

國立交通大學
企業管理碩士學位學程
碩士論文

先發優勢

在P2P和VOIP產業裡的內源性時代之Skype

First Mover Advantages: The Endogenous Growth of
Skype in the P2P and VoIP Industry

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中華民國 103 年 7 月

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Abstract

Skype is a well known company and their services are used by hundreds of millions of people around the world. A company does not just grow to this size and sustainability by chance alone. Although, as you will see, chance does play a role in the early phases of a company's development, the real distinctions lie in a company's core competencies, efficiencies, and strategic decisions. When a company decides to enter the market with their products and services they always hope that increased profits and majority market share can be achieved. In looking at these factors it is quite easy to show what companies are successful and which aren't. In fact, what's more interesting is the journey a company takes to get to where it is today.

When a company decides to pursue a first mover strategy, they put themselves at risk with high R&D costs, imitation from competitors, and the underlying dynamics of the external factors which dictate consumer behavior. It is not easy to be a first mover and achieve the advantages that may come with it. Most companies fail to succeed with a pioneering strategy and the reasons are not easily identifiable. However, every so often, a company can implement its resources and efficiencies in the right places after the decision to become a first mover is made.

Skype is an example of one of these companies. They have seen great success in the very competitive market of mass communication. In addition, they started early when network effects were just beginning to become a trend in the online world. They created a market that never before existed. Free long distance communication wasn't possible until the emergence of the internet. When Skype developed its technology and made it available for free to the public, they had started a network effect that hadn't been seen since the telephone was first introduced. Skype basically replaced the landline communication network throughout the world and allowed people fully utilize the World Wide Web in a way that no company had before.

Keywords: First mover advantages, Endogenous growth model, Network effect, Entry timing

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Table of Contents

Abstract.....	i
List of Tables	v
List of Figures	vi
List of Appendices.....	vii
I. Background and Research Objectives	1
II. Research Methods.....	2
2.1 Theoretical Research.....	2
2.2 Models	2
2.3.1 Endogenous Growth of First Mover Advantages.....	2
2.3.2 Pace of Market Evolution Model and Environmental Dynamics Model.....	2
2.3.3 First Mover Advantage: A Conceptual Framework.....	3
2.4 Qualitative Restrictions.....	3
2.5 Quantitative Restrictions	3
III. Endogenous Growth of Skype.....	4
3.1 Is Skype a First Mover?	4
3.2 Measures of a First Mover	4
3.3 Examples of First Movers.....	5
3.3.1 Proctor and Gambles' Disposable Baby Diaper	6
3.3.2 DuPont	6
3.4 Luck and Opportunity	6
3.5 The Network Effect	7
3.6 Examples of the Network Effect	8
3.6.1 The PTSN (Public Switched Telephone Network)	8
3.6.2 The World Wide Web.....	9
3.7 An Endogenous Opportunity	9
IV. Skype's Market Entry.....	11
4.1 A Decision to Pioneer.....	11
4.2 Skype is born from Kazaa	11
4.3 Market Entry Timing	12
4.3.1 Pace of Market Evolution.....	12
4.3.2 Market and Technology Relationship	13
4.4 Skype's Entry Timing	14
4.4.1 Market Growth	14

4.4.2 P2P Technology Growth.....	15
V. Skype’s First-Mover Mechanisms	16
5.1 Mechanism 1: Technology Leadership.....	16
5.1.1 Skype P2P Architecture	16
5.1.2 Skype Security	17
5.1.3 Skype Quality of Service.....	18
5.2 Mechanism 2: Preemption of Resources	20
5.2.1 Patents and Legislation	20
4.3 Mechanism 3: Development of Switching Costs.....	23
5.3.1 Switching Costs and Network Effects.....	23
5.3.2 Switching Costs and Competitive Pricing.....	24
VI. First Mover Advantages.....	25
6.1 Performance Outcomes.....	25
6.2 Profitability Advantage	25
6.2.1 Profitability and Later Entrants.....	26
6.3 Market Share Advantages.....	27
6.3.1 Market Share and Late Entrants	27
6.4 Acquisitions, Buyouts, and Stock Incentives.....	28
6.4.1 eBay Inc. acquires Skype in 2005	28
6.4.2 Microsoft Acquisition of Skype in 2011	29
VII. Skype’s Disadvantages.....	31
7.1 Competitors and Technology Growth.....	31
7.1.1 Mobile VoIP Competitors.....	31
7.1.2 Business VoIP Competitors	32
7.1.3 Skype Comparison.....	33
7.2 Skype’s Incumbent Inertia	33
VII. Findings and Implications	35
VIII. Conclusions.....	36
IX. References.....	38
X. Appendices	41

List of Tables

Table 1	Top and Bottom 5 Countries Based on Average Available Bandwidth.....	17
Table 2	Number of Registered Skype Users in Specific Regions.....	18
Table 3	Skype Recommended Bandwidth for Call Types.....	18



List of Figures

Figure 1 Endogenous Growth of a First Mover.....8
Figure 2 Skype’s P2P Architecture.....16
Figure 3 First Mover Advantage: A Conceptual Framework.....24



