but generally, the higher the base fee the larger the subsidy. Table 4 shows subsidized offer for ‘Galaxy S7 32G’ by telecommunication companies. LG U+, the smallest carrier, offers the highest subsidies on most plans as it tries to expand market share but the difference from other two companies is not so big.

Table 9. Mobile Phone Stores (2015.6)

	SK Telecommunication	KT	LGU+
Direct Controlled Store	4,159	2,778	2,077
Retail Stores	Large Chain Store	1,539	1,394
Retail Stores	Small Retail Store	11,623	9,945

Data: Ministry of Science, ICT and Future Planning

Table 10. Phone Subsidies Offered by Telecommunication Companies (Galaxy S7)

(unit: won)

Basic Monthly Fee(around)	SK telecommunication	KT	LGU+
100,000	248,000	237,000	264,000
50,000	137,000	143,000	158,000
30,000	61,000	66,000	79,000

Data: SK telecommunication, KT, LGU+ home pages, Jin shin (2015)

Table11. LTE Phone Flat Rates of MVNOs (2016.1)

(unit: won)

Data(Mb) /Voice(min)	MVNO	Basic Monthly Fee	Telecommunication Company(KT)
250/100	Merchant Korea	7,800	29,900
300/100	Sejong Telecommunication	8,000	29,900
1,000/100	Great Human Software	12,900	34,900
600/50	Great Human Software	8,900	34,900
700/50	Free Telecommunication	9,900	34,900
1,500/70	Sejong Telecommunication	15,000	39,900
1,000/no limit	Winners Tel	24,900	34,900
10,000/no limit	Evergreen Mobile	39,900	59,900

4.3. Monthly Rate Plans

Recently telecommunication companies began to offer calling plans that offer ordinary voice free and only charge video call and data. The voice calls use data also but telephone companies levied roughly 10 times compared with fare for the data until recently [1]. As market share of MVNOs increase sharply, telecommunication companies came to correct their distortion of the rate system in order to make their service appear more attractive. The minimum monthly rate of telecommunication companies is around 29,900 won. If the consumer is not a heavy consumer he may save 3/4 from the charge of telecommunication companies when he subscribes to MVNOs. Even though he is a heavy consumer he can save about 1/3. Telecommunication companies offer strategic discounts to attract consumers when the consumers make themselves tied to friends and other persons or subscribe to bundle internet, TV or line phone and when they use credit cards connected to the telecommunication companies.

Phone producers such as Samsung and Apple offer subsidy (discount) to three telecommunication companies but they usually do not to MVNOs. It looks apparently an unfair practice but Korean government did not regulate it. I cannot find any rational reasons there. Telecommunication companies give different amount of discounts to the subscribers who purchase new phones depending on the price levels of rate plans. This behavior encourages consumers to use higher data plans than necessary. Thus consumers choose higher rate plan leave more ratios of data offered than lower rate plan consumers. In 2012 consumers using LTE34 (34,000won/month) use 87.1% of data offered but consumers using LTE 72(72,000won/month) use only 42.6% and leave 57.4% unused [14].

Consumers may choose rate discount rather than phone subsidy, 20% of the fare is discounted. In this case if the monthly rate schedule is 100,000 won, the rate discount is 20,000 won and if the rate schedule is 30,000 won the rate discount is only 6,000 won. If the subsidy belongs to the purchase of a phone, the subsidy should be offered the same amount to any consumers of the same phone.

