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**Cambodia Mobile Telecommunication Market:
Opportunities and Challenges**

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ABSTRACT

Information and Communications Technology (ICT) has become a necessity in social and economic development and is a leading sector to enable and drive growth in other sectors in Cambodia such as education, agriculture, and health. Recently, the mobile telecom service market in Cambodia has demonstrated rapid growth, which is jumping off the fixed-line, with a penetration rate of 75.27% of the total population by the end of 2010. Despite this rapid growth rate, the mobile telecom service market in Cambodia faces a number of key challenges. There seems to be excessive competition in the mobile telecom service market due to the number of operators (eight active operators). In the short term, this market favors demand side rather than supply side by lowering prices. Consumers' welfare increases with the lower prices resulting from heavy competition. Also the dominant market players gain relatively higher profits while those of the less-dominant players have been squeezed by increasing market polarization. Furthermore, there is a lack of sector policy framework, Telecommunication Law, which means government Ad hoc regulations are implemented in the market to resolve the issues. These factors will contribute to market failure and lower market efficiency in the long run. This study examines the competitive environment of the mobile phone market in Cambodia to identify what the challenges are and how to overcome them through the involvement stakeholders in the mobile phone market in Cambodia. In addition, we criticize the current static efficiency-based market performance. We analyze various data including relevant government documents, operators' data, and materials from relevant websites. Furthermore, a survey was conducted with 150 people to examine the consumers' assessment on the experiences of mobile telecom services usage. The expected results will verify that the current static efficiency-based policy framework results in a stagnant market and is lacking sustainable driving force, which needs to be resolved in the dynamic perspective. Finally, we propose future policy framework for the dynamic efficiency enhancement in the market.

Keywords: Telecommunication Policy, Cambodia, Mobile Phone Market

INTRODUCTION

Telecommunication services have become a necessity for communication in society, and require good infrastructure and policies to satisfy both sides of the industry: service providers and service receivers. Telecommunication services permit a quick response to market communication at all geographical levels: city, national, regional, and global. Also, the service offers market efficiency and economic growth of the country (1). The telecommunication service was initiated as a universal service in the United States in 1907 when Theodore Vail, the President of AT&T, introduced the interconnection system (2). In addition, Telecommunication appears to be a high risk-prone industry and demands strong network externalities (3). As the sector grows, the Telecommunication service is becoming more complicated in term of market competition, policy and regulation, and technology. The government plays important role in supporting the sector growth of Telecommunication in Cambodia. The Ministry of Post and

Telecommunication of Cambodia (4, 5) is the only institution in charge of establishing policy and regulation; and Telecom Cambodia, a state-owned enterprise established on 1st January 2006, is in charge of infrastructure relating to the telecommunication sector in Cambodia (6).

Cambodia, a country with a long history and a population of 14.7 million, is one of the developing countries located in Southeast Asia suffering from civil wars and struggling to recover itself to catch up with neighboring countries. Recently, Cambodia has seen an improved economy at the macro level and better ICT infrastructure development. Since political stability and economic growth, Cambodia adopted free-market policy and conducted a privatization process since 1991. Digital communication had been adopted in Cambodia rapidly to support high-demand for real-time communication (7). This contributes to mobile phone market development. Interestingly, the Cambodian mobile phone market attracts strong investment interest to accommodate competition in the market. The mobile phone market in Cambodia has become a hot-spot of market competition lately due to the fact that 8 companies are active in the small population market (8). Cambodia's mobile phone has increased faster than expected and higher than that of the fixed phone market (5). According to Asia Pacific Digital Review, Cambodia was one of countries in the world in which mobile phone subscribers grew faster and overtook fixed phone subscribers (9).

Despite the fast penetration growth rate, the mobile telecom service market in Cambodia faces a number of key challenges – unfair competition, interconnection issues, and lacking of overarching framework (10, 11). There seems to be excessive competition in the mobile telecom service market due to the proportionally high number of active operators. In the short term, this market favors demand side rather than supply side by lowering prices. Consumers' welfare increases with the lower prices resulting from severe competition. Also, the dominant market players gain relatively more profits while those of the less-dominant players have been squeezed by increasing market polarization. In the long run, these factors will contribute to market failure and lower market efficiency. As a result, the main objective of this study is to examine the competitive environment of the mobile phone market in Cambodia to identify what challenges there are and how to overcome them through the involvement stakeholders in the Cambodian mobile phone market. In addition, we criticize the current static efficiency-based market performance. To meet the objective, we established the research questions: (1) is the Cambodian mobile phone market profitable? And (2) should Cambodian mobile phone market be restructured to ensure sustainability in the long run?

