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Insight into the Rival Effects of M&As within the Context of Mobile Ecosystem: The Case of Google and Apple

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Abstract

Due to the speed of ICT convergence, the concept of business ecosystem has been adopted for understanding the business value chain. Within the business ecosystem, keystones play a central role. Currently, Google and Apple are the keystones of the mobile ecosystem and they have been quite active in acquiring firms over the past few years. In our study we empirically examined the effects of the two firms' mergers and acquisitions (M&As). Specifically, we examined the acquirer and rival effects of their M&As according to the type of target firms. We used CPND(Contents, Platform, Network, Device) and sub categories to classify the targets. Through a t-test on the CARs of the M&As within each category, we were able to explore what type of M&As affected the acquirer, the rival or both. The results provide a basis for understanding the complex relationship between two keystones within the business ecosystem.

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Keywords: M&A, Rival effects, Google, Apple, Event study, Mobile convergence, Business ecosystem

Introduction

Ever since the widespread adoption of smartphones innovative change has accelerated in not only the mobile industry, but other industries as well. The pace of ICT convergence is faster now than ever before and the boundaries between many industries have been diminished. Businesses now form many complex inter- and intra-industry relationships. In particular, increasing number businesses are forming a close relationship with the mobile sector. Under these circumstances, conventional concepts regarding business networks have many limitations in understanding the mobile business. Thus, a new concept of “mobile business ecosystem” has been introduced in explaining the mobile sector.

The business ecosystem concept was first proposed by Moore (1993). Just like the biological ecosystem, there are certain functional groups within the business ecosystem. Among them are the keystone players who play a central role within the ecosystem. These keystones focus on creating platforms and sharing solutions throughout their network (Iansti

& Levien 2004). These players not only try to innovate and create value themselves, but provide the platform and resources necessary for other firms (known as “niches”). Niches use the platform and resources to create wealth, value and innovation that is necessary for the ecosystem to evolve.

Inside the mobile ecosystem, Apple and Google are currently the main keystones. With the introduction of iOS and AppStore by Apple, and Android OS and PlayStore by Google, these two firms have led the widespread use of smartphones and have changed the ICT environment completely. Thus, it is worthwhile to understand and analyze the strategies of these two firms to gain insight into what has happened and what will happen in the whole mobile ecosystem.

To gain a deep level of understanding about these firms, this paper empirically analyze their mergers and acquisitions (M&As). The two firms have actively been involved in M&As during the last decade. Google has always been, and still is very active in M&A, with 163 known acquisitions from 2001 to 2014 averaging over 11 acquisitions per year. Apple on the other hand, has not been so active in acquiring firms and had only 29 acquisitions from 1988 to 2009 averaging around only 1 acquisition per year. However, in the recent years, Apple has taken M&A to be a core part of their business strategy with 33 acquisitions from 2010 to 2014, averaging over 6 acquisitions per year. Despite such active participation in M&As by both keystone companies, not much empirical research has been done regarding the cross effect of their M&As.

Analyzing the rival-acquirer cross effect of these companies is especially important because the criteria which sets the competitive relationship among firms have changed and become more complex with the introduction of the ecosystem concept. Traditionally competition was defined between firms within the same industry. These two firms however,

are categorized under different industries. Instead, they compete as keystones within the mobile ecosystem by providing platforms which niches from various industries can use to create, distribute, and host products and services. To put it simply, while traditional relationship of competition was based on the affiliation of the firms, currently the competing relationships are based on the roles of the firms. Also, cooperation among competing firms has become widespread, leading to the creation of the term “coopetition”. Even Google and Apple are cooperating with each other, with Google providing Google apps to Apple’s iOS and Apple authorizing them. Empirically analyzing the cross-effects of these two firms could aid in understanding the new and complex business relationships within the mobile ecosystem.

This paper aims to explore the interrelationship between the keystone players using event study. In other words, this study investigates the rival effects of Google and Apple in addition to the main effect on the acquirer. In the next section, after reviewing the literature, the overall research design including the methodology and analyzing framework is provided. The empirical results and interpretation follows and finally, the implications are discussed in the conclusion section.

