

Jirakasem, Monarat; Mitomo, Hitoshi

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Substitution between mobile telephony and OTT communication services: the case of Thailand

Monarat Jirakasem^{*}, Hitoshi Mitomo

Graduate School of Asia-Pacific Studies, Waseda University, JAPAN

Abstract:

This research aims to examine the relation between Over-The-Top (OTT) services and mobile telephony. It will also investigate factors affecting customer use of OTT services. Such services have been increasing in terms of revenue and intensity of usage; conversely, revenue from mobile telephony has been declining. As a result, many analysts expect that OTT services may soon replace mobile telephony. Nonetheless, empirical research regarding this assumption is scarce, particularly in the case of Thailand. Thus, this research aims to explore the claim regarding substitution between those two communication services. The research relies on survey data collected in 2014 by NBTC, and comprises 4,716 observations. OTT services in Thailand were found to be complimentary to mobile telephony usage (p-value < 0.001). Furthermore, individuals tend to employ OTT services if they are: female, not married, gaining higher income and education, living in urban areas, owning smartphones, and using international calls. These results are expected to benefit policy makers and the telecommunications field by providing evidence showing that substitution between OTT services and mobile telephony has not occurred in Thailand.

Keyword: Over-The-Top (OTT) services, Mobile telephony, Thailand, Substitution effect

Introduction

Over-The-Top (OTT) services, which comprise applications or services delivered to customers via the Internet without any involvement of network operators (EPRS, 2016), were widely mentioned in the news and mass media in Thailand as a highlighted issue around the middle of the year 2017. Regarding the announcement of the National Broadcasting and Telecommunications Commission (NBTC), a regulator in Thailand, they are planning to generate a regulatory framework for OTT services to create a level playing field in the industry. As a first step, they required that Facebook fan page operators register themselves to the

^{*} Corresponding author

E-mail address: monar_jirak@moegi.waseda.jp

regulator and ensure that they do not provide unsuitable content and illegal advertisements. The regulator then declared that they would force foreign OTT service players to establish local offices in Thailand to legally and properly pay cooperate income taxes and abide by local law (Bangkok post, 2017). However, once those plans were announced, critics began to argue that they were unclear and not concrete. The NBTC decided to postpone the regulation plan. At this moment, the NBTC has yet to issue official regulations for OTT, but their announcement reflects an attempt to regulate and control OTT services, providing evidence that OTT services are becoming more crucial as important actors in the telecommunications and media market in Thailand today.

OTT services in Thailand

Similar to the situation in other countries, OTT in Thailand has been growing significantly in the past few years. Advertising revenue for OTT services was reported by the NBTC as approximately 2.16 billion Baht or approximately US\$69 million in 2016 (Ibid, 2017). There is also an expectation that premium OTT services in Thailand will grow 54% by 2019 (Reodique, 2016). Conversely, telecommunications service revenue has been decreasing because usage and subscriptions are continuously diminishing. Since the revenue of these two types of communication service is going in opposite directions, many analysts predict that it is highly possible that OTT services will replace other telecommunication services (Arthur D Little, 2012; Silverstreet, 2013 cited in Joshi et al (2016); L.E.K., 2015). Apart from this problem, official policies and regulations for OTT have not been established, as mentioned previously. Meanwhile, traditional telecommunication services, including mobile telephony, are obligated in the regulations such as those involving licensing, interconnection, and universal services. This situation is considered unfair competition or providing a lack of a level playing field. Thus, many estimations suggest that OTT will replace traditional telecommunication services, particularly mobile telephony. However, empirical studies on this assumption are limited, especially in the case of Thailand. Thus, in this research, OTT services are examined to analyze the claim that such services can substitute mobile telephony.

In this study, only OTT communications services are included. The term, OTT communications services, refers to applications provided on mobile devices that contain voice calling as the main feature. Facebook messenger, LINE, WhatsApp, WeChat, and Skype are examples of OTT communications services.

Previous research

Studies examining the replacement of telecommunication services by OTT communications services are quite limited. One of the few is the work of Arnold, Schneider, and Hildebrandt (2016). Their study fails to find evidence that OTT communications services are replacing telecommunication services. However, much of the literature has studied telecommunication services that are part of OTT services

or resemble such services, such as Voice over IP (VoIP) and mobile internet. Some of those studies found that VoIP or mobile internet could substitute mobile voice calling (Cecere & Corrocher, 2012; Lange & Saric, 2016). Other studies found that mobile internet complements mobile voice calling (Gerpott, Thomas & Weichert, 2014). The findings regarding this issue are mixed. OTT services and mobile telephony in Thailand will be investigated in this analysis to establish the substitution effect between new and old communications services.