The paper structure is organized as follows. Section 2 – Cambodia Telecommunication Market briefly introducing Facility-Based Competition and Service-Based Competition, Cambodian Mobile Phone Market Structure and Cambodian Telecomm Regulations. Section 3 – the research methodology of this study will be described. Section 4 – the result and discussion will be discussed. Finally, section 5 – the conclusions, including implication and limitation will be provided.

CAMBODIA TELECOMMUNICATION MARKET

FACILITES BASE COMPETITION VS SERVICE BASE COMPETITION

Facilities Base Competition (FBC) or 'infrastructure competition' refers to service providers that possess all the required equipment to build their own platform to offer substitutable services (3). Although FBC requires severe investments in

infrastructure, the government implements FBC policy in order to promote technology competition and enhancement between incumbents and new entrants (12). The FBC policy enables advantages such as increased flexibility and innovation in providing services (13), less intervention from government policy (14), and increased long-term efficiency (3). However, the FBC has enforced barriers to new entrants and requires tremendous sunk cost investment. In this sense, new entrants are hardly entering into market for competition. Therefore, incumbents could afford to enjoy lower average cost by economies of scale.

Unlike the FBC, Service Base Competition (SBC) plays a vital role in supporting the entrants through lowering barriers. The SBC enables the entrants to pay more attention to flexible business models, compete with incumbents and lease the facilities (11). The market efficiency in the telecommunication sector requires a workable market competition strategy. Additionally, the SBC incorporates workable market structure in the short run to flexibly fulfill customer demands due to untied upfront investment (15). According to Das, telecommunication market competition requires two main factors: sustainability and efficiency of competition (16).

The mobile phone market in Cambodia is mixing scenario between FBC and SBC; however, it seems favor to SBC scenario. The higher dominants in market possess their own facilities and equipments and the lesser dominants share infrastructure with incumbents. According to Strangio, the issues of interconnection and tower sharing had been raised as barriers to industry (17). Due to the numbers of operators, the mobile market was dragged into a fierce competition between mobile operators. This scenario made the mobile market in Cambodia focusing on service-based competition. The market promotion played an important role in service competition. Additionally, it led to lack of infrastructure and R&D investment to improve service quality.

CAMBODIA MOBILE PHONE MARKET STRUCTURE

Mobile phone market in Cambodia becomes fierce in competition and complicated in market structure. Before 2008 the mobile market consisted of only four main players that enabling market expansion. The Royal Government of Cambodia is promising to provide political stability and economic growth, which is a key attraction to investment in telecommunication sector. Currently, the mobile phone market consists of eight private companies, including the new merged companies – Latelz and Applifone – in early January 2010. The perspective from operators’ side is that the mobile phone market is overcrowded (7). As a result, the mobile penetration rate is growing rapidly. The following table will provide information about technologies, market share and basic tariff fees (within and across networks) as well as data access from each operator.

Table 1. Data is from each operator’s website and Total Population 14.7 millions (5)

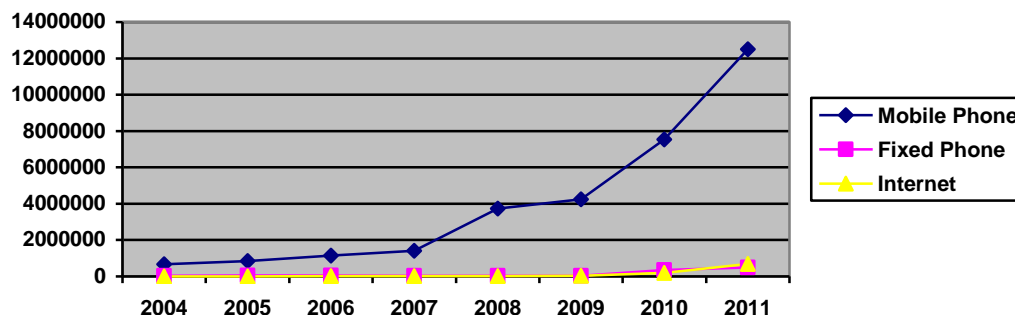
Operators	Technology	Within Network	Across Network	Subscriber (Market Share %)	Data Access
Viettel	GSM 900/1800MHz & 3G	6.5¢	10¢	5,700,000 (44.99%)	1\$/day for 150MB
CamGSM	GSM 900/1800MHz & 3G	5¢	7¢	2,900,000 (22.89%)	400KB = 1¢

