

Strategic action and customer mobility: Antecedents and consequences of strategic actions in the Korean mobile telecommunication service industry

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Abstract This paper investigates the sources and consequences of strategic actions in the Korean mobile telecommunication service industry. Based on competitive dynamics research and an organizational learning perspective, it suggests hypotheses and tests them with monthly data on service providers' competitive and alliance actions, as well as statistics on monthly subscribers during 2002–2007. We show the positive effects of a firm's own experience, other firms' strategic actions, and firms' alliance tendencies on the likelihood of firm-level competitive action and alliance. We also find that negative performance feedback accelerates the mimetic influence of rival firms' competitive actions and that positive performance feedback strengthens the momentum effect of a firm's own alliance experience on the likelihood of alliance. Both competitive actions and alliances appear to influence customer mobility across firms in a complex manner. Based on customer mobility data, this study finds that alliances increase market dynamism, that is, customer mobility. It also shows that competitive actions, in general, serve to effectively attract switching customers from rivals. This study partially answers questions regarding the triggers of competitive actions and alliance activities among mobile telecommunication service providers and their performance consequences.

Keywords Strategic action · Organizational learning · Competitive action · Alliance tendency · Mobile telecommunication service · Customer mobility

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The literature on competitive dynamics has examined the patterns of competitive actions and their performance implications in diverse industries (Ferrier, Smith, & Grimm, 1999; Miller & Chen, 1994; Smith, Grimm, Gannon, & Chen, 1991). However, except for Young, Smith, and Grimm (1996), most studies have not distinguished cooperative actions, such as equity and technology licensing arrangements, from competitive actions and examined only what is categorized as competitive action (Derfus, Maggitti, Grimm, & Smith, 2008; Ferrier, 2001; Miller & Chen, 1994). Recently cooperative value co-creation actions have been conceptualized as distinct constructs, for example, co-development and relational capability (Gnyawali, Fan, & Penner, 2010: 598–601). As resources and capabilities outside the firm boundary become more important, managers need to garner their capabilities for utilizing external resources and cooperate with other firms (Cohen & Levinthal, 1990; Dyer & Singh, 1998; Lavie, 2006).

Such cooperation, regardless of whether the relationship is horizontal or vertical, has been addressed by a number of studies (Chung, Singh, & Lee, 2000; Doz & Hamel, 1998; Dyer, 1996; Gulati, 1995; Kogut, 1988). Brandenburger and Nalebuff (1996) noted that relationships with competitors, suppliers, and buyers vary over time and are not necessarily trade-off relationships. In making markets, other players are complementors, while they are competitors in dividing up markets (Brandenburger & Nalebuff, 1996). Furthermore, market players take on multiple roles. On any given day, Microsoft may find Apple to be a supplier, buyer, competitor, or partner. Samsung may compete with Apple in the smartphone market while cooperating to supply it chips for iPhones or iPod digital music players. Thus, given today's business competition, it is difficult to categorize a player clearly as a customer, supplier, competitor, or complementor. Therefore, the market's competitive and cooperative scope expands from direct competitors into players in what has been termed the value net (Brandenburger & Nalebuff, 1996). These players simultaneously compete and cooperate with each other and can play multiple roles.

Building on the co-opetition perspective, this study investigates the sources and consequences of strategic activity. To be consistent with the literature on competitive dynamics (Ferrier et al., 1999; Miller & Chen, 1994), it focuses on competitive actions. Despite the term *competitive*, the scope of competitive action does not exclude cooperative actions such as alliances. Since cooperative actions can be beneficial for the cooperating partner but a competitive threat to other players, cooperative actions are considered a type of competitive action, as in previous studies (Miller & Chen, 1994). In practice, firms can employ alliances to execute vigorous competitive actions such as new product development and the launch of a new service. Again, alliance is not the only type of cooperative action. Even without explicit agreements, firms can cooperate with each other, as in, for example, tacit price collusion. Therefore, alliance is only a part of the whole realm of cooperative activity. This paper thus regards alliance as a type of competitive action, that is, competitive activity allied with suppliers, customers, competitors, or complementors.

We contribute to the literature in several important ways. First, this is the first systemic study of how organizational learning mechanisms influence both competitive action and alliance activity. We investigate the effect of three main mechanisms of organizational learning—a firm's own experience, other firms' actions, and performance feedback—on the likelihood of competitive action and alliance. Our study

shows a learning curve and evidence of learning from others for both competitive action and alliance activity. However, the performance feedback effect selectively moderates two main learning mechanisms, depending on whether a focal strategic action is competitive or an alliance activity.

Second, we compare the nature of competition and the performance implications of competitive action and alliance tendencies in the Korean mobile telecommunication service industry, revealing both similarities and differences. In this empirical setting, we find that a focal firm’s competitive actions enhance its performance, while rival firms’ competitive actions decrease it (Young et al., 1996). However, if we delve more deeply, we find an interesting competitive mechanism. Rival firms’ alliance tendencies increase customer mobility, that is, market dynamism, while a focal firm’s alliance tendency has no performance effect. In this study, a focal firm’s alliance tendency seems to have an indirect performance effect, since it increases the amount of competitive action, which leads to an increase in the number of net switching customers, specifically incoming customers.