Objective and contribution of the study

There are two main objectives for this research: 1) examine the impact of OTT services on mobile telephony, and factors affecting OTT service usage. This objective is expected to contribute to the field of telecommunications because empirical studies on this topic, particularly in Thailand, are relatively few; and 2) create guidelines for players in the telecommunications field, including regulators and policymakers.

Research Question and Methodology

The main research question is: What is the relation between OTT communications services and mobile telephony regarding the problem mentioned above? To further understand this phenomenon, the following research question is required: What are the factors affecting users to employ OTT services?

To answer these research questions, this study mainly relies on a framework adopted from the studies of Gerpott & Meinert (2016) and Cecere & Corrocher (2012). The first one emphasizes that resources, time, and budgets of the individuals are limited, so they might switch to the another functionally comparable choice, when a choice requires additional money or time (Becker, 1965; Ghose & Han, 2011 cited in Gerpott & Meinert, 2016). With resource limitations, users are likely to choose the service that is less time consuming and less expensive than others. These theories can imply that when OTT services and mobile telephony are functionally comparable, these two services negatively correlate. In other words, OTT communications services can replace mobile telephony. This is also the first assumption of the research question posited above.

For the second research question regarding factors causing users to change their usage, questions about customer characteristics were adopted from prior studies. These questions relate to socio-demographics and mobile tenure (Cecere & Corrocher, 2012; Gerpott & Meinert, 2016; Arnold, Schneider & Hildebrandt, 2016).

Because OTT communication services mostly have no price (i.e. prices that OTT services players provide to customers are zero due to their business model), cross price elasticity cannot be performed in this study.

Data acquired in this study were cross sectional, retrieved from the NBTC. The survey was conducted in 2014, which is the early period of OTT services in Thailand and comprised 4,716 respondents. Data were analyzed using Probit.

Variables

This study aims to investigate the substitution of OTT services and mobile telephony, so their usages are the main variables. OTT service usage is defined as a dependent variable named OTT_CALL (Table 1). The value of the variable takes 1 if he/she uses OTT calls on a daily basis, and 0 if otherwise. MOBILE_FREQ is the independent variable indicating mobile voice call usage; respondents were asked how many times on average each day they call using a mobile phone. Because the daily number of outgoing calls tends to differ significantly, it was ranked into three groups, 0, 1, and 2. Users who never call using mobile phones and users who rarely use them (less than 1 time per day), take value 0, and this rank is used as reference. General users (those who call 1–9 times daily), take value 1. The next one, 2, represents users calling ten times or more daily. This variable assumes that mobile telephony usage negatively correlates to OTT service usage (i.e. it is expected that OTT services replace mobile telephony usage).

Table 1: Descriptive data

Variable	Mean	Std. Dev.	Min	Max
OTT_CALL	.387	.487	0	1
MOBILE_FREQ	.987	.513	0	2
SMARTPHONE	.576	.494	0	1
INTER_CALL	.076	.265	0	1
FEMALE	.511	.500	0	1
MARRIED	.517	.500	0	1
AGE	40.177	16.198	15	93
AGESQ	1876.536	1391.805	225	8649
NO_DIPLOMA	.334	.472	0	1
INCOME	15.070	13.287	0.5	215
RESIDENCE	.335	.472	0	1

Source: Author's calculation

Apart from the main variables explained above, this study also examines the relation of consumption of smartphones and international call services and OTT services. Smartphones, defined as a SMARTPHONE variable, are considered an important communication device today. Smartphone users in Thailand comprise approximately 22.48 million (Statista, 2018), with a clear upward trend. With smartphones, users can use OTT services, but it is possible that they will keep using the traditional and more familiar communication services, for instance, non-smart mobile phones. Consequently, this variable is examined. When OTT services are available, users are more likely to employ OTT services instead of mobile telephony. Thus, smartphone usage is expected to positively correlate to OTT service usage. International calls, INTER_CALL, are expected to positively correlate to OTT services. Because international calls are expensive and OTT enables users to call for free or at a low price, users of international calls are more likely to change from international calls through PSTN to OTT calls.

Socio-demographic characteristics are included in the model to further understand customer behavior (Ibid, 2012). The first variable is FEMALE. This dummy variable takes 1 if the respondent is female, and 0 if the respondent is male. Regarding the work of Cecere and Corrocher (2012), females are more likely to adopt VoIP, so in this study, a sex variable was adopted and expected a similar effect. Thus, this variable is expected to positively correlate to the OTT variable.