List of Appendices

- Exhibit 1** Two Scenarios for Pace of Market Evolution.....10
- Exhibit 2** Model of Environmental Dynamics and First Mover Advantage.....11
- Exhibit 3** Global Internet Users and Penetration.....12
- Exhibit 4** Number of VoIP Phone Lines for Small/Medium and Large Businesses.....13
- Exhibit 5** Total International Phone Calls and Skype Traffic.....26
- Exhibit 6** Number of Users Concurrently on Skype.....26
- Exhibit 7** Skype Financials 2005-2009.....25



I. Background and Research Objectives

This paper aims to explore the qualifications that constitute the dynamic mechanisms that firms use to gain first mover advantages. In using existing frameworks, models, and research of first mover strategies we will be able to define how a firm can endogenously recognize the opportunity for pioneering as a first mover and implement the proper technology and strategies to sustain the advantages gained. In the case of Skype, many have argued that they were not a first mover in the VoIP industry, and their subsequent success does not fall under first mover advantages. In this paper, I will give evidence supporting the hypothesis that Skype is indeed a first mover according to the existing research and guidelines of what a first mover actually is. We will look at Skype's industry leading proprietary technology, management decisions, timing of entry, and finally the rewards and advantages that they have been allowed in their 10 year history.

The findings of this paper will enable academic persons and managers to better recognize how a first mover can utilize its strengths and minimize its weaknesses. It will give examples of previous first movers and relate their winning strategies to those of Skype. We will look at the rewards sustained by Skype such as profits, market share, and eventually being acquired by larger companies wanting to capture these advantages for themselves

The information laid out will support the frameworks and models of existing research so that they can be reinforced and put to use in other cases. This is important because the first mover advantage has been criticized over time as a broad generalization without much merit. Although rare, the first mover mechanisms are difficult to distinguish between different companies and industries and the advantages are not always the same. My hope is that this uncertainty as to what a first mover is and the process of becoming a first mover can become clearer to the reader concluding this paper.

II. Research Methods

2.1 Theoretical Research

This paper will contain a number of examples from published works in order to make the plausible assumptions needed. These publications will be taken from scholarly journals, news articles, public archives, as well as previous statistical analysis.[1] As you will see, empirical data will play a small factor in my determination of whether or not Skype has benefitted from being a first-mover. Empirical research in the area of first movers has been riddled with bias however; we cannot simply disregard what empirical research has been done in the categorizing and understanding of first movers. Theoretical research methods allow for a larger range of research tools to be utilized and those tools can be related to each other in a many number of ways.

2.2 Models

The first mover advantages and the mechanisms that enable these advantages have many different models. In order to explain these advantages and mechanisms, different frameworks are often useful. Timelines and entry order sequences can provide support for theories of first mover advantages.

2.3.1 Endogenous Growth of First Mover Advantages

This model will help illustrate how a first mover through a combination of 2 main factors. They propose that the emergence of a first mover is determined by the firm's business proficiencies and luck. The model was first illustrated by Marvin B. Lieberman and David B. Montgomery in a special issue of the journal of strategic management in 1988.

2.3.2 Pace of Market Evolution Model and Environmental Dynamics Model

These models presented by Fernando F. Suarez and Gianvito Lanzolla in their 2007 paper from the Academy of Management Review, detail the pace of technological evolution in proportion to the pace of market evolution. These two factors can have a huge effect on the amount of advantages or disadvantages that a company experiences.

2.3.3 First Mover Advantage: A Conceptual Framework

This model builds on Lieberman and Montgomery's Endogenous Growth Model and goes into more detail by adding factors such as late entrants, mechanism moderators, and cost vs. differentiation. These external conditions can reduce or increase the advantages that a first mover is allowed.

2.4 Qualitative Restrictions

The endogeneity issue is the most debated issue in past qualitative research. Because some merit of luck is involved in the generation of a first mover, this remains to be a topic that needs more theoretical study. Some believe that even the term "first mover" is too broad and therefore cannot be accurately classified. For this paper, an attempt will be made to pinpoint what mechanisms are involved to support a single company's advantages by using similar companies in similar market environments. A disclaimer must be said that the mechanisms used by Skype may not be the same mechanisms that attribute to another company's first mover success.

2.5 Quantitative Restrictions

As addressed in the previous restrictions with qualitative measures, the same holds true when applying empirical studies to the first mover dynamics. Because the difference between any two company's proficiencies is widely ranged, coupled with different external forces, it becomes very difficult to accurately measure their mechanisms on a level basis. What empirical evidence can offer the analysis of first movers is by simply categorizing the main factors. However, as mentioned, these mechanisms can vary while holding the same basic structure. Empirical evidence helps us refine concepts and frameworks, yet do little to tell us the specific differences between firms within each mechanism.

III. Endogenous Growth of Skype

3.1 Is Skype a First Mover?

This is a question that can be looked at and analyzed from many dynamic perspectives. You might find that the answer is not what you may think. You will, however, see that Skype indeed benefitted from similar advantages that are categorized in previous cases. According to models that outline the definition of a first mover, Skype meets most of the criteria. The guidelines consolidated by previous research shows an agreement on the basic mechanisms that are common in many first mover firms (Lieberman, Montgomery, 1988).