Theory and hypotheses

Two theoretical streams underlie this study. First, organizational learning explains the antecedents of both competitive action and alliance activity. In the organizational learning literature focused on experience, there are three main theoretical mechanisms: learning by doing, or the experience curve, learning from the experience of others, and performance feedback-based learning (Argote, 1999; Greve, 2003b; Schulz, 2002). Figure 1 illustrates how these experience-based learning mechanisms work individually and interact with each other. Learning by doing and learning from others are used to uncover the antecedents of competitive action and alliance activity

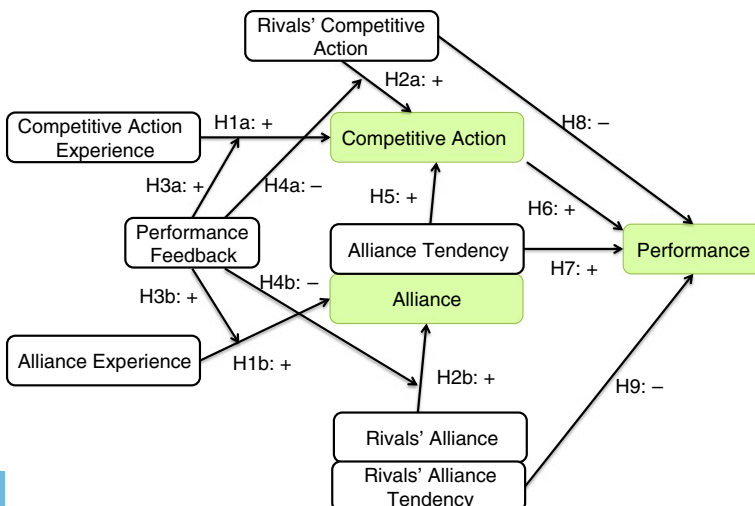


Figure 1 The research framework

in H1a, H1b, H2a, and H2b, our first four hypotheses. Performance feedback strengthens or weakens both mechanisms: learning by doing and learning from others.

Second, the competitive dynamics perspective has gained a strategic understanding of competitive action and reaction among rivals. Although a few studies note a Red Queen effect due to the interaction of competitive actions between focal firms and rivals (Barnett & Hansen, 1996; Derfus et al., 2008), to our knowledge, no research explains the consequences of strategic actions—including both competitive actions and alliances—in the integrated manner of this study, shown in Figure 1.

Learning from one's own experience

At first, a firm can minimize risk by repeating routines that have been proven to work through past experience. According to Nelson and Winter (1982), when an organization faces high uncertainty, the tendency to utilize existing knowledge accumulated through past experience becomes stronger. Moreover, from organizational learning, capacity accumulated through learning by doing has a major influence on the direction of the next period's actions (Crossan, Lane, & White, 1999; Nelson & Winter, 1982). Experiential learning is consistent with the discussion on strategic momentum (Amburgey, Kelly, & Barnett, 1993; Amburgey & Miner, 1992; Kelly & Amburgey, 1991). Academic research as well as anecdotal evidence across contexts suggests that some actions are repeated even if they are seemingly absurd and/or irrelevant (Allison, 1971; Boeker, 1989; Fredrickson & Iaquinto, 1989; Miller & Friesen, 1980; Mintzberg & McHugh, 1985; Quinn, 1980).

In this vein, a firm with considerable experience with competitive and cooperative action gains information and knowledge to reduce uncertainty, as well as opportunities to learn routines for strategic actions. Accordingly, this study posits that a firm with more experience with strategic actions will be more likely to attempt strategic actions in the next period. This paper classifies strategic actions into two categories: competitive actions and allied competitive actions. Therefore, we propose the following hypotheses:

Hypothesis 1a The more competitive action experience a focal firm has, the more competitive actions it will take in the following period.

Hypothesis 1b The more alliance experience a focal firm has, the more alliances it will make in the following period.

Learning from others

A firm can accumulate knowledge through other firms' actions, that is, through vicarious learning (Haunschild & Miner, 1997; Kraatz, 1998; Levitt & March, 1988; Miner & Haunschild, 1995). Learning from others can appear as different modes of imitation, including outcome-, frequency-, and trait-based imitation (Haunschild & Miner, 1997). In frequency-based imitation, an organization presumes that the number of times a particular action is taken by other organizations signals the degree of its legitimacy or effectiveness (DiMaggio & Powell, 1983; Haunschild & Miner, 1997;

Tolbert & Zucker, 1983). Accordingly, firms show a tendency to carry out actions that are very frequently executed by other firms. Therefore, we suggest that the more frequently another firm's strategic actions are implemented, the more likely a focal firm is to take such actions for granted (Graham, 1978; Maitland, Rose, & Nicholas, 2005; Wade, 1995). In addition, the imitation of other firms is noticeable in relationships with industry rivals. According to rivalry-based imitation, a firm increases its tendency to copy its rivals' strategic actions to maintain its present competitive position and prevent attacks (Klemperer, 1992; Lieberman & Asaba, 2006).

Based on the theories of both vicarious learning and rivalry-based imitation, we suggest the following hypotheses:

Hypothesis 2a As the frequency of rival firms' competitive actions increases, the frequency of the focal firm's competitive actions increases.

Hypothesis 2b As the frequency of rival firms' alliances increases, the frequency of the focal firm's alliances increases.

The effect of performance feedback on learning

Hypothesis 1 predicts that the experience stock of a focal firm's competitive actions will show a positive relation with the frequency of its competitive actions due to learning by doing (Levitt & March, 1988; Nelson & Winter, 1982) or strategic momentum (Amburgey & Miner, 1992). Studies in organizational learning suggest that once a firm has accumulated experience, unsuccessful outcomes as well as the successful consequences of an action will increase its likelihood of being repeated (Kelly & Amburgey, 1991). However, we argue that the effect of the frequency of the focal firm's own competitive actions varies according to firm characteristics. Thus, we suggest in H1a and H1b that the focal firm's performance feedback will moderate the effects of the relations.

Learning theory suggests that when performance decreases below aspiration levels, organizations tend to be risk seeking and risk averse above aspiration levels (Bromiley, 1991; March & Shapira, 1992). Therefore, organizations performing above aspirations are less likely to explore new possibilities and more likely to repeat proven recipes or routines, reinforcing lessons drawn from earlier experience (Lant, 1992; Levitt & March, 1988). In contrast, clearly poor performance induces organizations to take risks, trying new types of actions such as initiating nonlocal ties, R&D investments, and acquisitions (Baum, Rowley, Shipilov, & Chuang, 2005; Greve, 2003a; Iyer & Miller, 2008). Therefore good performance feedback reinforces experiential learning, while bad performance feedback weakens the link between experience and repetition.