Literature Review

The Keystones of the Mobile Ecosystem

The concept of ecosystem for analyzing complex business networks has been used by many researchers ever since Moore (1993) first introduced the concept. The business ecosystem can be defined as “a business community that brings together firms from various interdependent industries” (Isckia, 2009, p. 2). Due to technological developments and the convergence of many industries, the boundaries between industries have shattered and more

industries are becoming interdependent. Conventional concepts for understanding the relationships between businesses cannot be accurately applied under these circumstances. Instead, the ecosystem concept has come to be a powerful analogy in explaining the whole business network. (Iansti & Levien, 2004; Moore, 2005;). Since the network of mobile businesses is very complex and there are many interdependent industries involved, the ecosystem concept should be implemented for analyzing the many inter-related effects of the whole mobile sector.

In understanding the ecosystem, one should keep in mind that there are certain functional groups within the ecosystem depending on the roles they play within the ecosystem. According to Iansti & Levien (2004) the functional groups are dominators, keystones, and niches. The dominators' role is to dominate all the niches in the ecosystem through integration strategies, control as many nodes within its network, and capture value for its own benefit. The keystones play a significant role in the creation and redistribution of value within the ecosystem. They take the role of leadership but not in a dominant way. They only posit themselves to few nodes rather than trying to control the whole network. Finally, niches are mostly the small actors within the ecosystem who try to specialize in order to differentiate themselves from others and create most of the values within the environment that the keystones provide. This paper will be focusing on the keystones as they play a very central role in the development, or co-evolution of the whole ecosystem.

The keystones “focus on creating platforms and sharing solutions throughout the network” (Iansti & Levien, 2004). It should be noted that the keystones are platform providers. They provide platforms which the niches can use to create value through innovation. According to

Song (2010), a keystone strategy is most effective for a firm if the “business is at the center of a complex network of asset-sharing relationships and operates in a turbulent environment”. In the mobile ecosystem, Google and Apple are the most influential keystones with the Android platform and iOS platform.

Severa studies that mention the mobile ecosystem of the Google and Apple ecosystem can be found in recent years. (Basole, 2009; Kahru, 2014) Apple became a keystone in the mobile ecosystem when they entered the mobile market with iOS and the AppStore. Through iOS and AppStore Apple provided a primarily closed, but partially open platform that third party developers could use to create applications and sell them. Meanwhile Google’s mobile ecosystem was created, following Apple, after the acquisition of Android and introduction of the Android OS and the Play Store in 2008. Also, Song (2009) points out the role of Google as a keystone in the Internet sector. He argued that within the Internet sector, “Google occupies richly connected platform that provides the foundation for creating many niches, creates network among advertising participants, and works to increase diversity and productivity” (Song, 2010, p. 9).

Apple’s platform is a semi-closed source platform and in order for an application to be sold within Apple’s app store, authorization is needed. Currently, Google develops many apps compatible for iOS and Apple authorizes these applications. Such cooperation seems quite irrational, since they are constantly at war with each other in expanding and evolving their ecosystems through value creation. However, the relationship between the two keystones is far more complex than the traditional notion of rivalry. This is mainly due to the fact that although the two firms compete as rivals within the mobile ecosystem, their main revenue sources are completely different. While Google generates most of their revenue through

advertisement, the main source of revenue for Apple is manufacturing devices. Under such circumstances, these two firms compete fiercely and cooperate with each other at the same time.

Daidj and Jung (2011) emphasized that the term “coopetition” is increasingly being associated with the business ecosystem concept. Like Daidj and Jung, there have been efforts trying to qualitatively explain such complex relationships formed within the business ecosystems. However, not much empirical analysis have been done regarding such relationships. In this study, we tried to fill the gap by empirically examining the relationship of the keystones of the mobile ecosystem.

The Effects of M&A

Mergers and acquisition is defined as the combination of two firms through absorption or purchase. Many firms carry out this strategy for various purposes and the result of such actions influence many actors surrounding the participants of M&A. This paper will not focus on the motivations behind M&A but rather focus on its effects.

Many researches over the years have explored the effects of M&A focusing on the shareholder wealth effects of the acquirers and targets. (Billet et al, 2004; Akben-Selcuk, 2011; Hiruta, 2012) Billet (2004) studied the bondholder wealth effects in M&A by studying the M&As of the 1980s and 1990s and found that there was significant positive wealth effects for the bondholders of the target firm while significant negative wealth effects were found for the bondholders of the acquiring firm. Akben-Selcuk (2011) analyzed the impact of M&A on the acquirer performance by studying the M&As of Turkish companies. Hiruta (2012) focused on the M&As of Japanese firms and found that there was significant short-term wealth effects on both the acquiring and target firms. Although it is widely believed that

M&As provide significantly negative effects for the acquirers, the acquirer effects regarding M&As is still controversial.

