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## Conference Paper

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# Determinants of the subscription to bundled services and their effect on customer retention in the Korean communications sector

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## Abstract

Since bundles provide price discounts to customers and have lock-in effects for businesses in the communications sector, the number of bundle subscribers is rapidly growing in many countries, including Korea. The consumer welfare and marketing effects of bundles have been well documented. Existing literature, however, has paid little attention to identifying the facets of benefits and risks that influence subscriptions, the differences in switching costs between subscribers and non-subscribers, and the relationships among bundle satisfaction, customer retention, and switching costs. To address these gaps, we performed an empirical analysis using survey data from 550 individuals. Our findings show that concern about lock-in and performance as well as economic benefits influence subscriptions to the bundles, switching costs are higher for the subscribers than for stand-alone service users, and monetary switching costs of bundles directly affect customer retention. These results show the lock-in effects of switching costs of bundles in subscribers' decision-making, retention, and churn. The implications for regulatory policy and customer strategy are discussed.

*Keywords:* Service bundles, Bundling, Lock-in effects, Switching costs, Customer retention, Loyalty

## I. Introduction

Bundles provide several benefits to both customers and businesses in the communications market. Customers can get a variety of benefits from bundles, such as price discounts, additional savings, convenient payments, and a reduction of search costs (Adams and Yellen, 1976; Schilke and Wirtz, 2012). Bundles, on the other hand, have the potential for hindering customers' switching behavior through lock-in effects, and the restriction of competition among providers (Shih, 2012). Bundles are an efficient marketing method for providers to prevent subscriber churn because of the associated switching costs (Lee and Lee, 2010). These services are also likely to contribute to the efficient diffusion of new products or services in the communications sector.

As competition between service providers becomes more intense in the communications sector, securing customer loyalty is imperative to maintaining market position and enhancing corporate profits (Kim et al., 2004; Chang, 2015). Bundling has been highlighted as a core marketing strategy for keeping existing customers and attracting additional purchases (Bughin and Mendonça, 2007; Srinuan et al., 2014). As a result, service providers

have been making huge investments in the development and sale of bundles since the mid-2000s. Eurobarometer (2016) reported that the subscription rate of bundled communications services in EU households was close to 50% in 2015. A report of KISDI (2016a) showed that as of the end of 2015, 85.8% of Korean households were using service bundles, and of those, the subscription rate for communications providers was 71.8%. Korea has one of the highest subscription rates for bundles in the world.

Bundles have been studied extensively in industrial organizations and corporate strategy since the 1970s, covering topics such as leveraging of market power (e. g., Adams and Yellen, 1976; Whinston, 1989; Choi and Stefanadis, 2001), entry barriers (e. g., Nalebuff, 2004), strategies for introducing new products (e.g., Simonin and Ruth, 1995), and marketing strategies (e. g., Stremersch, and Tellis, 2002). Research on how bundles affect switching costs or customer loyalty is relatively recent (Kim, 2015).

Literature on bundles in the communications sector is mainly related to the effects on competition among providers and consumer welfare (Papandrea, 2003; Krämer, 2009). A few studies have identified the influential factors of bundle subscription, in terms of socio-graphics (e. g., Üner et al., 2015) and motivators (e.g., Klein and Jakopin, 2014; Srinuan et al., 2014; Mikkonen, 2015). The relationship between service bundles and switching costs has not been thoroughly examined in the literature (e.g., Burnett, 2014; Prince and Greenstein, 2014). In particular, discussions on the differences between the switching costs of subscribers and non-subscribers are far from complete (e. g., Prince and Greenstein, 2014; Kim, 2015). In the communications sector, there is little literature on the role of switching costs in bundle satisfaction and customer retention.

These studies have research gaps in that (a) except for economic benefit, factors influencing the subscription to service bundles have not been identified, (b), there is controversy as to whether the increase in switching costs of bundle subscriptions has a statistically significant effect, and (c) the role of switching costs in the relationship between bundle satisfaction and customer retention has rarely been analyzed.

To fill these research gaps, this study aims to explore the benefits and risks perceived by customers that determine their decision to subscribe to communications service bundles. We seek to identify the increasing effect of switching costs imposed by bundles. We also intend to analyze the effects of bundles in consumer retention or churn. Towards this end, we examined the market status of service bundles in the Korean communications sector and reviewed the research literature on bundling and switching costs to establish three research questions. We conducted the empirical study using survey data collected from individuals in Korea. We consequently discuss the findings of this research, and suggest implications for regulation and market strategy.