Furthermore, the focal firm's high performance more or less signals that its past decisions were appropriate. The decision-making process of such a firm will be considered effective and credible by a focal firm's CEO, which increases overconfidence and confirms the current mental models and routines of competitive actions. Thus consecutive successes and CEO hubris can trap firms with myopia and inertia, exemplified by the Icarus paradox (Hiller & Hambrick, 2005; Miller, 1990). The concept of a *competency multiplier*, where good performance strengthens experiential

lessons, has been tested in the context of acquisition in the US commercial banking industry (Haleblian, Kim, & Rajagopalan, 2006). However, it has not yet been tested in the integrative context of competitive actions and alliances. Thus, we suggest the following hypotheses:

Hypothesis 3a As a focal firm's performance relative to its aspiration levels increases, the relationship in H1a becomes stronger.

Hypothesis 3b As a focal firm's performance relative to its aspiration levels increases, the relationship in H1b becomes stronger.

Hypothesis 2 predicts that the frequency of rival firms' competitive actions will be positively related to the frequency of the focal firm's competitive actions due to vicarious learning and/or competitive motivation. However, we argue that the effect of the frequency of rival firms' competitive actions varies, depending on the focal firm's characteristics. Thus, we suggest in H2a and H2b that the focal firm's performance will moderate the effects of the relationship.

A focal firm's high performance implies that its past decisions were appropriate. Its decision-making process will thus be considered effective and legitimate by others. On the other hand, managers of firms performing far below their aspiration levels start seeking the cause of their poor performance (Cyert & March, 1963) and find solutions in neighboring firms, which are seen as reference groups (Levitt & March, 1988). Therefore, firms will be more influenced by environmental signals, such as the actions of other firms, when their performance is below aspiration levels than when it is not (Kraatz, 1998). In other words, a firm is more susceptible to social influence when its performance is low.

This influence complements the moderating effect of performance feedback on the relation between competitive action experience (or alliance experience) and subsequent competitive action (or alliance), because relying on a reference group is a natural next step after distrusting internal competence. While H3a and H3b refer to suspicions about accumulated experiential wisdom, leading to the disruption of routines formed through experience, we suggest that organizations might follow their peers in the reference group and react to their unsatisfactory performance (Conell & Cohn, 1995; Kraatz, 1998).

Moreover, a focal firm's high performance implies that it retains sufficient resources and the capacity for decision-making and successful implementation of strategies. Resources and capacity can act as a basis for independent decisions (Phillips & Zuckerman, 2001). In such a case, the focal firm will be comparatively less influenced by its rivals' actions. Similarly, if the focal firm performs well, it can accumulate slack, which buffers against environmental threats (Cyert & March, 1963). Therefore, a firm with slack will deem it less important to respond to a rival's action. Thus, we suggest the following hypotheses:

Hypothesis 4a As a focal firm's performance relative to its aspiration levels decreases, the relationship in H2a becomes stronger.

Hypothesis 4b As a focal firm's performance relative to its aspiration levels decreases, the relationship in H2b becomes stronger.

Firm-level cooperative mechanism

Hypothesis 2 argues that a firm's competitive actions are influenced by those of other firms. However, they can also be influenced by cooperative action with other firms. This paper argues that a focal firm's alliance tendency is the basis for its competitive action in the next period. Alliances with other firms provide complementary knowledge, skills, and other tangible/intangible resources for the focal firm (Koh & Venkatraman, 1991; Mariti & Smiley, 1983; Nelson, 1988; Young et al., 1996). Thus, a focal firm's greater alliance tendency means it uses external resources and that a partner firm's skills and knowledge are transferred to the focal firm (D'Aveni, 1994; Lenz, 1980). These transferred resources become strategic leverage for the focal firm to compete effectively with its rivals.

If a focal firm forms alliances with suppliers, competitors, or complementors located in its value net (Brandenburger & Nalebuff, 1996), they all become embedded in an alliance network. Due to the structural characteristics of an alliance network, resources and information flow between members. Resources and information can be critical in that they enable a focal firm to take competitive action in the next period (Gnyawali, He, & Madhavan, 2006; Gnyawali & Madhavan, 2001; Young et al., 1996). That is, members of an alliance network have a network-based resource advantage.

In addition, being a member of an alliance network conveys a superior position over non-member rivals (Chung et al., 2000; Lee, Lee, & Pennings, 2001; Stuart, Hoang, & Hybels, 1999). For example, if a focal firm forms an alliance with a particular complementor, it not only obtains a network-based resource advantage but also blocks rival firms' network formulation. Thus, the firm can gain a double advantage.

Through this network-based resource advantage, a focal firm can execute competitive actions more efficiently in the next period. Accordingly, we suggest that the greater the focal firm's alliance tendency, the more likely it will take competitive action.

Hypothesis 5 As a focal firm's alliance tendency increases, the frequency of its competitive actions increases.

Performance consequence

Studies on competitive dynamics have investigated performance caused by strategic actions in diverse ways and within different contexts (Chen & MacMillan, 1992; Ferrier et al., 1999; Lee, Smith, Grimm, & Schomburg, 2000; Miller & Chen, 1994, 1996a, b; Smith et al., 1991; Young et al., 1996). At the action–response dyad level, competitive actions lead to superior performance for the initiator, whereas greater response likelihood and early timing appear to be beneficial for responding firms (Chen & Miller, 1994; Chen, Smith, & Grimm, 1992; Smith et al., 1991). The effect of a competitive repertoire on performance has been investigated at the firm level (Miller & Chen, 1994, 1996a, b). Competitive inertia in tactical actions, defined as “the level of activity that a firm demonstrates in altering its competitive stand,” appears to be positively related to performance (Miller & Chen, 1994: 2). Moreover, simplicity and nonconformity in competitive repertoires have been found to hurt subsequent firm performance (Miller & Chen, 1996a, b).

This study focuses on the performance implications of the frequency of competitive actions. A firm's competitive activity creates both internal and inter-firm assets in the form of routines, knowledge, and relationships (Nelson & Winter, 1982). Especially in a hypercompetitive environment, more frequent action in a given period of time will result in greater market opportunity due to the speedy erosion of the temporary competitive advantage obtained by individual actions (D'Aveni, 1994). Empirical studies find that active firms improve their market share (Ferrier et al., 1999) better than inactive firms and increase their performance by greater levels than their sluggish rivals (Derfus et al., 2008; Young et al., 1996). Thus, we suggest the following hypothesis:

Hypothesis 6 The higher the frequency of competitive actions, the higher the focal firm's performance.