Other researches went beyond the participants and analyzed the impact of M&A on the rivals of the participants. There is an abundant amount of researches concerning the effects of M&As on the rivals of the acquiring and target firms. Eckbo (1983) was one of the first to empirically consider the effects of mergers on the rivals of the merging firms. On the one hand, there were views that M&As provided positive wealth effects to the rivals of the M&A participants. Song & Walkling (2000) carried out a study on the rivals of the target firms, based on the acquisition probability hypothesis. They based their studies on the hypothesis acquisition of a certain target may give off positive information that they might also become targets in the near future to the rivals of the target firm and thus leading to positive wealth effects. Other studies noticed the collusion effects of horizontal M&As and showed there were positive effects for the rivals of the acquiring firms. (Eckbo, 1983; Fee & Thomas, 2004; Clougherty & Duso, 2009).

Recently, in contrast to the studies above, some researchers looked into the negative effects that could be brought on the rivals of the acquirers. Hasan et al (2011) explored the negative effects on the rivals of the acquirers by analyzing the effects of M&As between stock exchanges. Akdogu (2008) focused on the competitive advantage theory and analyzed the telecommunications industry. The study showed that significant negative effects were present on the acquirer's rivals.

The majority of the studies regarding the effects of M&A(whether rival or acquirer) have been focused on whether M&A itself provides a certain effect or whether a certain deal type, such as horizontal, vertical, etc has an effect on the participants or rivals of the participants. Also, studies have limited their definition rivals as firms within the same industry.

As we have aforementioned, borders between industries have diminished and firms from different sectors are forming rival relationships. To contribute to the body of M&A studies, this paper employed a new approach for analyzing M&As and focused on the characteristics of the target companies. Also, this paper examines the rival effects of Google and Apple, firms from completely different sectors, which have formed rivalry as keystones in the mobile ecosystem.

Research Design

Methodology

The event study methodology is widely used in measuring the short-term wealth effects of M&A (Song & Walkling, 2000; Akdogu 2008; Hasan, 2011). Under the assumption that the market processes information about a certain event in an efficient and unbiased manner, the effects of a certain event can be measured through the event study method. The effect of a certain event can be observed through any abnormal returns around the time of the event. The aim of this article is to explore the effects of M&A on the acquirer and the acquirer's rivals and thus the event study method will provide a means to analyze the effects in an empirical manner.

This study will look into the M&As of Google during the period from January of 2008 to May of 2014. This period was selected because it encompasses the period when Google and Apple became rival keystones within the mobile sector through the introduction and

widespread adoption of iOS and Android based smartphones. Apple introduced the iOS based iPhone in April of 2007 and Google followed with the distribution of the first version of Android OS in November of 2007. Therefore, it was logical to analyze all the M&As that were announced after 2007.

As the first step of implementing this method, event windows were defined. Since it was assumed that the market processes information efficiently, and Google's M&A announcements were sometimes very close to each other, event period was chosen to be (-5,5). Within this period, all possible event windows were selected in analyzing the effects of M&A. After the event window has been decided, an estimation window is needed in order to estimate the parameters of the market model. In this paper, we chose (-120, -30) as our estimation window.

With the selected estimation window, we can now predict the market model, which can be expressed as in Equation (1). The parameters will be estimated by OLS, based on the CAPM model.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

Where,

R_{it} = Realized return of the share of Apple($i = 1$) or Google ($i = 2$) at time t

R_{mt} = Realized return on Nasdaq at time t

ε_{it} = The error term

α_i = The intercept

β_i = Parameters of the regression equation

After the parameters are estimated, the abnormal return (AR) will be calculated. Abnormal return can be obtained by subtracting predicted returns from the realized return and can be expressed as Equation (2).

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) = \varepsilon_{it} \quad (2)$$

After obtaining the abnormal returns, the cumulative abnormal return (CAR) will be calculated for the event window period using Equation (3).

$$CAR(t_0, t_1) = \sum_{t_0}^{t_1} AR_{it} \quad (3)$$

In this paper, t-test was used to test whether the CAR was significantly different from zero.

$$\text{test} = \frac{CAR(t_0, t_1)}{[Var(CAR(t_0, t_1))]^{1/2}} * \frac{1}{\sqrt{n}} \quad (4)$$

Where

n = Number of days in the event window

Data Collection

As access to an M&A database like SDC Platinum was impossible, and the reliability of such database is questionable, we first looked into the listings of M&As of each company using Wikipedia. Since Wikipedia is not considered a reliable source, we checked each M&A through reliable sources like news and financial magazines. We were able to gather a total of 190 M&As and their announcement dates.