## II. Research background and research questions

### *2.1. The market status of communications service bundles in Korea*

Korea is one of the countries with the highest proportion and diffusion of subscriptions in information and communications services, including broadband internet, fixed and mobile communications, and paid broadcasting services (NIPA, 2017). The subscription rates of total households as of the end of 2015 for fixed telephony, broadband internet, paid broadcasting, and mobile communications were 64.8% (local calls: 47.9% and internet

calls: 18.4%), 71.9%, 96.3% (cable broadcasting service: 66.3%, internet protocol television (IPTV): 26.2% and satellite broadcasting: 3.8%), and 93.2%, respectively (KISDI, 2016b; Korea MISP, 2017).

Korea is also one of the leading countries in the bundle subscription of communications services. Service bundles were first introduced in the Korean communications sector in 1999 when a new entrant to the market, Hanaro Telecom, offered broadband internet and local calls as a package (KISDI, 2016a). The Korean Ministry of Information and Communication allowed the major providers to launch bundles through an amendment to the law in 2004. Under asymmetric regulation to prevent abuses of market power, the price discount was available for late entrants to the market, which impeded the market activation of service bundles (Park, 2010). After price regulations of bundles were relaxed in 2007, various bundled services were released in the Korean communications market, and as a result, the number of subscribers to these services has grown rapidly as shown in Table 1. As of 2015, 85.8% of total households are purchasing two or more services as a package from one provider, which shows that bundle subscriptions are prevalent among consumers of broadcasting and communications services. The consumer utilization rate of bundles offered by communications service providers was exceptionally high in 2015 at 83.7% (KISDI, 2016a).

**Table 1**  
Bundle subscription households of Korean broadcasting and communications services

(unit: ten thousand households)

Year		2007	2008	2009	2010	2011	2012	2013	2014	2015
Subscription company	Broadcasting	133	236	275	310	219	245	265	279	261
	Communications	176	388	688	897	1,043	1,140	1,187	1,262	1,344
Overall subscribers		309	624	963	1,207	1,262	1,387	1,452	1,541	1,606
Subscription rate in households		18.7%	37.2%	56.5%	69.5%	71.3%	77.3%	79.7%	83.5%	85.8%

Source: KISDI (2015, 2016a), Korea MISP (2017).

Tables 2 and 3 show the subscription rates in Korean households by service and bundle type as of 2015. Bundle subscription rates among households using each service of broadband Internet, fixed telephony, paid broadcasting, and mobile communications were 96.7%, 53.4%, 73.6%, and 49.0%, respectively. The households subscribing to double-play bundle service were the highest at 43.4%, followed by triple-play service (39.1%), and quadruple-play service (17.5%). The users of bundled broadband internet and others accounted for 96.7% (1,546 ten thousand households) of the bundle subscribers, which indicates that this service is the primary bundled service in Korea. The subscribers opting for bundles of broadband internet and mobile communications, or others were 760 ten thousand households (47.6% of total subscribers and 40.6% of total households). This shows that leading operators in broadband (KT) and mobile communications (SK telecom) areas have a competitive advantage.

**Table 2**  
Subscription rates by service in Korea as of 2015

Service	In all households	In subscription households by each service	
	Overall subscription rate	Subscription rate as bundles	Subscription rate as stand-alone
Broadband Internet	71.9%	96.7%	3.3%
Fixed telephony	66.3%	53.4%	46.6%
Paid broadcasting	96.3%	73.6%	26.4%
Mobile communications	93.2%	49.0%	51.0%

Source: Adaptive from KISDI (2015, 2016a), Korea MISP (2017).

**Table 3**  
Subscribers by bundle types in Korea as of 2015

(unit: ten thousand households)

Bundle types		Subscribers	Rate in total subscribers
Double-play	Broadband and paid broadcasting	339	21.2%
	Broadband and fixed telephony	161	10.1%
	Broadband and mobile communications	142	8.9%
	Fixed telephony and mobile communications	23	1.4%
	Fixed telephony and paid broadcasting	29	1.8%
	Total dual-play bundles	693	43.4%
Triple-play	Broadband, fixed telephony, and paid broadcasting	287	18.0%
	Broadband, paid broadcasting, and mobile communications	241	15.1%
	Broadband, fixed telephony, and mobile communications	97	6.1%
	Total triple-play bundles	625	39.1%
quadruple-play	Broadband, fixed telephony, paid broadcasting, and mobile communications	280	17.5%

Source: adapted from KISDI (2016a)

## 2.2. Literature review and research questions

Bundles refer to multiple goods offered as a single package at a discount rather than products or services sold separately (Guiltinan, 1987). Bundles have been mainly studied in the literature on industrial organizations, business strategy, and marketing disciplines, since they have a great impact on consumer choice and welfare, competition among businesses, and customer strategy (Lee and Lee, 2010). On the consumer side, bundles offer the economic benefit of being able to purchase multiple goods at a lower price than purchasing items individually (Adams and Yellen 1976; ref). Bundles can also provide purchasing or usage convenience to consumers in payment or post-management as well as a reduction in transaction or search costs, because the purchase is concentrated in a single company. On the other hand, bundles where the contract requires the consumer to continue to use the service for a certain time cause monetary or psychological switching costs to consumers, enhancing customer lock-in effects (Burnett, 2014). On the enterprise side, bundles are an effective marketing means for retaining existing customers and attracting new customers at a relatively lower cost (Andrews et al., 2010; Srinuan et al., 2014). Market dominating firms, however, can maintain or strengthen their market positions through economies of scale or the portfolio effects of bundling (Nalebuff, 2003).