Also critical to firm performance, a firm's alliance tendency is the extent to which it executes competitive actions in concert with other players such as buyers, suppliers, rivals, and complementors. Complementors include players providing complementary products or services. For example, hardware manufacturers have software providers as complementors. Alliance is a tool for utilizing and leveraging external resources across firm boundaries. There is evidence that alliance partners' resources and capabilities have a considerable impact on firm performance (Afuah, 2000; Baum, Calabrese, & Silverman, 2000; Lee et al., 2001; Singh & Mitchell, 1996; Stuart et al., 1999). Given the level of competitive activity, a focal firm's greater alliance tendency means that it actively utilizes external resources and that a partner firm's skill and knowledge are transferred to it. For example, a firm without an online marketing channel may cooperate with Internet shopping malls to promote a new service. Some content providers may have a critical resource or capability that a service provider needs. Network resources due to an alliance will enhance firm performance. Thus, we propose the following hypothesis:

Hypothesis 7 The greater the alliance tendency, the higher the focal firm's performance.

Recently, Derfus et al. (2008) studied Red Queen competition in the context of actions among rivals. The authors examined the relations between a focal firm's actions and performance and rival firms' actions, showing that the strength of these relations depends on market structure and position. Previous studies have also suggested a negative effect of industry-level competitive activity or rivals' response rates on firm performance (Chen & Miller, 1994; Young et al., 1996) and that more active firms increase their market share (Ferrier et al., 1999). In line with this research, we hypothesize the following:

Hypothesis 8 The higher the frequency of rival firms' competitive actions, the lower the focal firm's performance.

Although there have been a number of studies on the effect of rival firms' competitive actions on a focal firm's performance (Derfus et al., 2008; Ferrier,

2001; Ferrier et al., 1999; Miller & Chen, 1994, 1996a, b; Young et al., 1996), a small number of studies examine the effect of rival firms' alliance activity on focal firm performance (Silverman & Baum, 2002; Singh & Mitchell, 1996). Given rival and focal firms' competitive actions, a greater alliance tendency of rival firms implies their higher level of utilization of external resources and capabilities, which constrains a focal firm's opportunities in this respect. Alliance among rivals can act as a negative externality on the focal firm. Singh and Mitchell (1996) found that businesses face an increased risk of dissolution if they do not form new partnerships after their partners form new collaborative relationships with others. In addition, Silverman and Baum (2002), studying a biotechnology firm, found that a rivals' alliances are normally harmful to a focal firm. This effect may be due to the role of alliances on foreclosing rivals' alliance opportunities (Gomes-Cassares, 1994). In a world of limited partners, winning the race to secure a high-quality partner can increase a firm's chances of gaining better access to resources and potential partners relative to its rivals. Therefore, we propose the following hypothesis:

Hypothesis 9 The greater the alliance tendency of rival firms, the lower the focal firm's performance.

Data and methodology

To test the hypotheses empirically, we focus on the various actions of three Korean mobile telecommunication service firms: SK Telecom (SKT), Korea Telecom Freetel (KTF), and LG Telecom (LGT). These firms form an oligopoly market in which they monitor and react to each other instantly. One company, SKT, has 50% of the market share, with the portion of its market share over 50% regulated by the government. We focus on the firms' actions in a competitive environment, consistent with previous studies (Chen et al., 1992; Ferrier, 2001; Smith et al., 1991). Based on the competitive dynamics and organizational learning perspectives among firms, this study focuses on the strategic action patterns of mobile telecommunication service firms simultaneously maneuvering for both competition and cooperation to acquire better positioning in the domestic mobile telecommunication services market.

Sample

This study uses structured content analysis (Jauch, Osborn, & Martin, 1980) and discusses specific aspects of the methodology for analyzing competitive interactions, including the sources of actions and the procedures for identifying actions. We identified all competitive actions reported between 2002 and 2007 in the *Maeil Business Newspaper* (www.mk.co.kr) and on *ETNews* (www.etnews.co.kr) in Korea. An action is defined as a specific market move, such as a price cut or a special promotion. The *Maeil Business Newspaper*, the primary source of data on actions, provides information about all types of business behaviors, while *ETNews* reports issues from various areas. In the first stage, we asked an Internet expert who was also skilled at programming to search for and gather all instances of news about those

three firms' behaviors from an online database provided by the two news companies. The keywords for the search were *SKT*, *KTF*, *LGT*, *SK Telecom*, *Korea Telecom Freetel*, and *LG Telecom*.

We collected 39,000 news items for the period from January 2002 to July 2007, excluding duplications from both data sources. In addition, we chose news items reporting only actions that could be deemed business behavior. An extensive review of all such news items selected determined 10 types of competitive moves: promotions, services, pricing, technology development, manufacturing, capacity investment, word attacks, cooperation for establishing a technology standard, new content services, and others. In addition, we categorized each action according to the type of alliance, as follows: alliance with no one, alliance with a content provider, alliance with an equipment or technology provider, alliance with another mobile telecommunicating service firm, and alliance with others. Three researchers—two doctoral students and a researcher with a doctoral degree—identified the news items.

Initially, over the course of several months, two researchers independently identified the action and alliance types for a subset of sampled news items. Subsequently, we tested the reliability of the identification of action and alliance types by the two researchers (Perreault & Leigh, 1989). On the subset of 92 articles, the inter-judge reliability for action types was .88 while that for alliance types was .86, which implies that the identification of action and alliance types in this study holds considerable reliability and that the judgments of the two researchers were quite consistent with each other. Next, the two researchers were each put in charge of news items to identify the action and alliance type of each action. A third researcher finally identified events deemed difficult to identify (due to ambiguity) by the first two researchers.

Summing the events by month in terms of action and alliance types, a data set was created for this study. Table 1 summarizes all the competitive actions by the mobile telecommunicating service firms during the period January 2002 to July 2007. The data set has a panel data structure.