MFone	EGSM 900, GSM 1800 MHz, CDMA 450MHz & 3G	7¢	7.5¢	1,500,000 (11.84%)	50KB = 1¢
Hello	GSM 900/1800 MHz & 3G	8¢	11¢	1,180,000 (9.31%)	100MB/50¢
Latelz- Applifone	GSM 1800 MHz & 3G	5¢	6¢	800,000 (6.31%)	50KB = 1¢
SOTEL CO	EGSM 900 & GSM 1800 MHz	5¢	6.7¢	500,000 (3.95%)	450Kb - 1¢
Cadcomm MMS	3G	5¢	7¢	50,000 (0.39%)	1MB/¢
GT-TELL	CDMA 1800MHz	5¢	7¢	40,000 (0.32%)	3\$=1.5GB

Surprisingly, mobile phone and Internet penetration rates have grown noticeably. The mobile penetration rate has increased rapidly nineteen times from just 2004 to 2011. There were only 660,993 subscribers in 2004 and 12,500,000 subscribers in 2011. Cambodia was considered one of the fastest-growing mobile phone markets in the world, as mobile phone subscribers surpassed fixed phone subscribers in the market (4, 18). In 2011, the mobile penetration rate was 91%, and it is expected to increase more than 100%. Although Internet subscribers have increased eighty-eight times from 7,671 subscribers in 2004 to 680,000 subscribers in 2011, it is only 5%, which is still relatively low compared to whole population (7). In 2011 based on MPTC data among the operators, Vietnam's Military Telecom Corporation (4) captured the market share quickly up to 45% since it launched in February 2009 (4).

The fixed phone penetration rate is only 3% of total population which is increased thirteen times from 37,590 subscribers in 2004 to 500,000 subscribers in 2011. However, it is a very limited growth rate compared to that of the mobile phone and Internet market. The following graph provides the number of subscribers of mobile phone, fixed phone, and the Internet from 2004 to 2011.

Graph 1: Number of Subscribers in Mobile Phone, Fixed Phone, and the Internet (18).



TELECOMMUNICATION REGULATION

Recently, Cambodia made a strong effort to reach many achievements in the ICT and Telecommunication sectors such as increasing the number of subscribers in all technologies of mobile phone, fixed phone, and Internet. These achievements can be achieved through closed collaboration with the International Telecommunication Union (ITU). The Ministry of Posts and Telecommunications Cambodia understands the importance of the ICT and Telecommunication sectors and provides strong support to all cooperative projects with other development partners to strengthen the sectors (19). The Ministry of Posts and Telecommunications Cambodia is in charge of establishing policy, regulation and managerial roles including responsibility for issuing and managing licenses and frequency spectrums related to Telecommunication sector in Cambodia. Currently, there is no overarching policy or framework for the Telecommunication sector in Cambodia. However, there are existing laws and regulations that are noted to possess significant gaps and loopholes and are used to govern the sector. The draft version of Telecommunication Law was issued in 2000 and is under the process of discussion and revision at the Office of Council of Ministers. The Royal Government of Cambodia has shown a promising sign of putting effort into the law, but there is no exact deadline for its enactment (20). Therefore, we can understand that the Telecommunication sector in Cambodia has a lack of strong regulation and monitoring to accommodate the strong competition in the market. In addition, the sector is lacking policy support on backbone infrastructure and R&D investment.

RESEARCH METHOD

In this study on mobile phone market structure in Cambodia, we adopted qualitative study method for collecting all relevant documents. Government relevant documents such as meeting reports, regulation, Prokas (official directive), and minutes of workshops were collected through the website of the Ministry of Post and Telecommunication Cambodia (21). In addition, the draft of the Telecommunication Law was obtained from the Council of Ministers. Besides the government documents, others relevant data on technologies, tariff fees within and across networks, and Internet data access fees were collected through media websites in Cambodia. This qualitative study allows us to capture overall picture of telecommunication environment in Cambodia.