With the diffusion of high-speed Internet and the introduction of new services due to technological

developments, bundles have been mainstreamed in the communications sector since the early 2000s (Pereira and Varela, 2013; Grzybowski, 2014). A few studies have examined the effects of bundles on market competition, businesses, and consumer welfare. Papandrea (2003) explored the social effects of bundles including the impact on competition and reduction of consumers' search costs in the Australian telecommunications industry. Bughin and Mendonça (2007) analyzed the impact of bundles on the communications market in EU countries, and showed that bundles increased corporate profits via 'sorting effects,' which refers to the process of homogenizing consumers who have different preferences for each product or service into a single commodity. Krämer (2009) investigated the leveraging effects of market powers through bundling, which telecommunications firms employed as a marketing weapon for securing competitive advantages or increasing profits. Shin et al. (2015) revealed that commodity bundling in information and communications services positively impacted diversification, which in turn contributed to corporate performance in Korea.

Research has recently been conducted to identify the influential factors of bundle subscription in the communications sector. Several studies focused on service characteristics, socio-demographics of the subscribers, or motivators such as price advantages. Schilke and Wirtz (2012) investigated the effects of service characteristics, and the basic factors (usefulness and ease of use) of technology in an acceptance model of broadband triple bundles. Klein and Jakopin (2014) identified the relative importance of price conditions to customers' willingness-to-pay for mobile telecommunications service bundles in Germany. Srinuan et al. (2014) found that a determinant of consumers' decisions to purchase multiple telecommunications services was a price discount, which consequently enhanced the lock-in effects for the service providers in Sweden. Mikkonen et al. (2015) found that bundle functions and usage convenience were major factors affecting customers' purchase of telecommunications bundles in Finland. Examining the Turkish telecom market, Üner et al. (2015) identified the effects of socio-demographic variables on the choices of bundles, which played a role as a strategic measure for capturing new customers or enhancing customer retention because of switching costs. Previous studies on the influential factors of bundle subscriptions are limited in terms of mainly focusing on the economic benefit of bundles. In general, consumers make the buying decision from the value perspective, after assessing risks as well as benefits of a product or service (Kim et al., 2007). We thereby establish a research question to fill the research gap:

- RQ1: Which factors (benefits and risks) promote and prevent subscription to communications service bundles?

Only a few studies have analyzed the increase in switching costs imposed by bundles in the communications sector (Kim, 2015), but these findings leave room for discussion. Using survey data of American households, Prince and Greenstein (2014) identified statistically that switching costs were higher at the bundle service level than at the individual service level. Kim (2015), on the contrary, used an empirical analysis of survey data on consumers in the Korean telecommunications market to find that switching costs were not increased for bundle service users, when compared to individual service users. The following research question is set up to identify the research issue:

- RQ2: Are there differences in switching costs between subscribers and non-subscribers to communications service bundles?

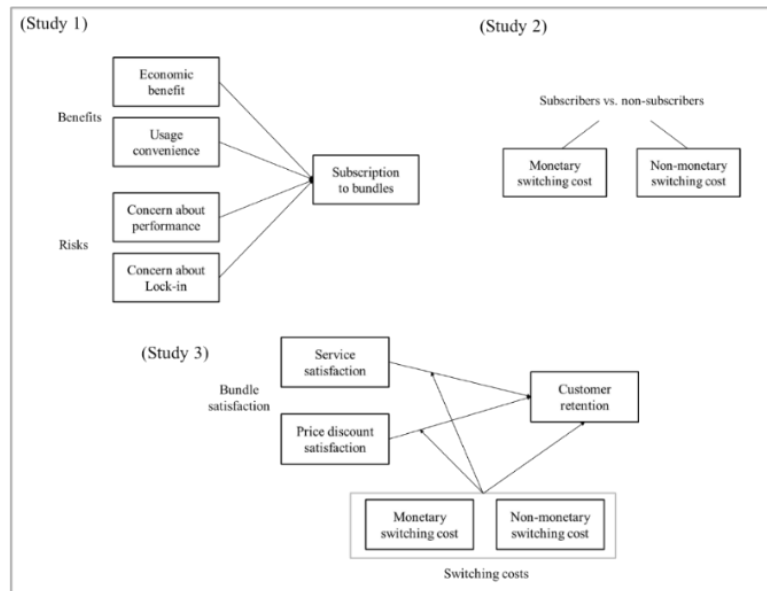
There has also been little examination of the role of switching costs on bundle satisfaction and customer retention. Some studies empirically determined that switching costs played a role as a determinant of customer retention or a moderator in the satisfaction-customer retention link in the context of individual service (Lee et al., 2001; Kim et al., 2004; Yang and Peterson, 2004; Nagengast et al., 2014). Other studies empirically concluded that subscribers of bundles in internet or mobile communications are less likely to switch providers (Yang, 2013; Burnett, 2014; Lee et al., 2017). To our knowledge, however, the relationships among bundle satisfaction, customer satisfaction, and switching costs have been not documented in the communications sector. We establish a research question to address this research gap:

- RQ3: How do switching costs of communications service bundles affect the relationship between bundle satisfaction and customer retention?

### III. Research model and methodology

#### 3.1. Research model

To answer the suggested research questions, we establish the research model with constructs for each study as shown in Figure 1.



**Fig. 1.** Proposed research model

The constructs are based on previous research on consumer behavior or market competition in communications services including bundles (Kim et al., 2004; Srinuan et al., 2014; Mikkonen et al., 2015; Üner et al., 2015). In the study on research question 1, we use the constructs of benefits (economic benefit and usage convenience), and risks (concern about performance and concern about lock-in) of communications service bundles associated with the subscription decision. In study 2, the differences between bundle subscribers and non-subscribers are analyzed in terms of monetary and non-monetary switching costs. In the third study, we explore the role of monetary and non-monetary switching costs on the relationship between bundle satisfaction (service and price discount satisfaction), and customer retention.

### 3.2. Measurement

The constructs were measured using the items as listed in Table 4.

**Table 4**  
Constructs and measurement items

Constructs		Measures	Related studies
Benefits	Economic benefit (EB)	<ul style="list-style-type: none"> <li>• Benefit from price discount</li> <li>• Benefit from additional savings with long contracts</li> <li>• Benefit from sign-up gifts</li> <li>• Benefit from free access to some value-added services</li> </ul>	[9], [12], [13], [16]
	Usage convenience (UC)	<ul style="list-style-type: none"> <li>• Convenience from paying a single bill</li> <li>• Convenience from a single helpline for customer support</li> <li>• Convenience from integrating the information system or a website</li> </ul>	[6], [7], [13]
Risks	Concern about performance (PER)	<ul style="list-style-type: none"> <li>• Concern that the overall service function of bundles may be lower, compared to using each component by provider</li> <li>• Concern that the overall service quality of bundles may be lower, compared to using each component by provider</li> </ul>	[4], [17], [18]
	Concern about lock-in (LOCK)	<ul style="list-style-type: none"> <li>• Concern about the difficulty of switching to another provider during the contract period</li> <li>• Concern about overall loss incurred, if the contract is terminated prematurely</li> <li>• Concerns about missing opportunities to purchase bundles with better conditions</li> </ul>	[7], [10], [12], [13], [18]
Bundle satisfaction	Service satisfaction (SSAT)	<ul style="list-style-type: none"> <li>• Overall satisfaction on the function of bundles and components</li> <li>• Overall satisfaction on the service quality of bundles and components</li> <li>• Overall satisfaction on the content quality of bundles and components</li> </ul>	[5], [13], [15]
	Price discount satisfaction (PSAT)	<ul style="list-style-type: none"> <li>• Overall satisfaction on service plans of bundles</li> <li>• Overall satisfaction on discount rate of bundles</li> <li>• Overall satisfaction on additional savings with long contracts of bundles</li> </ul>	[1], [3], [12],
Switching costs	Monetary switching cost (MSC)	<ul style="list-style-type: none"> <li>• Penalty associated with switching providers</li> <li>• Loss of monetary benefits from long-term membership associated with switching providers</li> <li>• Newly required monetary costs associated with switching providers (e. g., device exchange cost)</li> </ul>	[2], [5], [8], [13]
	Non-monetary switching cost (NSC)	<ul style="list-style-type: none"> <li>• Difficulty in searching new alternatives associated with switching providers</li> <li>• Difficulty in termination and new subscription procedures associated with switching providers</li> <li>• Time and effort associated with switching providers</li> </ul>	[2], [5], [8], [18]
Customer retention (CR)		<ul style="list-style-type: none"> <li>• Intention to stay with the existing bundle provider in the future</li> <li>• Intention to continue using bundles in the future</li> </ul>	[11], [12], [14]

[1]: Johnson, 1999, [2]: Burnham et al., 2003, [3]: Cao et al., 2003, [4]: Featherman and Pavlou 2003, [5]: Kim et al., 2004, [6]: Andrews et al., 2010, [7]: Park, 2010, [8]: Chuang, 2011, [9]: Schilke and Wirtz, 2012, [10]: Shih, 2012, [11]: Yang, 2013, [12]: Srinuan et al., 2014, [13]: Mikkonen et al., 2015, [14]: Oghuma et al., 2015, [15]: Shin, 2015, [16]: Üner et al., 2015, [17]: Yang et al., 2015, [18]: KISDI, 2016b



The items were first generated from the existing literature, and then adopted and modified reflecting the results of in-depth interviews with five experts (three senior researchers and two professors in the field of consumer behavior and market analysis in the communications sector), and six individuals.