In our study, we decided to analyze the M&A events within the period between January of 2008 to October of 2014. Such a period was selected because Google, who was a follower in the mobile platform business, first released its Android platform on November of 2007, which started the platform war between the two companies. The number of M&As in the specified period was 150 M&As. Of these M&A events, we eliminated 9 events, because these events occurred during a non-trading day, such as holidays and weekends. Finally, a total of 169 M&As were selected for analysis through the event study method.

The stock prices of each company and the market index within the analyzing period were retrieved from Yahoo! Finance.

Analysis Process

As the purpose of our study was to explore the effects of M&A to the acquirer and the acquirer's rival, we carried out the event study methodology on Google and Apple's M&As with no assumptions or hypothesis about the results. We first tried to see whether the M&As of Google or Apple provided any significant acquirer or rival effects. We conducted an event study for all event windows, on all selected targets of Google and saw whether there was any significant effect on Google or Apple's stock price. Then, we took all the selected Apple's targets and went through the same process. Here, there was no significant result, implying that overall, neither Google nor Apple's M&As provided any significant effect to either the acquirer or the rival.

Since such broad analysis of the acquirer or rival effects does not provide any implications on the complex relationship of the two keystone firms, we decided to classify the M&As according to their characteristics. There are many characteristics of M&A that could contribute to the wealth-effects of M&A. Traditionally, many scholars have looked into effects related to the deal characteristics such as deal type(hostile or friendly takeover,

vertical or horizontal M&As, cross-border M&As, stock for stock or cash deal) and deal amount. All these characteristics, however, were incompatible with our study. Classification by vertical/horizontal may have been valid under the traditional business value chain concept, but within the ecosystem perspective, vertical and horizontal is not an appropriate concept. Cross-border M&As were meaningless in our studies as most of the acquisitions by Apple and Google were within the US. Financial characteristics of the deals such as stock/cash and deal amount was out of consideration due to data availability.

However, classification by target type is appropriate for our study for a couple of reasons. First, information on type of target is available to all players in the stock market and this can be a basis with which the market valuates the event. Second, as we have mentioned, there are many different types of firms within the mobile business ecosystem, and when a keystone acquires a certain type of firm, this could signal a critical signal to the rival keystone.

Before classifying the targets, we first sorted out all M&As that had no significant (at 5% significance level) acquirer or rival effects for all event windows and gathered only the M&As that provided either significant effect for the acquirer, rival or both in at least one event window. We first conducted a t-test on the average of the ARs of each event within each event window. The t-test was carried out for both rival and acquirer stock's ARs. Then, the CARs of each event were recorded for further analysis.

We went through this process because we wanted to see what effects were present for the acquirer or rival, when the acquirer acquired a certain type of firm. Therefore, the acquisitions that provided no significant effects are meaningless data that could deter our analysis. Also, the effect of each event might be prevalent within a certain event window and not present under other event windows, due to leakage of information. This process can assure that all significant events will be captured in the latter part of the analysis.

After the classification, t-tests were carried out to see whether the average of the CARs within each category was significantly different from zero. Since we gathered all the significant CARs from different event windows, there were multiple CARs for each acquisition. To solve this problem, we selected CARs with the largest absolute value among all the significant CARs of each acquisition. The reasoning behind such selection was that in the occurrence of an event, the absolute value of the CAR reaches a peak and then returns to zero. Therefore, the largest absolute value of the CARs could be the measure of the effects of the acquisitions.

Classification

We classified the targets by their characteristics according to the Contents Platform Network Device (CPND) taxonomy. Many researchers and institutes have used the CPND taxonomy in analyzing the firms within the information and communications technology (ICT) sector (Kweon, Kweon, Kweon & Cha, 2014; Lee & Kim 2013). Since Google and Apple are keystones of the mobile ecosystem and most of their acquisitions have remained within the ecosystem, this taxonomy would be an appropriate approach in our study. For Google, we added another category which we defined as “Technology/R&D”. The targets that belong to this category are firms that do not fit in the CPND taxonomy and are firms that are mainly focused on technology and R&D. After the classification, t-test was carried out for the CARs of all the M&As inside each category to see whether the M&As belonging to that certain category provided any significant effects and if so, what effects they provide.