Statistical methods

We employed fixed-effects negative binomial regressions to investigate the factors influencing future competitive actions and alliance activities, along with firm performance. It is naturally assumed that the count data are generated by a Poisson distribution. Applying multiple regressions based on a normal distribution to a model where the dependent variable follows a Poisson distribution can lead to statistical bias. As an extension of the Poisson regression, a negative binomial regression was used to estimate models of the counts of an event when it displayed extra-Poisson variation in the form of overdispersion.

Variables and measurement

Dependent variables This study has three dependent variables for testing the hypotheses. The first is *competitive action* during time $t + 1$. Table 1 shows the action frequencies of the Korean mobile telecommunication service firms by year. As

Table 1 Summary of the actions of the Korean mobile telecommunicating service firms.

Year	SKT			KTF			LGT		
	Competitive action			Competitive action			Competitive action		
	Independent action	Alliance activity		Independent action	Alliance activity		Independent action	Alliance activity	
2002	305	145	160	244	135	109	144	89	55
2003	197	115	82	174	101	73	79	48	31
2004	196	94	102	238	121	117	90	42	48
2005	231	95	136	206	85	121	82	42	40
2006	274	99	175	208	75	133	87	36	51
2007 ^a	147	66	81	77	42	36	48	24	24
Mean	246	112	134	209	102	107	96	51	45

^a Total number of actions of firms by July 2007.

shown, competitive actions consist of independent actions and alliance activities, an independent action is behavior undertaken alone, and alliance activity is behavior undertaken with a partner or partners. *Competitive action* was calculated by summing all of the actions taken by each firm each month. The second dependent variable is *alliance activity* during time $t + 1$. *Alliance activity* is calculated by summing the number of actions taken by each firm with a partner or partners each month. To test H6 to H9, the last dependent variable is *firm performance* at the end of the month. *Firm performance* is measured as the number of net switching customers, that is, the number of incoming customers minus the number of outgoing customers. Alternatively, we use both the number of incoming and outgoing customers to measure *firm performance*. These performance measures for customer mobility across rival firms eventually cumulatively influence market share.

Independent variables To test H1a, *competitive action experience* was measured as the sum of competitive actions over the preceding 4 months. This variable focuses on the effect of learning by doing. To test H1b, *alliance experience* was calculated by summing the alliance activities of a focal firm over the preceding 4 months. This variable is also related to experiential learning. To test H2a and H8, *rival firms' competitive actions* were measured as the number of each one's competitive actions. To test H2b and H9, *rival firms' alliance activity* was measured by counting the number of their alliance activities.

To measure *performance feedback*, monthly performance was measured by market share, because market share is announced monthly and is public information observed by all market players. To test H3a, H3b, H4a, and H4b, we use a firm's performance relative to its aspiration level, a variable based on behavioral theory (Cyert & March, 1963). In this study, the aspiration level is confined to the historical aspiration level. The Korean mobile telecommunication service industry is an oligopolistic market occupied by only three firms, with SKT occupying almost half the

market. Therefore, the social aspiration level formed by averaging the performance levels of the three firms is unlikely to hold as it would in other industries. The historical aspiration level was formulated as the mean of the subscriber-based market share over the preceding 3 months. Thus, *performance relative to aspirations* was calculated by subtracting the historical aspiration level from the subscriber-based market share. To test H5 and H7, a firm's *alliance tendency* was measured as the number of alliance activities divided by the total number of all types of competitive actions, including independent actions. To test H5, *competitive action* was calculated by summing all the actions taken by each firm each month.

Control variables This study includes two control variables. The first is *firm size*. The structure of the Korean mobile telecommunication service market is formed by a leading firm (SKT) and two other firms. The leading firm has maintained its controlling market power of over 50 % market share since January 2002; therefore, the model should control for *firm size*. *Firm size* was measured using the natural logarithm of the total number of subscribers. The other control variable is the *time effect*. The mobile number portability policy was instituted in January 2004. It provides customers the freedom to switch to an alternative service provider, with nearly zero switching costs. Accordingly, years after 2004 are coded as one, and zero otherwise.

Results

Table 2 reports the means, standard deviations, and correlations between the major variables in this study. It should be noted that there is some degree of correlation between the variables. Thus, we examine the variance inflation factors to detect multicollinearity. The variance inflation factor scores of each model are less than 5. Because a rough measure of multicollinearity is for the variance inflation score to be 10 or higher, our analyses are unlikely to have serious problems related to multicollinearity. Overall, we conclude that multicollinearity is not a serious concern.

Table 3 reports the negative binomial regression coefficients used to test the hypotheses. Model 1 tests H1a. Hypothesis 1a assumes that the experience of competitive action would have a positive effect on future competitive actions. As expected, the result of model 1 shows a positive relation, which is statistically significant ($p < .01$). Thus, H1a is supported. Hypothesis 2a assumes that rivals' competitive actions would have a positive effect on a focal firm's future competitive actions. The coefficient of rival's competitive action in model 2 is statistically significant ($p < .01$). This result supports H2a. Model 3 tests the positive moderating effect of performance relative to the aspiration level in the relation of H1a. The result of model 3 shows a positive and statistically weakly significant ($p < .10$) moderating effect. Therefore, H3a is weakly supported, but not in the fully specified model 6. Model 4 tests the negative moderating effect of performance relative to the aspiration level in the relation of H2a. The result of model 4 shows a negative and statistically significant ($p < .05$) moderating effect. Therefore, H4a is supported. Model 5 represents the result of the test of H5. Hypothesis 5 assumes that a firm's alliance tendency would have a positive effect on future competitive actions. The coefficient

Table 2 Descriptive statistics and correlations.