In review of the question of whether or not Skype is a first mover, the mere definition of the term allows Skype to be both. It is possible that Skype introduced a disruptive technology and is merely a late entrant to an existing market. It is also possible that they created a whole new market with the mechanisms similar to a first mover. By looking at the actual advantages and model behavior of Skype over time, the answer becomes clearer. Skype is a first mover and the following 4 chapters will explain why. In the next section we'll explore what the consensus is of a first mover and look at some past cases of how pioneering firms were subject to first mover advantages.

3.2 Measures of a First Mover

The existence of first-mover advantages has been, for a long time, a highly debated topic (Suarez & Lanzolla, 2007). There are skeptics that say it doesn't exist at all. Moreover, there is no doubt that there can be disadvantages due mostly to external factors such as economic environments and consumer behavior (Gal-Or, 1987). However, much research has been conducted to say that there can be first mover advantages given the correct environment with the correct firm. As you will see, some research has even calculated factors such as luck (Lieberman & Montgomery, 1988).

The definition of first mover is not, by any means, a simple and straightforward statement. Just as a business environment can be manipulated, so can the definition. During my research, I tried to select works that pertain mostly to the situation of Skype. In taking this

unbiased approach, I also found that Skype's mechanisms and advantages were synonymous with a majority of those that I reviewed. The definition proposed by Lieberman & Montgomery is a good representative of Skype's case for being a first mover, because it takes a neutral stance compared to other research efforts.

Lieberman and Montgomery define it as follow:

"...the ability of pioneering firms to earn positive economic profits (i.e. profits in excess of the cost of capital). First mover advantages arise endogenously within a multi stage process..."

They describe two categories to support the existence of first mover advantages: The economic theories behind barriers to entry due to a firm's utility functions, and an amalgamation of consumer behavior between pioneering brands and later entrant brands (Lieberman & Montgomery, 1988)..

The definition is comprehensive; therefore we should look at the first mover advantage at a deeper level. What are the exact economic theories behind the firm's functions and how do they attribute to creating entry barriers? Relating to their second category, what are the forces that attribute to brand loyalty or at least switching costs? The answers to these questions are the building blocks in creating first mover advantages. These are what a company must have in order to survive long enough to see their investments pay off. Achieving this foundation is difficult and therefore first mover advantages are by all means, a rare occurrence. No research has ever produced a perfect framework that was 100% effective. However, with the right timing, some luck, and the right mechanisms, the chances become increasingly better.

3.3 Examples of First Movers

In this section we will try to get a better understanding in regards to the broadness of successful first movers. To do this, we will look back at previous first movers and see what their opportunities were to pioneer given their company's proficiencies and any change in the environment they conducted their business in. There are many discrepancies in the area of empirical evidence to show how these opportunities comes about, and the endogenous nature is often difficult for managers to predict (Kerin, et al., 1992).

3.3.1 Proctor and Gambles' Disposable Baby Diaper

Some critics say that P&G were not the first to move into the disposable baby diaper market (McKenzie & Lee, 2010). This may be true; however they were the first to move into the mass consumer market. They learned how to bridge the gap between the product and the consumer, something that Johnson and Johnson was not able to do. Johnson & Johnson might well have been the first mover from a time perspective, but they didn't possess all the resources needed to make a market (McKenzie & Lee, 2010). When P&G developed their diapers, they created a market that was never there before. This example shows that even if you are the first to think of a new product that does not necessarily mean you are able to move on that creation or idea. The advantages are only given to those who can move to the market first with the tools necessary to be successful and, therefore accept the rewards.

3.3.2 DuPont

DuPont is a chemical company that has seen significant first mover advantages in numerous markets entered. Many of their advantages have come from the fact that the company has had a huge technological lead over other companies and a current number of more than 3,500 active patents (Lieberman & Montgomery, 1988). Technological leadership has constructed entry barriers for competing companies. Time constraints and high learning costs are mechanisms that contribute to a firm's advantages sustained over time. This was much different from the case of Procter & Gamble who used product differentiation and placement as the mechanisms for their sustained advantage. DuPont uses its technology and patents to ensure theirs (Chandler, 2005).

3.4 Luck and Opportunity

A firm and its management have very little control of where the opportunity for a pioneering decision will become realistic. According to the model put forth in a paper by Fernando Suarez and Gianvito Manzolla, the initiation of an opportunity for a first mover to pioneer is sparked by an asymmetry in an external environment that the firm has no control over. This phenomenon has been looked at in many research attempts, however none have been

able to give an empirical explanation to how these opportunities rise. Most research has had to concede that these are the external forces that sometimes cannot be predicted for every different situation (Kerin, et al., 1992). Capitalism is a free ride economy system, and when you have this much freedom, the variables become difficult to explain. It's similar to the stock market; when reverse engineering this phenomenon, the answer is clear, however predicting them is nearly impossible.