The next variable is MARRIED. This variable represents respondents' marital status; 1 implies they are married, 0 otherwise. From the literature, this variable should result in a positive coefficient (i.e. married respondents are more likely to call using OTT). AGE and AGESQ refer to users' age and age squared. This variable is expected to be negative because it is possible that older people are less likely to spend time using technological devices. The NO_DIPLOMA variable indicates individuals' education level; respondents who obtained a diploma less than high school have a value of 1, and 0 for those who obtained higher than high school level. This indicator is predicted to be negative because higher-educated users are more familiar with technological devices and internet use. The next variable is INCOME, which indicates individuals' income, and it is expected that when people earn more income, they are more likely to purchase more sophisticated devices. The last variable is residence, which takes 1 if respondents are living in the urban area, and 0 if they are living in rural areas. The assumption on this variable posited that there would be a high quality of services and internet connections in the urban area, so people who live in such areas could easily enjoy good internet connections, leading to heavier usage of the Internet than those living in rural areas. Thus, this variable is predicted to be positive.

Results

Results of Probit analyses are provided in Table 2. The answers to each research question are explained in this section.

RQ1: what is the relation between OTT communications services and mobile telephony?

Mobile phone call usage is the most important variable in this research. The coefficient of mobile phone calling and OTT service usage is positively correlated, and statistically significant with a p-value = 0.002 for group 1, and 0.006 for group 2. Thus, OTT services and mobile voice calling are complimentary. Consequently, the assumption posited that OTT services could substitute for mobile voice calling fails; in contrast, the relation is complimented. In other words, people who make mobile telephone calls tend to also use OTT services.

RQ2: What are the factors affecting users' employment of OTT services?

To explore factors affecting individuals' use of OTT services, the usage of smartphones, international calls, and socio-demographic characteristics are included

in the model. Table 2 illustrates that all variables are statistically significant, except the age of the individual, and thus age is not related to OTT service use. The first factor variable is smartphone usage. Smartphone usage was found to correlate to OTT service usage, with a positive coefficient and p-value < 0.01. Similar to the international call variable, it is positively correlated to OTT call usage and statistically significant, with a p-value < 0.01. Thus, these two factors significantly affect users with respect to OTT service calling. In other words, those who possess smartphones are more likely to call using OTT, which is also the case if they are international call users.

Table 2: Results; dependent variable OTT_CALL

Variable	Coef. (std.err.)	Marginal effects dy/dx (std.err.)	p-value
<i>Factor variables</i>			
MOBILE_FREQ			
1	.304 (.097)	.393 (.006)	0.002
2	.311 (.112)	.394 (.015)	0.006
SMARTPHONE	1.518 (.061)	.356 (.010)	0.000
INTER_CALL	.463 (.086)	.106 (.02)	0.000
<i>Socio-demographic characteristics</i>			
FEMALE	.179 (.047)	.041 (.01)	0.000
MARRIED	-.154 (.06)	-.035 (.014)	0.010
AGE	-.015 (.011)	-.003 (.003)	0.195
AGESQ	-.0002 (.0001)	-.00004 (.0003)	0.225
NO_DIPLOMA	-.475 (.064)	-.11 (.014)	0.000
INCOME	.006 (.002)	.001 (.0004)	0.002
RESIDENCE	.12 (.049)	.026 (.011)	0.014
Number of obs = 4719			
LR chi2 (11) = 2444.32			
Prob > chi2 = 0.0000			
Pseudo R2 = 0.3881			

Source: Author's calculation

Socio-demographic characteristics were apparently important factors affecting OTT service usage. Apart from the age variable, which is not capable of indicating OTT usage, all socio-demographic characteristics were statistically significant. The first one is individual gender. Females were found to be more likely to use OTT in this case study, with a p-value < 0.01. The next one is marital status; married users were less likely to use OTT because the coefficient is negative with a p-value = 0.01. Individuals' education is the third characteristic indicating OTT usage. Because NO_DIPLOMA was negatively correlated to OTT calls, the higher the education respondents gained, the more likely they were to use OTT services. The fourth factor is individual income. This factor is positively related to OTT calls (i.e. people are more likely to use OTT services when they receive higher income). It is also possible

that when the people have more income, more expensive and sophisticated devices become affordable, and thus it is easier to enjoy online services such as OTT. This phenomenon may also be applicable regarding the last factor, residence; those living in urban areas are more likely to use OTT services. In sum, those more likely to use OTT services are female, not married, gaining higher education and income, and living in urban areas.