Secondly, we checked the concentration level of the mobile phone market through applying the Herfindahl-Hirschman Index (HHI) method, which is widely accepted in anti-trust law, competition markets structure, and technology management (22). Herfindahl Index is applied to measure the level of concentration in the industry's market structure to ensure anti-trust law. According to Chin, "Herfindahl Index is calculated by summing squares of the percentage market share held by respective firms" (23). Therefore, the formula of HHI is shown as following:

$$H = \sum_{i=0}^N S_i^2$$

The index is classified into 3 categories: below 1500 is "*unconcentrated*", between 1500 and 2500 is "*moderately concentrated*", and above 2500 is "*highly concentrated*". The less-concentrated market structure means it is moving toward perfect competition while the highly-concentrated means monopolistic competition in the market.

Thirdly, we conducted a survey to examine the consumers' assessment on their experiences of mobile telecom services usage. We conducted with 150 mobile users in the capital, Phnom Penh, and Kratie province by distributing questionnaires in hard copies in several locations: business areas, Cambodia Mekong University, and markets. We translated the questionnaire into Khmer, Cambodian language, through a back-translation process.

RESULTS AND DISCUSSIONS

According to our analysis on the documents and data collected from various sources, the results of this study present two significant challenges: market structure and telecommunication policy. First of all, market structure could be distorted in the long run due to the fact that some operators might experience a deficit of revenue or negative profit. Although the Herfindahl Index results show that the market concentration level is 2830, which is classified as highly-concentrated, the market structure can be considered as less competitive and move toward monopolistic competition. Based on the evidence, Metfone from Viettel operator has owned 45% of the market share after distributing 500,000 Metfone SIM card for free (9). It provides concern to the sector that competition is moving toward monopolistic competition due to this unfair competition. The Herfindahl Index for the year 2010 is 2492, which is less than 2500, expressing a certain level of competition as a moderately concentrated market (24-26). In addition, the Herfindahl Index cannot also determine the strength of competition in the market as it cannot evaluate the market competition since there are other factors contributing to market structure.

Since the predatory pricing issue was introduced in the market in 2009 it has led to disputes between two operators, Mobitel and Beeline, by accusing each other of interconnection blocking and predatory pricing (27). To solve the issue, the Royal Government of Cambodia established Inter-ministerial Circular on "Unfair Competition of Interconnection Blocking" dated on 29 September 2009, Regulation on "Measurement To End Interconnection Blocking" dated on 21 October 2009, and Directive on "Setting Up Floor Price" to set up a minimum price on 4 October 2010 (23). Based on the Directive on "Setting Up Floor Price", the tariff fees are USD 4.5¢ per minute for within network connection and USD 5.95¢ per minute for connecting across the network, excluding VAT and Specific Tax. Here is the formula for calculating interconnection fee:

$$\text{Interconnection Fee (4.65¢) + Crossing TC Fee (1¢) + Regulator Fee (0.3¢) + VAT + Specific Tax}$$

This price scheme has put an end to the predatory pricing competition; however, the competition is still occurred. The price scheme policy produced a controversial issue against the free market policy in the Telecommunication sector in Cambodia. Additionally, the government utilized free market policy, which means that particular interventions should not be introduced to operators. While operators put a huge effort into breaking down pricing packages to attract customers; the consumers are enjoying the environment of cheaper price packaging. As a result, the gap between revenue and penetration rate is so wide that it might discourage infrastructure investment, because the Average Revenue Per User (ARPU) has decreased tremendously due to strong competition in the market.

Secondly, the Telecommunication sector in Cambodia has a lack of overarching policy or framework, especially the Telecommunication Law and Radio-Communication Law and Frequency Monitoring, which are necessary to enact enforcement and sector

implementation. As the competition in the market is getting stronger, the overall policy/framework is necessary to govern both desirable and non-desirable situations. Currently, the Telecommunication sector is utilizing government directives procedure as measures to intervene or resolve issues in the market. Furthermore, the service-based competition has dragged down R&D and infrastructure investment, which cause trouble to service quality. According to MPTC, Cambodian mobile phone market adopted 2G technology since 1992 and 3G in 2008. By the end of 2010, there are only 64% of mobile phone users uses 3G and 30% of users is still using 2G (28). Additionally, the user survey showed that 56% of mobile phone user expressing difficulties in communication within the network and 73% experienced difficulties in communication with users from across the network. The impression on slow progress of technology development in the telecommunication sector is a concern of the mobile phone market in Cambodia. Moreover, the percentage of using 2G is still considerably high. As a result, Cambodian mobile phone market should focus on FBC to strengthen infrastructure and boost quality of technology.