In the title of this chapter I highlight that the first mover advantages presented themselves endogenously (Suarez & Lanzolla, 2007). The reasons this opportunity was exposed by Skype deal has to do with luck and timing , but at the same time, Skype's business proficiency in IP and P2P networking worked in their favor as well. There was some sort of asymmetry in a consumer market that had not been taken advantage of until Skype entered. In the next section we will look at the facts behind the endogenous growth of a new emerging market. The network effect will play a major role in how this opportunity came to be. Later we will identify why Skype was in a good position to use the network effect in harmony with their technology.

3.5 The Network Effect

The network effect is a widely used term for describing how a good or service can become more popular and/or valuable as it increases its number of users (Madden, et al., 2004). Although negative network effects occur, we will only look at those cases where a positive network effect is present. The four most typical kinds of network effects are: two sided, direct, indirect, and local. Skype has benefitted from a direct network effect. This positive externality allows anyone who is part of the network to benefit whenever another user enters the network. In addition, the person who enters does not necessarily intend to create a positive effect on the network. The economic side of the network effect has been studied and shows that the demand-side of economic scales relates closely (Madden, et al., 2004). As demand for a product becomes greater, the economic value also increases. Therefore as others demand and use a particular good or service, every user can derive value. This is the economic value of network effects and there are 2 kinds. Inherent value is produced when I use the product, and on the other side, network value is produced when others use the product (Weitzel, et al. 2000). Skype has the position to create both of these economic values with their services. Currently, we can see the network effect in almost every form of media. The internet itself is a

phenomenon that was created by and for a huge positive network effect. Within the World Wide Web, we see social media sites that have also been positively affected by this phenomenon. Facebook and Twitter are great examples of this. The more people that you can incorporate into your private social network, the more valuable your network becomes (Weitzel, et al., 2000).

3.6 Examples of the Network Effect

The network effect played a significant role in the generation of Skype's first mover opportunity; therefore it's useful to look at the 2 most renowned network effects in our recent history. You will see that both of these occurrences were built on by previous ideas; however they split and emerged to appeal to the public in ways never before seen. Their impact has been profound enough to change our everyday lives, and allow us to become more connected to each other. In return, more opportunities have spawned from their frameworks.

3.6.1 The PTSN (Public Switched Telephone Network)

Based on the telegraphic technology commercialized at the end of the 19th century, the Public switched telephone network or PSTN was developed in the 1960's. The telegraphic method of communication only uses symbols or pulses to transmit an encoded message. This encryption must be known by both the sender and receiver. Morse code is an example of one of these encryption methods. The telephone worked differently in a way that it was able to transmit sounds. The PSTN was not a well demanded product until some later technologies were produced. The first telephones were connected directly to each other. Therefore you would need as many lines as you would have contacts. Teletraffic lines and switchboards were developed which allowed telephone users reach a far greater number of people. Now telephones are networked together in a local exchange. These exchanges were then grouped into trunks. This trend kept expanding until customers were capable to call anyone in the world that had a receiver (Rappaport, 1996).

In this example we see a direct network effect. As the amount of users increased, so did the network. A new customer immediately had the access to the telephone network and directory, and the existing user's telephone had a higher economic value (Katz & Shapiro, 1985). The operators are the facilitators of these networks, they cost money, and therefore they must

have a cost structure. The basic idea is that the farther the receiver you are trying to telephone, the more it will cost. In most countries the operators are privately owned, however some countries use government to regulate the telephone lines. In any case, due to this network effect, the carriers were investing large amounts of money into the infrastructure of the network. This is where most of the barriers came for late entrants. Then when the internet began to emerge, many people saw an opportunity to invest in a new disruptive technology (Husig, et al., 2005).

3.6.2 The World Wide Web

As the web grows and expands, its network effect on society has had a huge impact on our everyday lives. The telephone cannot compare to the effect the internet. We now can find any piece of information at any time. We can create online marketplaces and websites to hang out with friends. Almost anything that carries internet value has some sort of economic value. As mentioned earlier, social networking sites are only as valuable as the amount of users registered, and the value rises with each additional user (Richardson & Domingos, 2002). Online auction sites also gain value with each user. This is particularly important for this style of websites. In order to make the auctions competitive, they need to have a large user base. Google has made a business on cataloging information. They supply users with accurate information and sell advertising space to appeal to the vast amount of foot traffic that flows through their servers. The internet was a disruptive technology that was based on the same networking effect that the telephone was based on.

3.7 An Endogenous Opportunity

In the next chapter we will discuss what proficiencies and business decisions were the mechanisms for Skype's advantages. However, in order for Skype to derive its economic advantages from being a first mover, we must first understand where this opportunity came from. When you look at the environment from which Skype was created, it is almost a mimic of why Skype exists. From the first network environments found in telegraphs and telephones, to an internet of connected computers, the endogenous rise of a first mover opportunity looks quite obvious from Skype's perspective. By using their technology, they found this opportunity in VoIP, or "voice over internet protocol". They wanted to help customers turn their computers into

telephones. The infrastructure already existed and the customer base was basically that of any telephone user (Rao, et al., 2006).