Since no researches that provide the exact definition of CPND, we defined each category to fit the context of our analysis and to make the classification process more robust. First, contents are sources of information and entertainment. Within the contents category, all targets which either produce contents, provide the means to create contents, gather and

provide curated contents, and produce application software, were included. The term platform is used widely and the definition of platform is quite loose. Therefore, we used the definition defined by Parker & Van Alstyne(2012). In their paper, they defined the platform as “the set of components used in common across a product family whose functionality can be extended by third parties and which is characterized by network effects”(Parker & Van Alstyne 2012 p. 3). Within the platform category, all targets that provide services that fall within this definition were included. The network category includes targets that provide network services such as wi-fi, data, and voice services. Finally, in the device category, all manufacturing firms that produce mobile or related devices were included.

To analyze the acquisitions at a deeper level, we further divided the firms within the Contents, Platform, Device categories into several sub categories. The Network category was excluded from sub-categorization due to the lack of targets within that category. The contexts of which Google and Apple have acquired device related targets were quite different. Therefore, we sub-categorized the device section differently for each company. <Table 1> shows all the categories and sub-categories and the number of targets within each category.

Table 1 Classification of targets

Category	Sub-Category	
Contents	Business Oriented	
	Consumer Oriented	
Platform	Cloud/Analytics	
	Commerce	
	Marketing/Advertisement	
	OS/Apps	
	Payment	
	Search	
	Social	
	Video	
Network		
Device	Google	Mobile & New
		Smarthome
	Apple	Performance & Efficiency
		Feature

Results & Discussion

We analyzed the CARs of all M&As within a category through a t-test on whether the average of the CARs were significantly different from zero ($H_0: \mu = 0$). We first carried out the t-test on Google's acquisitions based on the CPND + Technology/R&D categorization and found no significant result. However, we were able to obtain significant results from the sub-categorization. The results regarding the sub-categorized Google's acquisitions are shown in <Table 2>. Here, we excluded the categories that only had a sample size of 2 or less from the t-test process as such a sample size is too small to provide any implications.

Table 2 Google Acquisition Effects – Sub-Categorization

Category	Sub-Category	N		μ_{CAR} (p-value)	
		Significant Acquirer Effect	Significant Rival Effect	Acquirer Effect	Rival Effect
Contents	Business Oriented	9	8	0.034* (0.058)	0.016 (0.568)
	Consumer Oriented	14	13	-0.009 (0.409)	0.008 (0.679)
Platform	Cloud/Analytics	5	6	0.002 (0.951)	0.050** (0.0430)
	Commerce	5	6	-0.008 (0.688)	0.047** (0.033)
	Marketing/Advertisement	5	6	0.009 (0.688)	-0.030* (0.085)
	OS/Apps	5	5	0.027** (0.045)	-0.04*** (0.000)
	Payment	2	0	-	-
	Search	0	2	-	-
	Social	3	5	-0.016 (0.721)	-0.003 (0.961)
	Video	4	5	-0.028 (0.398)	-0.041** (0.024)
Network		2	1	-	-
Device	Mobile & Electronics	5	3	-0.046** (0.031)	-0.051* (0.056)
	Smarthome	2	2	-	-

Technology/R&D	6	7	-0.007 (0.713)	0.032 (0.238)
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*, **, and *** denote significance at 10%, 5%, and 1%, respectively

Following the analysis of Google's acquisitions, we went through Apple's acquisitions. Unlike Google, there was a significant result regarding the CPND classification. Since the number of Apple's acquisitions was quite small compared to Google, the sub-categorization process resulted in a lack of samples within most of the sub-categories and those with sufficient sample size provided no significant result. <Table 3> shows the results regarding the CPND classification of Apple's acquisitions.

Table 3 Apple Acquisition Effects - CPND

Category	N		μ_{CAR} (p-value)	
	Significant Acquirer Effect	Significant Rival Effect	Acquirer Effect	Rival Effect
Contents	6	11	-0.005 (0.878)	0.006 (0.682)
Platform	3	5	0.051 (0.475)	-0.033** (0.022)
Network	0	0	-	-
Device	7	3	0.022 (0.483)	-0.029 (0.505)

To generate a clear insight in analyzing the results, we classified the significant categories according to their effects. <Table 4> shows all the significant categories and their effects.

Table 4 Result Classification

Acquirer \ Rival	Positive	No Effect	Negative
Positive		Google-Contents-Business Oriented*	Google-Platform-OS/Apps**, ***
No Effect	Google-Platform-Cloud/Analytics** Google-Platform-Commerce**		Google-Platform-Marketing/Advertising* Google-Platform-Video** Apple-Platform**

Negative			Google-Device-Mobile&Electronics**, *
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A recognizable result that could be found from <Table 4> is that with the exception of Google’s acquisition of business oriented contents and mobile & new device related targets, all of the targets that provided significant acquirer, rival or acquirer/rival effects were platform related. This shows that the market perceives Apple and Google as keystones and that the market is quite sensitive towards decisions regarding their platform strategies.