The questionnaire consisted of four sections. In the first section, we asked demographic information, and the type and number of components in the respondents' communications bundle subscriptions. In the second section, with reference to Mikkonen et al. (2015), the questionnaire items asked all individuals to assess the importance by item of all sub-factors of benefits and risks involved in making decisions to purchase bundles. The third section contained the items related to switching costs. Both bundle subscribers and non-subscribers were asked to evaluate their perceived level of switching costs for bundled services versus stand-alone services. In the last section, we asked bundle subscribers to assess their perceived levels of bundle satisfaction and customer retention. Most items were measured on a seven-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (7).

### 3.3. Data collection

Prior to the initiation of the survey, a pilot test (using 50 individuals) was conducted to ensure the questionnaire's clarity and to validate the measuring instrument. The survey was conducted from January to March 2017 through an Internet based survey administered by a professional research company in Korea. The survey subjects were limited to adult males and females who could make IT product or service purchasing decisions at home. Finally, a total of 550 usable respondents were collected. Table 5 presents the respondents' demographics and bundle subscription information. About 52.4% percent of the respondents were females and 47.6% of the respondents were males. About 47.1% of the respondents were over 40 years old (n=259), followed by those between 30 and 39 years old (34.2%). The ratios of workers (32.2%) and housewives (33.8%) were relatively the highest among the occupations of respondents. In addition, 16.8% of respondents did not subscribe to bundled services at home. The ratio of those subscribing to double-play bundles (39.6%) was the highest among respondents, followed by triple-play bundles (36.0%) and quadruple-play bundles (17.6%). Most respondents used broadband internet (73.1%) and paid broadcasting (70.5%) as bundles, while mobile communications had a high rate of use as a stand-alone service (49.6%).

**Table 5**  
Respondents' profile

	Criteria	Frequency (n=550)	Percentage
Gender	Male	262	47.6%
	Female	288	52.4%
Age	20-29	103	18.7%
	30-39	188	34.2%
	Over 40	259	47.1%
Occupation	Worker	177	32.2%
	Housewife	186	33.8%
	Business or self-employed	81	14.7%
	Student	68	12.4%
	Others	38	6.9%
Bundle types	No subscription	84	15.3%

	Double-play	198	36.0%
	Triple-play	180	32.7%
	Quadruple-play	88	16.0%
Use as bundles	Broadband internet	402	73.1%
	Fixed telephony	252	45.8%
	Paid broadcasting	388	70.5%
	Mobile communications	262	47.6%
Use as a stand-alone service	Broadband internet	12	2.2%
	Fixed telephony	120	21.8%
	Paid broadcasting	135	24.5%
	Mobile communications	273	49.6%

## IV. Research results

### 4.1. Study 1: The group comparisons of influential factors in subscriptions to bundles

We empirically tested the group difference analysis to explore the factors of the benefits and risks affecting subscription to communications service bundles. To this end, we first identified the dimensionality of the measurement instrument using exploratory factor analysis (EFA). All variable items loaded are above .70 on their appropriate factor and explained 74.8% of total variance. The Kaiser-Meyer-Olkin (KMO) results are also higher than .70, which confirms the recommendation of Netemeyer, Bearden et al. (2003). We also examined the composite reliabilities values, average variance extracted (AVE) values, and Cronbach alpha values to test instrument validity and reliability. Table 6 shows that all recorded values satisfied the cut-off criterion (Composite Reliability and Cronbach's alpha > .07) suggested by related literature (Fornell and Larcker, 1981; Hair et al., 2010).