The beginning of Skype's pioneering achievement was when they noticed an imbalance in the symmetry of the telephone network. In some sense, they were aiming to use the disruptive internet technology to improve upon an existing technology. It is this asymmetry along with 2 other factors that allow for a first mover to gain advantages in the market. Published in a paper by Lieberman and Montgomery, the endogenous growth of a first mover is shown in figure 1 below.

Endogenous Growth Model of First-Mover Advantages

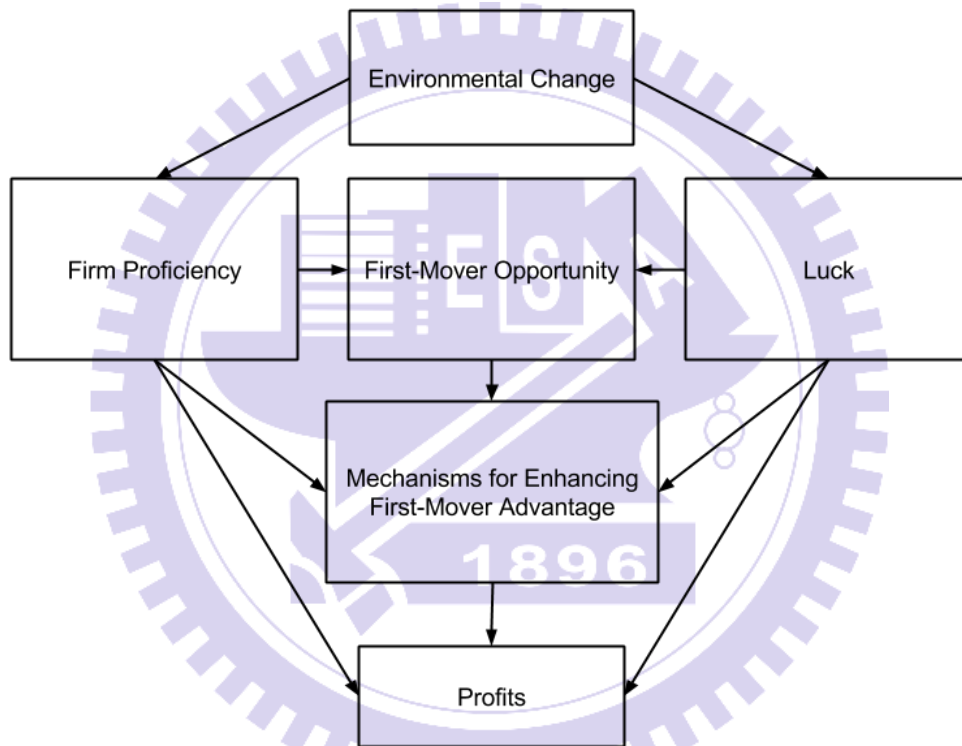


Figure 1

Source: Lieberman and Montgomery, 1988

This model begins at the top with an environmental change, this being the formation of the internet, and the outdated and costly PSTN. Next are the 2 factors of luck and firm proficiency which ultimately lead to the opportunity. This is where Skype begins to find its chance to be a first mover. As I mentioned, Skype or any company, is not able to predict or enhance the opportunity present, however they had the correct resources and timing so that they were able to realize the opportunity before any competitors.

IV. Skype's Market Entry

Before Skype was created, its founders and developers were already in a similar industry. They championed, at the time, the newly popular P2P networking systems and were able to create a service that was like nothing we had seen before. The sharing of data, legal and illegal, was easy and available to anyone with a computer and internet connection (Rao, et al., 2006). I will show in the next couple sections, how Skype was offered a bit of market luck to pair with its innovative IP technology.

4.1 A Decision to Pioneer

In Estonia, a very small country in Eastern Europe, Ahti Heinla, Priit Kasesalu, and Jaan Tallinn began programming the software that would be later known as Skype. However, this wasn't their first venture together. They had already produced an immensely popular software program, called Kazaa that would eventually be the basis for Skype. The two founders of Skype, Niklas Zennstrom and Jaanus Friis, had a vision and when they launched Skype, they stated, "We are launching Skype as the telecoms company of the future" (Stadler, 2006) . Since launching these two successful ventures, the founders and developers of Kazaa and Skype are looked at as public icons in Estonia. They did not embark on this journey to become rich and famous, but rather to help people connect in any way possible (Stadler, 2006).

4.2 Skype is born from Kazaa

As previously mentioned, Kazaa was designed by 2 of the programmers that went on to develop Skype, and one of the Skype founders, Niklas Zennstrom. Their company, Blue Moon Interactive was using a licensed form of file sharing protocol called Fasttrack. By implementing this proprietary protocol, Blue Moon was able to allow users to share virtually any kind of data file desired. Music was the most popular type of file on their system, and would eventually lead to numerous lawsuits and eventually the shutdown of Kazaa in 2012 (Ricketson & Ginsburg, 2006). Kazaa was extremely popular within the first few years of its implementation. Started in 2001, Kazaa reached over 389 million downloads by 2006 (Good & Kreckelberg, 2002). Since then, however, Kazaa has crashed. Almost right from the beginning, the music industry began issuing copyright infringement lawsuits to a number of similar applications. Napster, the most

popular music sharing P2P application was their prime target, but Kazaa was hit with a number of lawsuits as well. Even though this made it difficult for Blue Moon Interactive to continue with Kazaa, they could continue developing and implementing the same P2P style applications into services that were legal.