Discussion

In contrast to most previous studies focusing on substitution of mobile telephony and internet calls, this study surprisingly shows the complimentary relation between those two communication methods. OTT services appear to not have replaced mobile voice calling yet, instead they complement mobile phones in the case of Thailand. At present, concern about cannibalization or replacement of OTT services is probably exaggerated. Moreover, it seems that mobile operators, even internet providers, tend to be a partnership with OTT players; for example, offering customers additional services at a special price. Unless Net Neutrality[†] is implemented in Thailand, OTT players will continue to compete each other on a zero-rating[‡] plan, which eventually benefits internet and mobile network operators.

Even though this study did not find evidence for substitution between OTT services and mobile telephony, OTT services strongly correlate to smartphone adoption. Due to the technology being developed and offered at an affordable price, smartphone adoption has been increasing at a high rate; consequently, OTT service usage may also be increasing. Thus, mobile operators should consider their customer plans. Mobile internet-oriented plans may be interesting for smartphone users, rather than mobile voice-calling-oriented ones. In such a plan, customers would pay for mobile internet usage, and mobile voice calling would comprise an additional service. This plan may provide protection for the mobile voice calling market because it may trigger mobile telephony usage if users recognize that mobile voice calling is free or a low-price service. Mobile telephony is better than OTT services in terms of network stability, ease of use, and accessibility because OTT services are immature and need improvement. Moreover, OTT service quality mainly relies on an internet connection. If mobile voice calls are free or nearly free, customers may be more likely to choose mobile telephony as their primary communication service.

[†] Net neutrality is a principle coined by Tim Wu, stating that network operators may not discriminate between different data packets. In other words, data transmitted on the Internet should be treated equally without blocking, throttling, and discrimination. It is believed that this principle is capable of ensuring fair competition and innovation; innovators need not ask permission to distribute their innovations.

[‡] Zero-rating (toll-free data) is the practice of mobile network operators (MNO) not charging end users for data usage of specific internet content and applications of content providers (CPs) through their network but charge the content operators instead. It may benefit end users to use the services, but this practice can be considered anti-competitive and against the Net neutrality principle. (Peng and Preta, 2015, p. 1)

Nonetheless, because this survey was conducted in 2014, OTT services were still at an early stage in Thailand, and it is possible that it provided a complimentary service to mobile voice calls, and it may be that OTT has superseded mobile voice calls today. If OTT service substitution is currently occurring, policy makers will be required to obligate such services to regulations as well as other telecommunication services such as mobile telephony to maintain fair competition.

Limitation of the study

There are many limitations in this research. Firstly, as mentioned above, data regarding OTT has changed rapidly. The data used in this research can be considered relatively out of date. Thus, this study may provide a useful reference for future analyses because it can be compared how the popularity and emergence of OTT changed and affects other relevant services. Secondly, substitution effects could not be performed efficiently in this study because OTT service operators provide their services for end-users free of charge, so results in this study may slightly deviate from reality. Thirdly, the survey was designed in the form of a self-report. Individual answers may be different from actual usage. Moreover, the reasons why people living in urban areas enjoy OTT services more than those in rural areas were not thoroughly investigated in this research. It is assumed that the quality of the internet is better and more stable than in rural areas. However, there may be other reasons, such as users' values and attitudes, popularity of OTT services, motivations and user perceptions, which require further study.

Conclusion

Over-The-Top (OTT) services is a crucial topic today. OTT service usage has been increasing significantly; at the same time, revenue from mobile telephony, a traditional communications service, is declining. Therefore, there are many predictions made by analysts that OTT services will soon replace mobile telephony. However, the empirical evidence for this assumption is limited. This study aimed to investigate the substitution between OTT services and mobile telephony; in fact, both services were found to be complimentary in Thailand. In other words, OTT services are not replacing mobile telephony in this country but are positively correlated. Nonetheless, there are factors indicating the tendency to use OTT services; those who are female, not married, gaining higher income and education, living in urban areas, owning a smartphone, and international call users. This study contributes to the field of telecommunications in many ways. The work provides evidence of replacement of OTT services from mobile telephony but fails to suggest complete substitution. The study also shows those factors affecting users' adoption of OTT services in Thailand, as well as providing guideline for policy makers and mobile operators to adjust their plans to maintain fair competition in the telecommunications market. However, this

study still has many limitations, which are hoped to provide a reference for further communications service studies.

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