**Table 6**  
The summarized results of EFA, and testing validity and reliability

Factor	Item	Factor loading	Eigenvalue	% of variance	Composite Reliability	Cronbach's alpha
Economic benefit	EB1	0.857	2.949	24.578	0.740	0.881
	EB2	0.848				
	EB3	0.843				
	EB4	0.809				
Usage convenience	UC1	0.877	2.317	19.312	0.768	0.847
	UC2	0.856				
	UC3	0.848				
Concern about performance	PR1	0.874	1.561	13.007	0.781	0.710
	PR2	0.865				
Concern about lock-in	LOCK1	0.845	2.148	17.897	0.721	0.795
	LOCK2	0.800				
	LOCK3	0.830				

Table 7 indicates the statistical analysis results of group differences between bundle subscribers and non-subscribers. When making decisions, subscribers (n=466) recognized the economic benefit (5.481) of bundles as well as the concern about lock-in (5.265) as important factors, while non-subscribers (n=84) focused on the risks, including concern about performance (5.631) and concern about lock-in (5.033) rather than the benefits of bundles. Bundle subscribers (5.481 and 4.215) perceive economic benefits and usage convenience as higher compared to

non-subscribers (4.301 and 3.111). Both subscribers and non-subscribers evaluate the economic benefit of bundles relatively higher than their usage convenience. Non-subscribers, however, do not give much meaning to usage convenience (3.111), based on average scores. The results from analyzing risk factors are different from those for benefit factors. Subscribers' concern about lock-in (5.265) is higher than that of stand-alone service users (5.033), but the result for concern about performance is reversed (non-subscribers: 5.631 vs. subscribers: 4.341). Non-subscribers are worried about the low service performance of bundles. In sum, bundle subscribers highly perceive not only economic benefit, but also concerns about lock-in in making decisions regarding subscribing to bundles. Non-subscribers are significantly concerned about performance of services when using bundled services of the same provider rather than using the services individually from different companies.

**Table 7**

The results of group difference analysis between bundle subscribers and stand-alone service subscribers

Factor	Subscription type	Mean	t -value	d. f.	p-value	Result
Economic benefit	Stand-alone	4.301	-8.744	101.273	0.000	S<B***
	Bundles	5.481				
Usage convenience	Stand-alone	3.111	-11.751	146.52	0.000	S<B***
	Bundles	4.215				
Concern about performance	Stand-alone	5.631	13.31	137.025	0.000	B<S***
	Bundles	4.341				
Concern about lock-in	Stand-alone	5.033	-2.154	107.238	0.033	S<B*
	Bundles	5.265				

\*\*\*: < .001, \*\*: < .01, \*: < .05, S: Stand-alone service subscribers, B: Bundle subscribers.

Table 8 shows the results of a group difference analysis of subscription factors by bundle type, among bundle subscribers, using analysis of variance (ANOVA) tests of the Welch test and the Games-Howell test.

**Table 8**

The results of group difference analysis by bundle type

Factor	Bundle type	Mean	F-value	d.f.1/d.f.2	p-value	Result
Economic benefit	Double	4.867	148.098	2/247.807	0.000	D<T***<Q***
	Triple	5.747				
	Quadruple	6.315				
Usage convenience	Double	4.034	49.166	2/231.311	0.000	D,T<Q***
	Triple	3.972				
	Quadruple	5.121				
Concern about performance	Double	4.265	1.686	2/211.237	0.188	-
	Triple	4.433				
	Quadruple	4.324				
Concern about lock-in	Double	4.712	135.336	2/226.12	0.000	D<T***<Q***
	Triple	5.506				
	Quadruple	6.018				

\*\*\*: < .001, \*\*: < .01, \*: < .05, D: Double-play users, T: Triple-play users, Q: Quadruple-play users.

Quadruple-play bundle users (n=88) are relatively higher in their perceptions of economic benefit (6.315), usage convenience (5.121), and concerns about lock-in (6.318) than double (n=198) or triple-play bundle users (n=180). There is no difference among groups in concern about performance. These results are summarized as

follows: the greater the number of components in subscribing bundles, the higher the concern about lock-in as well as economic benefit-perception.

#### 4.2. Study 2: The group comparisons in switching costs

We empirically analyzed the group differences in switching costs by using service type, as shown in Table 9. Fixed telephony users in a stand-alone service (3.978) perceive monetary switching costs as relatively lower than do bundle users of fixed telephony (4.522). These findings are also true for all users of paid broadcasting and mobile communications. Therefore, the increase in perception of monetary switching costs because of using bundled services is found to be statistically significant, compared to using stand-alone services. To the contrary, only bundle users of fixed telephony perceive non-monetary switching costs as higher than the single users. In sum, the use of bundled services leads to an increase in switching costs, especially from an economic perspective.

**Table 9**  
The results of group difference analysis in switching costs

Service		Fixed telephony		Paid broadcasting		Mobile communications	
Subscription type		Stand-alone (n=120)	Bundles (n=201)	Stand-alone (n=135)	Bundles (n=388)	Stand-alone (n=273)	Bundles (n=262)
Monetary switching cost	Mean	3.978	4.522	4.247	4.603	4.430	4.755
	t-value	-3.639		-2.829		-2.986	
	d.f.	224.768		521		531.247	
	p-value	0.000		0.005		0.003	
	Result	S<B***		S<B**		S<B**	
Non-monetary switching cost	Mean	3.814	4.242	4.025	4.125	4.230	4.234
	t-value	-3.068		-0.751		-0.044	
	d.f.	236.849		231.768		530.077	
	p-value	0.002		0.454		0.965	
	Result	S<B**		-		-	

\*\*\*: < .001, \*\*: < .01, \*: < .05, S: Stand-alone service subscribers, B: Bundle subscribers.