4.3 Market Entry Timing

Many first mover studies have put a strong emphasis on the timing of entry that firms come to market. What most have found is that there is no perfect time that applies to all firms (Joshi, et al., 2009). There are simply too many environmental factors that can play a part as a variable and change the behavior of the market. In addition, technology advances at different paces for each industry. This makes it almost impossible to have a macro view on the timing of entry formula. The formula must therefore be subjective to each firm. We can, however, take two different environmental factors and see how they relate to each other and either reinforces first mover advantages or disadvantages. This can help explain how a firm can have a better chance at isolating the mechanisms for gaining advantages for being first to market, given certain external factors.

4.3.1 Pace of Market Evolution

Fernando Suarez and Gianvito Lanzolla have outlined a model in a paper which aims to explain what conditions are ideal for a company to choose early entry into a market (**See Exhibit 1**). They also acknowledged that this is a macro view of technology and market analysis; however it is useful in illustrating the two typical scenarios that usually occur. They use an S-curve to display the two core constructs in their analysis. These two constructs are technology evolution and market evolution. For each factor, the two scenarios are abrupt change and smooth change (**See Exhibit 1**).

Exhibit 1 outlines the two paces of market evolution based on number of resources over time. In scenario B you can see the abrupt change in market evolution where resources become readily available in a short amount of time, and inversely illustrated in scenario A, the market evolved smoother and less abrupt with resources becoming available slowly over time.

4.3.2 Market and Technology Relationship

Once you have determined the pace at which the market is growing and resources becoming available, you can inject the same model for technological growth. Again, both scenarios have abrupt and smooth changes, and the first mover advantage variables are constant across the resulting scenarios. With the 2 factors of market and technology growth; and the 2 scenarios, abrupt and smooth, Suarez and Lanzolla display 4 quadrants (**See Exhibit 2**).

Each quadrant has a combination of the dynamics that are at play between the 2 factors. In quadrant II and quadrant IV, the effects of first mover mechanisms are weak and therefore the advantages of being a first mover have the least likely chance of succeeding (**See Exhibit 2**). In quadrant III, the abrupt increase in market and technological evolution actually work against the mechanisms that allow first mover advantages (**See Exhibit 2**). Certain mechanisms are negatively affected and therefore rendered almost useless for first movers. Some of these mechanisms include technology leadership becoming less isolated; catching up to late entrants becomes more difficult; patents are ineffective given the time it takes to be issued; decision making becomes less clear and therefore resources are not acquired in a preemptive manner; and switching costs are lower because late entrants can enter the market quicker. Under the circumstances of a fast paced or abrupt technology and market evolution, a first mover firm would not be able to utilize its proficiencies at the best of their ability and therefore have a weak or even disabling effect in obtaining first mover advantages.

In quadrant 1, we see both market growth and technology growth move at a similar, smooth pace (**See Exhibit 2**). In this scenario first movers have the best chance from gaining advantages from isolating their firm's mechanisms. The idea of inertial advantage becomes more of a factor with slow market growth. This is because later entrants have trouble procuring the scarce resources. In this scenario, a first mover can expect a large market share because the market space for sharing with other firms is much lower (Suarez & Lanzolla, 2007). Consumer behavior is different in this scenario as well in that customers are more likely to have a "wait and see" strategy when there is no clear industry leader (Suarez & Lanzolla, 2007). In regards to switching costs, customers in a slow market will have less variety to choose from and their brand loyalty will become stronger the longer there is an industry leader. In an industry where technological leadership is an important mechanism, a slow growth in technology will make it more difficult for competition to improve upon the leader's technology. Even if they do

succeed in doing this, the first mover will have an easier time catching up. After analyzing each quadrant, we can clearly see that quadrant 1 is the typical scenario for a first mover to utilize its proficiencies and obtain advantages (**See Exhibit 2**). Smooth market growth and smooth technological developments together construct the ideal conditions for first mover advantages to be realized (Suarez & Lanzolla).

4.4 Skype's Entry Timing

When the team at Blue Moon Interactive were developing their P2P file sharing applications for both Kazaa and Skype internet usage was on a smooth yet steady growth pattern (**See Exhibit 3**). Throughout the world the internet infrastructure was becoming more and more accessible. The internet and its users are the main resources that are necessary for online file sharing and extremely important for Skype to function properly (Baset and Schulzrinne, 2004).