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Competitive action $t + 1$	15.26	7.58										
2. Alliance $t + 1$	7.90	4.97	.87***									
3. Firm Performance	.00	.01	-.24*	-.24*								
4. Firm size	16.18	.51	.65*	.61*	-.52*							
5. Experience of comp. act.	63.10	27.07	.74*	.64*	-.39*	.76*						
6. Experience of alliance	32.84	16.81	.71*	.67*	-.32*	.75*	.93*					
7. Alliance tendency	.49	.19	.13 [†]	.18*	.05	.15*	.02	.20*				
8. Rivals' comp. action	-.00	1.00	-.21*	-.15*	.19*	-.53*	-.32*	-.28*	.04			
9. Rivals' alliance	-.00	1.00	-.19*	-.05	.12	-.40*	-.28*	-.16 [†]	.14*	.82***		
1. Rivals' alliance tend.	.50	.13	-.03	.13 [†]	-.05	.01	-.02	.13	.19**	.12 [†]	.62***	
11. Perf. relative to asp.	.00	1.00	-.08	-.09	.55*	-.21*	-.17*	-.17*	-.01	.07	.07	.02

The superscripts [†], *, **, and *** indicate statistical significance at the 10 %, 5 %, 1 %, and .1 % levels.

Table 3 Results of fixed-effects negative binomial regression (dependent variable: Competitive action_{t+1}).

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	21.3353**	23.3230**	24.0629**	24.0629**	26.6618**	23.8240**
Firm size	-1.0997*	-1.2185**	-1.0909*	-1.2446**	-1.4379***	-1.2282**
Time effect	.1251	.1475 [†]	.1440	.1833*	.1210	.1445
Competitive act. exp. (H1a)	.1509**		.1614**			.1049*
Rivals' comp. act. (H2a)		.1015**		.0899**		.0788*
Perf. relative to asp.			.0124	.0750**		.0474
Perf. relative to asp. × Experience, comp. act. (H3a)			.0575 [†]			.0238
Perf. relative to asp. × Rivals' comp. act. (H4a)				-.0663*		-.0547 [†]
Alliance tendency (H5)					.3839**	.5598**
N	129	183	129	165	183	129
Wald χ^2	22.16	34.09	29.41	35.62	28.63	53.91

The superscripts [†], *, **, and *** indicate statistical significance at the 10%, 5%, 1%, and .1% levels.

of model 5 is statistically significant ($p < .01$). Thus, H5 is supported. Model 6 is the full model, including the variables mentioned above, and its results are quite robust, except for that testing for H3a.

Table 4 reports the results of the negative binomial regression used to test the model including alliance activity as a dependent variable. Model 7 is used to test H1b. Hypothesis 1b assumes that experience with alliance activities would have a positive effect on future alliance activities. The result of model 7 shows a positive relation that is statistically significant ($p < .01$). Thus, H1b is supported. Hypothesis 2b assumes that rivals' alliance activities would have a positive effect on the focal firm's future alliance activities. The coefficient of model 8 is statistically significant ($p < .001$). This result supports H2b. Model 9 tests the positive moderating effect of performance relative to the aspiration level on the relation of H1b. The coefficient of model 9 is statistically significant ($p < .05$). This result supports H3b. Model 10 tests the negative moderating effect of performance relative to the aspiration level on the relation of Hypothesis 2b. There is no evidence to support H4b in model 10; therefore, H4b is not supported. In the fully specified model 11, the result is consistent with partial models, although H3b is weakly supported ($p < .10$).

Table 5 reports the fixed-effects regression coefficients used to test the remaining hypotheses. The dependent variable is performance, as measured by the net number of switching customers. Hypothesis 6 assumes that a focal firms' competitive actions would have a positive relation with performance. The coefficient is positive and

Table 4 Results of fixed-effects negative binomial regression (dependent variable: Alliance_{t+1}).

Variable	Model 7	Model 8	Model 9	Model 10	Model 11
Intercept	21.9634*	24.4471**	2.9944*	21.8522*	23.7045*
Firm size	-1.1793 [†]	-1.3259**	-1.1153 [†]	-1.1513*	-1.2643*
Time effect	.2851*	.3062*	.3326*	.2863*	.3375*
Experience, alliance (H1b)	.1898**		.1927**		.1407*
Rivals' alliance (H2b)		.1857***		.1898***	.1181*
Perf. relative to asp.			-.0144	.0419	-.0012
Perf. relative to asp. × Experience, alliance (H3b)			.1148*		.0934 [†]
Perf. relative to asp. × Rivals' alliance (H4b)				.0182	.0229
<i>N</i>	129	183	129	165	129
Wald χ^2	17.30	34.62	24.93	31.96	32.01

The superscripts [†], *, **, and *** indicate statistical significance at the 10%, 5%, 1%, and .1% levels.

statistically significant ($p < .05$). Therefore H6 is supported. Hypothesis 7 assumes that the alliance tendency of a focal firm would have a positive relation with performance. The coefficient is positive but not statistically significant. Thus, H7 is not supported. Hypothesis 8 assumes that the competitive actions of rival firms would have a negative relation with performance. The coefficient is negative and statistically significant ($p < .05$). Therefore, H8 is supported. Hypothesis 9 assumes that the alliance tendency of rival firms would have a negative relation with performance. The coefficient is negative but not statistically significant; thus H9 is not supported.

As an alternative estimation of the endogeneity of the main variables in model 12, we compute the predicted values of competitive actions and alliance tendencies based

Table 5 Results of fixed-effects linear regression (dependent variable: Net number of switching customers).

Variable	Model 12	Model 13
Intercept	.5587	.1950
Firm size	-.0342***	-.0121
Competitive action (H6)	.0003*	.0001**
Alliance tendency (H7)	.0033	-.0002
Rivals' competitive action (H8)	-.0002*	-.0002*
Rivals' alliance tendency (H9)	-.0036	-.0003
<i>F</i> -statistics	7.14	3.96
R-squared (within)	.23	.21
<i>N</i>	129	81

In model 13, the independent variables of competitive action and alliance tendencies are predicted values estimated, respectively, from models 6 and 11. The superscripts [†], *, **, and *** indicate statistical significance at the 10%, 5%, 1%, and .1% levels.

on models 6 and 11 and reestimate model 12 with the predicted values of these independent variables, which are uncorrelated with error terms. We use the two-stage least-squares estimation approach (Johnston, 1991). As the first step, we obtain the predicted value of *competitive action* and *alliance tendency* from models 6 and 11. We then replace the actual values with these values. The results are shown in model 13. The result of model 12 is consistent with that of model 13. This implies, then, that the endogeneity problem is not serious.