#### 4.3. Study 3: The roles of switching costs of bundles on customer retention

We statistically tested the role of switching costs of bundles in the relationship between bundle satisfaction and customer retention. Table 10 shows the summarized results of exploratory factor analysis (EFA) and validity and reliability testing. All items of the variables loaded above .70 on their appropriate factor and explained 87.9% of total variance. Table 11 presents that the square root of the AVE for each construct is greater than the correlation values between any two constructs. All values also satisfied the recommended criterion for validity and reliability, suggested by Fornell and Larcker, (1981) and Hair et al. (2010).

**Table 10**

The results of factor analysis, and validity and reliability testing

Construct	Item	Factor loading	Eigen-value	% of variance	Composite Reliability	Cronbach's alpha
Service satisfaction	SSAT1	0.925	2.233	15.947	0.747	0.811
	SSAT2	0.854				
	SSAT3	0.747				
Price discount satisfaction	PSAT1	0.960	2.688	19.202	0.913	0.970
	PSAT2	0.953				
	PSAT3	0.947				
Monetary switching cost	MSC1	0.952	2.233	15.947	0.861	0.905
	MSC2	0.913				
	MSC3	0.902				
Non-monetary switching cost	MSC1	0.968	2.594	18.530	0.898	0.930
	MSC2	0.939				
	MSC3	0.926				
Customer retention	CR1	0.941	1.930	13.787	0.877	0.963
	CR2	0.923				

**Table 11**

Correlations of the latent variables and the square root of AVE.

Construct	SSAT	PSAT	MSC	NSC	CR
SSAT	<b>0.510</b>				
PSAT	-0.208	<b>0.827</b>			
MSC	0.034	-0.049	<b>0.724</b>		
NSC	0.019	-0.045	0.025	<b>0.796</b>	
CR	0.253	0.322	0.204	0.098	<b>0.755</b>

Note: Square root of AVE are the bolded diagonal values. SSAT: service satisfaction, PSAT: price discount satisfaction, MSC: monetary switching cost, NSC: non-monetary switching cost, CR: customer retention

Table 12 shows the hierarchical regression results for predicting customer retention of bundle subscribers (n=466). In the first model, independent variables of service satisfaction and price discount satisfaction were entered, which adequately explains a significant amount of the variance ( $R^2$  adjusted = .207,  $p < .001$ ). In the second model, the main effects of monetary switching costs and non-monetary switching costs on customer retention were estimated, where these factors account for an additional amount of the variance (the increase of  $R^2$  = 5.6%,  $p < .001$ ). Both service satisfaction ( $\beta = .328$ ,  $p < .001$ ), and price discount satisfaction ( $\beta = .405$ ,  $p < .001$ ) positively and significantly affect customer retention of bundle subscribers. Both monetary switching costs ( $\beta = .209$ ,  $p < .001$ ) and non-monetary switching costs ( $\beta = .105$ ,  $p < .01$ ) also positively and significantly affect customer retention as main effects. To examine the moderating effect of switching costs, we individually added the interaction term of the two satisfaction factors and the two switching cost factors in models 3 to 6. The interaction effect of non-monetary switching costs on the relationship between price discount satisfaction and customer retention is only found in model 6 ( $\beta = .106$ ,  $p < .01$ , with an increase of  $R^2 = 1.1\%$ ,  $p < .001$ ). These results can be summarized as follows: only monetary switching costs strongly determine bundle customer retention, whereas non-monetary switching costs positively moderate the effects of price discount satisfaction on customer retention.

**Table 12**

Hierarchical regression predicting customer retention

Construct	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SSAT	.334*** (7.910)	.328*** (8.031)	.330*** (7.987)	.331*** (8.030)	.330*** (8.092)	.331*** (8.156)
PSAT	.391*** (9.265)	.405*** (9.906)	.406*** (9.901)	.405*** (9.899)	.408*** (9.975)	.405*** (9.972)
MSC		.209*** (5.241)	.210*** (5.242)	.211*** (5.258)	.209*** (5.229)	.207*** (5.209)
NSC		.105** (2.628)	.104** (2.606)	.104** (2.607)	.104** (2.599)	.100* (2.524)
SSAT*MSC			.369 (.713)			
SSAT*NSC				-.023 (-.565)		
PSAT*MSC					.055 (1.366)	
PSAT*NSC						.106** (2.674)
R <sup>2</sup> adjusted	.207	.260	.258	.259	.261	.269
F-value	61.614***	41.761***	33.373***	33.423***	33.845***	35.285***
Increase of R <sup>2</sup>	-	.056***	.000	.001	.003	.011**

\*\*\*: < .001, \*\*: < .01, \*: < .05. SSAT: service satisfaction, PSAT: price discount satisfaction, MSC: monetary switching cost, NSC: non-monetary switching cost, CR: customer retention

## V. Discussion and conclusion

### 5.1. Discussion

This study empirically investigates (a) the effects of perceived risks as well as perceived benefits on communications service bundle subscriptions, (b) the increasing effects on switching costs of bundles, comparing subscribers to non-subscribers, and (c) the main and moderating effects of switching costs on customer retention of bundle subscribers.