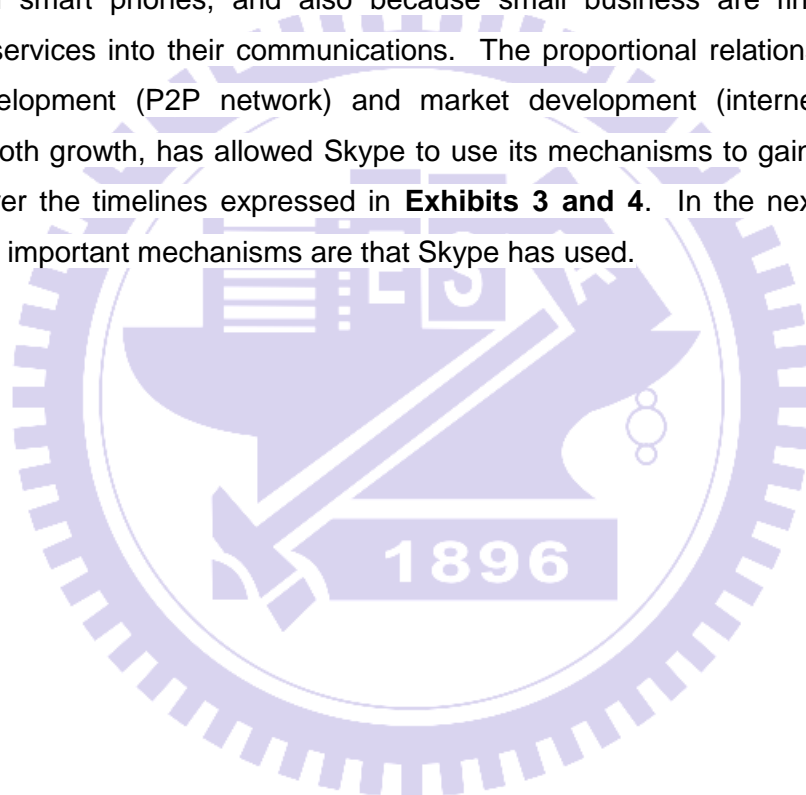
4.4.1 Market Growth

For a company whose core competencies are P2P file sharing and VoIP the internet is the marketplace where you will acquire your customers and ultimately establish your market share. The more users you can register to use your web services, the easier it is to perform your operations. For example, in eBay's case, the more customers they have bidding on items the lower the prices will be, and with this will also come a larger stock of various items. In Facebook's case, the application becomes more and more valuable with the increasing amount of users subscribed (**See Exhibit 3**).

Exhibit 3 is an example of the smooth market growth that I previously explained from Suarez and Lanzolla's findings. This type of market growth is the best for first movers because resources will be distributed at a lower rate than if it was an abrupt growth curve. This graph also shows that only one quarter of the world's population has internet access; however the trend is now beginning to rise exponentially. At some point in the future the rise will become even sharper and eventually level off like the typical S-curve. When this happens resources will become more easily acquired and late entrants have opportunities to enter the market.

4.4.2 P2P Technology Growth

We can see that for a long time web access around the world has been on a smooth incline. How about the technology developments related to P2P file sharing and VoIP? If this would show similar growth to that of market growth (internet access), we could infer that this is a good opportunity for a first mover to gain significant advantages (Suarez & Lanzolla, 2007). The fact is that P2P technology has slowed over the recent history, however VoIP technology has continued to grow at a smooth pace similar to that of the market (**See Exhibit 4**). The reason for the growth of VoIP services been mainly because of the year over year increase in cellular capabilities with smart phones, and also because small business are finding it easier to integrate VoIP services into their communications. The proportional relationship between the technology development (P2P network) and market development (internet access), most notably the smooth growth, has allowed Skype to use its mechanisms to gain advantages and sustain them over the timelines expressed in **Exhibits 3 and 4**. In the next chapter we will identify what the important mechanisms are that Skype has used.



V. Skype's First-Mover Mechanisms

As most researchers have concluded and concurred, the mechanisms that allow a company to obtain an advantage over its competitors can be classified into 3 categories. They are Technological Leadership, Preemption of Resources, and Development of Switching Costs. It's important to realize that a first mover doesn't need to possess all 3 of these mechanisms in order to gain advantages (Lieberman & Montgomery, 1988). These are simply the most commonly identified factors that a firm can use to their advantage. Since the definition of a first mover is broad, so are its variables depending on the type of business, industry, environment, management, and many others. However, for showing Skype as a first mover, the fundamental mechanisms that were first published by Lieberman and Montgomery in 1988 can produce a solid framework for analysis.

5.1 Mechanism 1: Technology Leadership

As mentioned in the previous section, the symbiotic relationship between market and technology growth will allow a company with superior technology to remain a leader in the industry for much longer than in an environment with rapid technological development (Suarez & Lanzolla, 2007). Skype uses a number of internet protocol methods to offer free VoIP service to anyone willing to download their proprietary software. Skype's P2P infrastructure for telephony was the first of its kind and has remained a secret to outside developers. Many have tried to reverse engineer the Skype protocol; however its closed source status has remained true to this day. Skype protocol is useless on other VoIP networks unless given permission and licensed out by Skype itself (Baset & Schulzrinne. 2004).