Additionally, we split the number of switching customers into two groups: incoming customers switching to the focal firm and outgoing customers switching to rival firms. Table 6 shows the results of seemingly unrelated regressions (SUR). When the dependent variables, such as the numbers of incoming and outgoing customers in this study, are not mutually independent, if we apply ordinary least squares, the variance of the estimate may be larger than the original variance. When there is any doubt regarding independence among dependent variables, the variance of the estimate can be reduced using SUR estimation, hereafter SURE (Greene, 2003). The results of the SURE in Table 6 are consistent, overall, with those in Table 5, which provides a robust test for H6 to H9. As an alternative estimation to treat the endogeneity of the main variables in models 14 and 16, we compute the predicted values of *competitive actions* and *alliance tendency* based on models 6 and 11 and reestimate models 14 and 16 with the predicted values of these independent variables, which are uncorrelated with error terms. The results of models 15 and 17 are shown and are inconsistent with those of models 14 and 16, respectively. This then implies an endogeneity problem. We consider the results from models 15 and 16 true estimates after correcting for endogeneity problems.

When performance is aggregately measured by the net number of switching customers, as shown in Table 5, H7 is not supported. The SURE results in Table 6 partially support H6 and H8. In Table 6, the estimated effect of competitive actions on the number of incoming customers is positive and significant in model

Table 6 Results of seemingly unrelated regressions.

Dependent variable	Number of incoming customers		Number of outgoing customers	
	Model 14	Model 15	Model 16	Model 17
Intercept	-.6871***	-1.0991***	1.2583***	-1.3014***
Firm size	.0412***	.0655***	.0754***	.0776***
KTF dummy	.0256***	.0325***	.0375***	.0403***
LGT dummy	.0579***	.0737***	.0835***	.0876***
Competitive action (H6)	.0000	.0001**	.0002*	-.0000
Alliance tendency (H7)	.0049*	-.0000	.0016	.0001
Rivals' competitive action (H8)	-.0001*	-.0000	.0001	.0001*
Rivals' alliance tendency (H9)	.0066†	.0111**	.0101*	.0113*
R-squared	.5753	.7000	.5720	.6452

In models 15 and 16, the independent variables of competitive actions and alliance tendencies are the predicted values estimated from models 6 and 11, respectively. The superscripts †, *, **, and *** indicate statistical significance at the 10%, 5%, 1%, and .1% levels.

15 ($p < .01$), whereas that on the number of outgoing customers is insignificant in model 17 ($p < .05$). By increasing the number of incoming customers, competitive action is beneficial to the focal firm, that is, it leads to an eventual increase in the focal firm's market share. In addition, H8 is supported by the SURE results in Table 6. The effect of rivals' competitive actions on the number of incoming customers is insignificant in model 15 ($p < .05$), but their effect on the number of outgoing customers is positive and significant in model 17 ($p < .05$). Therefore, by increasing the number of outgoing customers, rivals' competitive actions may be detrimental to the focal firm, that is, eventually leading to a decrease in its market share. In addition, H8 is supported by the SURE results from models 15 and 17 in Table 6.

The SURE results in Table 6 have interesting implications. Counterintuitively, the role of rivals' alliance tendencies is not to take away customers from focal firms but to increase the number of customers incoming from rivals based on the estimate in model 15 (.0111, $p < .05$) while increasing the number of outgoing customers to rivals based on the estimate in model 17 (.0113, $p < .05$). Rivals' alliance tendencies increase the turnover rate of customers through increasing the numbers of both incoming and outgoing customers, that is, market dynamics. Rivals' alliances with diverse market players enhance their market opportunities, as well as market uncertainty for focal firms.

Discussion and conclusions

This study offers additional evidence to confirm the prevalent assumptions that firms learn to execute competitive actions and alliances through both their own experience and others' actions (Derfus et al., 2008; Levitt & March, 1988) and that the competitive and cooperative activities of a focal firm and its rivals influence its performance (Chen & Miller, 1994; Ferrier et al., 1999; Miller & Chen, 1994, 1996b; Silverman & Baum, 2002; Singh & Mitchell, 1996; Smith et al., 1991; Young et al., 1996). Given that organizations learn from their own and each other's experience and make changes conditional on their performance, it is surprising that we do not know how organizations' learning by doing and learning from others are influenced by performance feedback. This paper tests three simultaneous learning mechanisms in competitive actions and alliances: It suggests the new findings that success strengthens learning by doing only in alliance activities, that failure-induced imitation (Kraatz, 1998) works only for competitive actions, and that both competitive actions and alliance tendencies influence firm performance. There appear to be different patterns between the inflow and outflow of switching customers in the Korean mobile telecommunication service industry.

We find, as hypothesized, that a firm's own experience in the past helps implement competitive actions as well as alliances. Although we hypothesize that this learning by doing in mobile telecommunication service firms in Korea is accentuated when performance relative to aspiration increases, we find this success-induced strategic momentum only in alliance activities, and not in competitive actions. In addition to learning by doing, mimicry works strongly in relation to both competitive actions and alliances. Although we hypothesize that this mimetic force in mobile telecommunication service firms in Korea is accentuated when performance relative to aspiration

decreases, we find this failure-induced imitation only in competitive actions, not in alliance activities. This asymmetric finding implies that alliance activity has a performance feedback mechanism distinct from that of competitive activity. Due to the time and cost required to search for partners and make agreements with them, managers may be unable to copy rivals' alliances in response to failure and just learn from own alliance experience instead.

A problemistic search is stimulated by a problem and is simple in the sense that the search is initially targeted at the neighborhood of the problem symptom and current alternatives (Cyert & March, 1963). Firms facing performance below their aspiration levels will search for a solution within the firm, such as a competitive action. Therefore, we infer that alliance activity requires more distant and explorative search efforts. This implication is consistent with the literature on learning by alliance (Doz & Hamel, 1998; Gulati, 1995; Mowery, Oxley, & Silverman, 1996). Firms acquire new knowledge and capabilities by alliance to overcome their limited social contexts (Rosenkopf & Almeida, 2003; Rosenkopf & Nerkar, 2001).