First, the results of group difference analysis in study 1 show that both subscribers and non-subscribers commonly perceived concerns about lock-in when deciding to use bundles. Subscribers focus on the economic benefits from bundles, while concerns about performance are the strongest barrier for non-subscribers. The influential factors of bundle subscriptions have been investigated in a few studies, which mainly dealt with socio-graphics (Üner et al., 2015) or benefits from bundles (Schilke and Wirtz, 2012; Srinuan et al., 2014; Mikkonen, 2015). Previous studies have rarely looked at why bundles are not used. This study identified the influence of lock-in concern on consumer decisions or behavior from the pre-use phase of bundles. This study identified a barrier to bundle subscription in terms of a concern over lower overall performance as a result of using bundles rather than using individual services by each operator. The influence of risk factors as subscription barriers needs to be clarified in various bundle contexts, through future empirical studies.

Second, the comparison of subscribers with non-subscribers in study 2 shows that switching costs are perceived by bundle subscribers to be higher than individuals who use stand-alone services view them. Research has paid little attention to the difference in switching costs of bundle users compared to stand-alone users of communications services. Some studies on this issue showed differences in the results (e.g., Prince and Greenstein, 2014; Kim, 2015). This study supports that bundles enhance monetary switching costs. However, the increase in non-monetary switching costs has different results for each service in this study. Therefore, active discussions on the increase of switching costs are needed through additional follow-up research.

Last, the regression analysis for study 3 shows that switching costs directly determine customer retention.

Some studies identified the roles of switching costs on customer retention or loyalty in the marketing discipline. The role in a communications service bundle context is under-researched. This study identifies that monetary switching costs are a predictor of customer retention for bundle subscribers, while, to the best of our knowledge, they do not play a moderating role in the relationship between bundle satisfaction and customer retention. Non-monetary switching costs show main and interaction effects between price discount satisfaction and customer retention. Additional discussion also needs to take place to investigate the main or interaction effects of switching costs in communications service bundles.

## *5.2. Implications*

From a theoretical point of view, this study has some implications. We identify the role of concerns about lock-in and performance as barriers to subscription of communications service bundles. Empirical analysis draws the results that consumers' perceived performance risk from bundles is the strongest reason for rejecting bundles. This study has served to extend the factors influencing use of bundles from just benefits to include psychological risks. This study also has theoretical meaning in that it finds statistical significance of the increasing effects of monetary switching costs imposed by bundles, which is somewhat controversial in previous studies. In the absence of consensus on the main and interaction effects of switching costs, this study has theoretical implications in its finding that monetary switching costs directly determine bundle customer retention, while non-monetary switching costs may have a moderating effect on some bundles.

This study provides practical implications for regulations and marketing strategies of communications service bundles. The increases of switching costs imposed by bundles identified in this study might restrict competition among providers, which results in lowering consumer welfare (Lee and Lee, 2010). Therefore, regulatory authorities need to closely consider issues related to the leveraging of market power, the effects of competition restrictions, and constraints on consumer behavior by bundles (Adams and Yellen, 1976; Choi and Stefanadis, 2001). As the market matures and competition between operators becomes more intense, maintaining existing customers is known as a more efficient marketing strategy than capturing new customers (Kim et al., 2004; Bughin and Mendonça, 2007). The main and direct effect of switching costs on customer retention is identified in this study. Hence, service providers need to extend their investment in resources and capabilities in heightening switching costs as barriers of customer churn as well as enhancing economic benefit.

## *5.3. Limitations and future study*

This study has some limitations that are useful for suggesting future studies. This study focused on customer preference and behaviors in subscription and retention of communications service bundles. This study shows little interest in business activities for bundles. We suggest the effects on market competition and firm performance of service providers' activities and investments in bundles as research issues for follow-up studies. This study does not identify the difference in bundle effects by customer type. These issues may be useful in theoretical implications of customer differentiation, and practical suggestions for enhancing customer loyalty by segmented

customers. We suggest future research be done on the comparisons of switching costs imposed on bundles by customer types (e.g., differences between customers (a) by market dominant or late providers, (b) by bundle subscription periods).

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