4.4. Restriction of Strategy Choice

MVNOs have just a small range of strategy choice. They can only design calling plans not to overlap other MVNOs' to lessen mutual competition and fee levels to maximize their own potential niche markets. If consumers have experienced MVNO, more than half of them may feel better but most consumers may not have enough information for rational decision. According to '2014 MVNO Survey' of the private survey company trendmonitor (www.trendmonitor.co.kr), consumers thought the major obstacles to market expansion of MVNOs were low level of awareness of MVNO(52.7%), low confidence level of MVNO(38.2%), low understanding of MVNO(32.2%), and 73.4% of respondents answered that they would consider subscribing to MVNO if MVNOs offer more various attractive smart phones [14]. About half of consumers do not know that the services offered by MVNOs are not much different from the MNOs. And they just guess that the range of services is very limited and the quality of telecommunication is also lower than MNOs. MVNOs do not supply new high end phones but consumers can purchase independently and use MNO services. There are many consumers who do not know this in the right way. MNOs make confused consumers who are potential MVNO consumers. The government regulators do not pay attention to these real problems.

4.5. Mobile Device Distribution Act

Mobile phone consumers had to subscribe mandatorily to unnecessarily costly rate plans with receiving low price phones and bear high cancellation fees for cancelling before their contract expired. Consumers were discriminated as the price of mobile phones varied with different subsidies to each consumer. 'The Mobile Device Distribution

Improvement Act' came into effect on Oct. 1, 2014. The law banned subsidies discrimination, capped subsidies and made discount rates on mobile plans in proportion to the subsidy.

But the law is based on very myopic view. The law mainly regulates upper limit of subsidies offered by MNOs and neglects price discrimination of smart phones by phone producers according to purchasing power and probably unfair connections between MNOs and mobile phone producers such as Samsung and Apple. That is, it concentrated on the partial improvement to curb the variation of subsidies given to individual consumers. But it was not the fundamental solution to maximize total consumer surplus. The law made it possible for MNOs to pay lesser subsidy to agents and made consumers pay more money for the mobile phones. Only MNOs came to gain more.

Table 12. Game Strategies of MNO and MVNO

MNO	MVNO
<ul style="list-style-type: none"> ◆ Utilize subsidiary MVNO to keep market share ◆ Monopolize supply of new high end phones ◆ Offer Subsidies more to heavier consumers ◆ Utilize tying subscribers, tying with other services such as internet services, TVs, and line phones. ◆ Offer financial benefit by cooperation with credit card companies 	<ul style="list-style-type: none"> ◆ Avoid overlapping calling plans against other MVNOs ◆ Make slightly different service packages and cheaper fee schedules compared with MNOs

5. Conclusion

MNOs have super power and play as a monopoly group in the Korea MVNO market. The three MNOs look like sharing marketing policies and have almost the same strategies in the rate schedule, phone and service charge subsidy and other policies. They may compete for bigger market share and sales or profits but we can hardly find any difference in sales policies. Thus we may say Korea mobile telecommunication market is not oligopoly but monopoly with three big MNO branches. MVNOs usually keep rules set by the government and MNOs. They have little power to negotiate contract conditions with MNOs. MNOs pay some attention to public opinion which affects the government regulators. Each MNOs has its own MVNO subsidiary. They have large equity capital around 200 billion won each and potentials to expand market share which is about quarter in total now.

New high end phones are supplied only to MNOs and product price discounts are offered only to MNOs by phone producers restrict competition seriously in MVNO market in Korea. Subsidies offered more to heavier consumers by telecommunication companies (MNOs) reduce consumer surplus a lot. These two behaviors are unfair discriminations. In the Korea telecommunication market there exists discrimination between MNO and MVNO by phone producers and discrimination between consumers according to their rate plans by MNOs. Discrimination of smart phone supply between MNO and MVNO affects consumers seriously since consumers do not choose MVNOs if they cannot get new high end smart phones from MVNOs.

MVNOs can utilize only limited range of strategies which contain designing rate schedule to avoid competition between MVNOs and differentiate from MNOs. Half of consumers do not have proper information about MVNOs, thus they cannot take advantage of the low cost services. Korea telecommunication market is seriously distorted. But the government does not try to solve these problems in the right way. Unfair game in MVNO market may reduce consumer surplus seriously. Thus if fair trade rule were established in the market, the distortion of market would be corrected and the communication cost of consumer will be decreased to half roughly.

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