This study also shows the dynamics of inter-firm rivalry: the relation between a focal firm and rival firms' competitive actions, alliance activities, and performance. In the context of customers switching in the Korean mobile telecommunication market, only competitive actions appear to have performance implications when performance is measured as the number of net switching customers. Specifically, a focal firm's competitive actions are self-beneficial, while those of rival firms hurt its performance. However, if we split the number of switching customers into two groups, incoming customers switching to a focal firm and outgoing customers switching to rival firms, the pattern becomes more complex. In attracting customers from rival firms, competitive actions appear to be effective. In addition, rival firms' competitive actions increase the number of customers switching to rival firms. A high alliance tendency is not helpful in taking customers away from rival firms, while other rival firms' high alliance tendencies help the focal firm attract customers, increasing the number of customers switching from rival firms to the focal firm. On the other hand, rival firms' alliance tendencies appear to be effective, a threat where the focal firm can lose customers switching to rival firms.

In sum, competitive actions appear to be an effective strategic tool for attracting customers away from rival firms, while alliance is an ambiguous, double-edged sword. As rivals increase alliance activities, a focal firm benefits from attracting increased numbers of customers from rival firms. At the same time, increasing rivals' alliance activities induces the focal firm's customers to switch to rival firms.

Since rival firms' alliance activities can be both an opportunity and a threat in terms of customer switching, it would be critical to seriously consider and monitor them. Preempting alliance opportunities for rival firms is an option for a focal firm applying strategic leadership. However, a high level of alliance activity does not guarantee a focal firm's competitive advantage. In a competitive environment with a higher level of rival alliance activity, competing through alliances may not be effective. Forming alliances to prevent rivals' competitive actions would be a valuable option. Eventually, competitive action will be the ultimate source of competitive advantage, while alliance activities simply facilitate customer mobility, which leads to reshuffling in the market.

Our study has several implications for managers. First, managers may gain a better understanding of when and why their firms and rival firms launch competitive actions

and alliances, which will help them predict their rival firms' competitive actions and alliance tendencies. Second, a better understanding of the performance implications of the focal firm's and rival firms' actions will enhance the effectiveness of their strategic decision-making. Specific prescriptions will depend on the type of strategic action and whether competitive action is based on alliance or not. It appears to be critical for focal firms to decide on a strategic direction, such as whether they should attack or defend themselves against rival firms. In particular, performance implications in terms of customer mobility across competing firms may guide managers regarding which type of strategic action will be helpful in attracting switching customers and in protecting their loyal customers from rival firms. For example, if a focal firm does not have sufficient resources or capabilities to continue a series of competitive actions, it may be better not to launch alliances, since alliance tendencies increase other rival firms' alliance tendencies, as well as customer mobility, which requires that market players launch competitive actions or risk losing their customers.

Limitations

Like most research, our study has limitations. First, the use of daily Korean newspapers helped us detect a relatively objective and accurate set of all of the events considered, namely, competitive actions executed by telecommunication service firms in Korea. However, journalists write articles not only to objectively track and record business events, but also to emphasize their own opinions in an effort to secure greater readership. Therefore, the business events chosen from newspaper articles are not completely free from subjective judgmental bias.

Second, this study uses the net increase in customer mobility across firms as a proxy for firm performance, a type of flow measure contributing to a stock measure of the market share. The market share is quite stable over time, especially on a monthly basis. Therefore, it is difficult to relate any strategic changes to monthly market share empirically. Fortunately, current regulations give customers the freedom to switch to alternative service providers: Due to the number portability policy that went into effect January 2004, the switching cost for customers, except for psychological or habitual switching costs, is effectively zero. Utilizing this situation, we decided to use monthly statistics on customers switching service providers to measure firm performance. This performance measure has two potential drawbacks. First, it may not consider the cost side of strategic actions. Additionally, the number of switching customers may not include new subscribers who have never used mobile phone services in Korea. However, the industry's distinctive characteristics themselves justify the performance measure. The proportions of fixed and sunk costs over the total cost for a mobile phone service are very large, while the quality difference between service providers is small. Therefore, competition for market share instead of profitability becomes prevalent. Another rationale for the firm performance measure is the state of the market life cycle: The saturated mobile telecommunication market has little room for creating new customers from outside the market. Although creating a larger pie is the most important agenda for all players, it appears that this market has already reached its saturation point in terms of subscribers.

Future research directions

We would like to suggest three specific directions for further research. First, the theoretical proposition supported by the current empirical context, namely, the mobile telecommunication service industry in Korea, may be a unique business setting. Therefore, the theoretical framework in other industries and different countries could be investigated. Second, we treated all actions as homogeneous except the categorization for alliances. Recent studies focus on one or two interesting types and delve into their strategic meaning of the specific action types, for example, the performance effect of co-creation actions (Gnyawali et al., 2010). Future studies could investigate the effects of specific types of actions, such as promotions and alliances with content providers. Third, firms in the sample participate in other markets, such as the Internet broadband carrier business. Multimarket competition makes the dynamics of competitive actions and alliances between rival firms even more complex. Furthermore, two of the three mobile telecommunication services, LGT and SKT, are among the five largest *chaebols* in Korea. Therefore, they have a much broader competitive scope. The current research model can be extended to consider the effects of multimarket competition and business group membership.

Conclusion

In conclusion, this study investigates both competitive actions and alliance activities simultaneously, reveals their antecedents from both competitive dynamics and organizational learning perspectives, and shows their performance consequences by utilizing the empirical context of the Korean mobile telecommunication service industry. Interestingly, rivals' alliance tendencies increase customer mobility within the market, for which all firms should be prepared. In addition, as expected, competitive actions are effective for attacking but not for defense, that is, keeping one's customers from switching to rival firms. This research therefore contributes to the literature by advancing our understanding of the antecedents and consequences of competitive actions and alliance activities.

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