According to the survey, 72% of users possess more than one SIM cards from the same mobile operator or from different operators. Additionally, there are some users who own even more than two SIM cards. Mobile users provide several reasons for using more than one SIM card: 64 users out of 150 separate business contact from personal contact, 61 users out of 150 avoid extra payment for across network call, 48 users out of 150 avoid communication errors during their call, and 35 users out of 150 use other devices such as tablet PC or 3G flash drives to access the Internet.

Furthermore, 62% of users mentioned that they have experienced changing from one mobile operator to another. 114 out of 150 users experienced difficulties in calling from one network to another, while 68 out of 150 users experienced difficulties in calling within the network. During the communication on the call, 110 users experienced difficulties in communication across networks while 84 experienced difficulties in communication within the network. The demographic table shows this as follows:

Table 2: Demographic Sampling

Measure	Item	Frequency	Percentage (%)
Location	Capital city	118	79
	Province	32	21
Gender	Male	101	67
	Female	49	33
Age Group	below 19	5	3.4
	19 ~ 24	45	30
	25 ~ 30	52	34.6
	30 and above	48	32
Education	High School	9	6
	Bachelor Degree	91	60.7
	Master Degree	46	30.7
	Doctoral Degree	4	2.6

Occupation	Student	36	24
	Businessmen	15	10
	Gov. Official	31	20.7
	Private Company/	68	45.3
	NGO Staff		
Average spending for using mobile phone	1 – 5\$	27	18
	6 – 10\$	48	32
	11 – 20\$	33	22
	21 – 30\$	19	12.7
	31 – 50\$	9	6
	50 – 100\$	4	2.7
	100\$ and above	10	6.6

CONCLUSION

Throughout our results and discussions, this study would like to establish two concrete recommendations to the Royal Government of Cambodia for strengthening sector growth. Firstly, the enactment of Telecommunication Law in Cambodia should be done as soon as possible to support the competitive environment of the mobile phone market, as well other relevant laws such as the Radio Communication Law, Spectrum Management, and Cyber Law (29). This will enable support for facility investment of mobile operators. This is very critical step for the Royal Government of Cambodia to work towards. We aware that MPTC made a strong effort on strengthening infrastructure; however, there are still limitations in focusing on infrastructure and R&D investments and the role of collaboration with development partners on infrastructure development projects.

Secondly, Merging and Acquisition (M&A) is a new trend for a competitive market environment like the mobile phone market in Cambodia. The Royal Government of Cambodia should be ready to establish M&A regulation in order to ensure a sustainable environment of competition and sector-friendly growth of the mobile phone market in Cambodia. The main benefits of M&A permit the operators to increase investment on infrastructure and market power, and eliminate interconnection cost between companies. As evidence of this M&A, in January 2011 two new entry operators of Latelz and Applifone merged together under the brand Smart . Therefore, merging and acquisition (M&A) might be a new trend for operators to gain more market power to rise up in market competition.

This study provides an implication on policy of the Royal Government of Cambodia. The government could expand the environment of the mobile phone market to ensure sustainable growth of the Telecommunication sector, and utilize recommendations of this study for further development of the sector. The implication of this study contributes to an overall framework to re-consider policy enforcement in the mobile phone market in Cambodia. Another implication of this study is that this paper might be

the first academic paper focusing on mobile phone market structure analysis in Cambodia.

However, this study provides two limitations, which contribute to future work. The first limitation is that there is a lack of data from the operators' side. The data of subscriber numbers is not sufficient for detail analysis on the market structure. In order to optimally analyze the mobile phone market efficiency in Cambodia, we required data on the operator's financial input and output performance. This can be a future study topic on the Telecommunication sector in Cambodia. The second limitation of this study is that all data used in this study is secondary data. In addition, most of them are not academic research papers. There are not many academic research papers to be found that focus on the Telecommunication sector in Cambodia.

In conclusion, the Telecommunication sector in Cambodia requires a strong regulation and the implementation at ground level of overall policy or framework. The Cambodian mobile market structure is a strong competitive environment, which means that some of operators might experience negative profits or deficit of revenue, although there is a floor pricing introduced. The mobile phone market's strength is the rapid growth of penetration rate and improvement of infrastructure for national coverage. The market structure seems over-crowded, which put strain on operators to gain economy of scale. The policy should push toward FBC to enhance infrastructure and quality of service.

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