In <Table 4> we can observe that Google’s acquisition of OS/Apps platform related targets provide a positive effect for Google and a negative effect for Apple. Also, Apple’s acquisition of platforms provided negative effects for Google. From this we can interpret that the market perceives the acquisition of the OS/Apps platform is synergistic and value creating for the acquirer while, such an acquisition is threatening for the rival. These results are important in the sense that it provides empirical evidence to support that, (1) Google and Apple are indeed the competing keystones within the mobile ecosystem, and (2) the keystones should focus on providing a better platform, which the niches can use to bring innovation within the ecosystem that is essential to the evolution of the ecosystem and the growth of the keystones. From a managerial perspective, this result could aid in M&A decisions such as deciding which acquisition could be the most profitable and synergistic. Also, this result provides helpful implications policy-wise, as the result can aid in setting policies to promote national firms to become a keystone within the mobile ecosystem.

Comparing Google’s acquisition targets that had “none/positive” effects on Google/Apple and “none/negative” effects on Google/Apple provides an interesting implication. Google’s acquisition targets inside the “none/negative” effects cell are all related to Google’s

traditional and main source of profit while targets inside the “positive/none” effects are related to a rather recent business area of Google. We can conclude from this result that, in the competing keystone relationship between Google and Apple, strengthening the main profit source of a company gives off a negative signal to the rival while diversification attempts results in a positive signal for the rival.

Google’s acquisition of business oriented contents provided a significant positive effect for Google. This shows that developing business oriented contents could be a potentially promising business for Google. Meanwhile, Google’s acquisition of mobile & electronics device related targets provided not only negative effects for Google, but also Apple as well. Acquisitions like this were defined as “value-destroying mergers” by Clougherty & Duso(2011). From this result, we can conclude that a keystone should be careful in diversifying their business into the main business of their rival keystone, as it could result in the destruction of value for not only the acquirer but also for its rivals. Also, this result provides a useful insight in policy making decisions. The occurrence of constant value-destroying M&As may lead to degradation of the whole ecosystem. Therefore, regulations against such M&As could be set to prevent such degradation.

Conclusion

In this paper, we looked into the effects of the M&As of Apple and Google, the keystones in the mobile business ecosystem. The effects were analyzed based on the characteristics of the target firms. We were able to see that the acquisition of different types of targets provided different effects for the acquirer and the acquirer’s rivals.

The results of our study provided many implications from the managerial perspective and investors’ perspective. The result of our study could aid management in making M&A

decisions such as deciding which company to acquire in the M&A market. Also, our study provides the means to anticipate what short-term effects could be present when the firm or the rivals of the firm acquire a certain type of target. Investors could also make use of our results. They could refer to the results of our study to estimate the returns of their portfolio in the occurrence of an M&A.

Also, there are implications for policy makers and regulators. Regulations could be set when a firm tries to enact value destroying mergers to muscle out competition. IT leading countries like Korea are trying to promote national firms to create their own competitive platforms. Based on the results of our study, the policy makers could make decisions to regulate or deregulate certain M&As in the mobile sector in order to achieve such a goal.

Finally, our study has contributions to the research area in several ways. As there has not been much empirical research regarding the mobile business ecosystem, our study could fill in this gap. Also, we have analyzed the rival effects of M&As in a different setting, compared to the conventional studies. The conventional studies have defined rivals firms as firms within the same industry. This study however, focused on the rivalry of keystone firms who are based in different industries. Therefore, this study could broaden the field of rival effects of M&As.

One limitation of our study is that we only looked into acquirer and rival effects of M&A within a certain setting. In doing so, it would be hard to generalize our findings. A more broad and extensive study should be done in order to generate a generalized understandings of the acquirer and rival effects of M&A according to the type of targets.

Also, our study only examined the effects of M&A according to the type of the targets. As access to the M&A data of each firm was limited, we were only able to classify the firms

according to the type of the targets. We believe that more extensive study could be done based on our studies, by those who have access to a more refined and detailed data.

Finally, although this study could enhance our understanding of the mobile ecosystem and the ecosystem concept itself, we only looked into a fraction of the ecosystem. Further empirical studies on the relationship between keystones and niches, and niches and niches should be done.

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