5.1.1 Skype P2P Architecture

The IP network that the programmers at Blue Moon Interactive, which later became Skype, consists of three different types of programmed entities within the decentralized network. These are super nodes, ordinary nodes, and the login server. Every person that downloads the Skype software on their smart phone or computer actually agrees to be a host for the Skype community. This means that any Skype user's Skype call may be routed through your device or PC without you even knowing it. Most users are just ordinary nodes which are used primarily to

initiate or receive a Skype call. Ordinary nodes also contain the user directory, meaning they can store the IP addresses of local ordinary and super nodes and therefore be able route calls of other users through these networks. The super node network was comprised of users with good bandwidth, no firewall restrictions, and enough processing power, however may not be used to connect each call. If a user was trying to contact another user who was too distant (in network addresses), or behind a firewall, then a super node would be utilized to bridge the gap or punch a hole in the firewall. If two ordinary nodes were close in network proximity and not behind any firewalls, then the call would be directly linked together without using super nodes. Since 2012 Microsoft has centralized the super node network in servers located in a large data center. The design is the same; however firewalls and network address translations have become more complex. By centralizing the super node network, each user isn't required to upgrade their software in order to upgrade the network as a whole. Instead Microsoft and Skype can simply upgrade the servers at the data center and achieve the same results in a much shorter amount of time. As previously mentioned, many have researched and attempted to reverse engineer Skype's proprietary network and protocol design, however nobody has been able recreate it with the same accuracy and security. Some countries, including the USA, have even made it illegal to attempt to do this on proprietary software such as Skype's.

Skype P2P Network Architecture

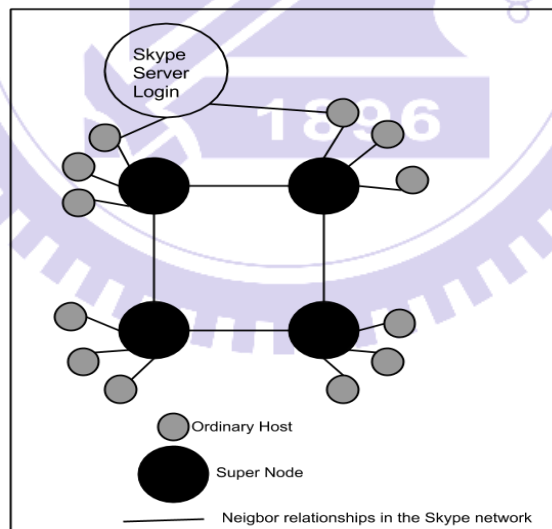


Figure 2

5.1.2 Skype Security

Skype's security methods were designed to work only with the Skype protocol (Baset & Schulzrinne, 2004). Skype claims to have a number of encryption methods for usernames,

login, communication and post communication. When a user downloads the software and registers their unique username, a random 256-bit number key is generated and paired with the encrypted key of Skype's server. The key and username are stored on person's pc or smart phone and an identity certificates are made in order to authenticate this user and password in the future for login and making calls. When a call is placed a 256-bit session key is created by Skype. The session key is used to encrypt the call for the duration and for a fixed time afterward.

There have been some recent reports that question Skype's security. Many critics have said that the actions by Skype and Microsoft to centralize their servers in a data center were so they can more easily monitor the calls and messages (Diffie & Landau, 2007). The FCC requires digital phone networks to allow wiretapping if warranted by the FBI. These allegations have been denied by Skype and Microsoft, in addition Skype has said that they should not be included in the category of digital phone networks because they do not own any actual wires or cell towers (Beard, 2010). Skype has never had a major breach of security; however this doesn't mean they've been perfect with their service. They experienced outages in both 2007 and 2010. Neither of these incidents was caused by an individual or group looking to disrupt the network (Rossi, et al., 2009).

5.1.3 Skype Quality of Service

Skype claims that audio calls should have no problem being placed with most internet connections. Video calls and group calls obviously will require more bandwidth. The average bandwidth around the world as of April, 2014 is as follows (all figures are for download speeds and measured in Mbps):

Top 5

Romania	Korea	Switzerland	Lithuania	Japan
56.0 Mbps	52.4 Mbps	49.8 Mbps	45.9 Mbps	40.9 Mbps

Bottom 5 (some countries have no servers at all)

Benin	Congo	Cuba	Syria	Mali
-------	-------	------	-------	------

1.0 Mbps 1.1 Mbps 1.2 Mbps 1.7 Mbps 2.1 Mbps

Table 1: Top and Bottom 5 Countries Based on Average Available Bandwidth

Source: <http://www.netindex.com/download/allcountries/>

Now if we compare these numbers with the number worldwide Skype users arranged into regions, you can see the importance for a strong network condition in order for Skype to guarantee high quality services.

Europe	Asia Pacific	US/Canada	Rest of World
148,000,000	147,000,000	52,000,000	59,000,000

Table 2: Number of Registered Skype Users in Specific Regions

Source: skypenumerology.blogspot.com

Europe has the most Skype users and its due in great deal to their high speed networks, but it also is important to note that Europe is made up of so many different countries with their own telephone carriers. This is the perfect environment for Skype to allow people to call across borders without having to pay long distance charges. USA and Canada contain only about a third of the users found in Europe, and a possibility for this may be because the USA and Canada have a much more consolidated telephone service industry. Interstate or inter province calls are relatively cheap compared to those of Europe and Asia. The most interesting fact is that throughout the rest of the world Skype still has 59,000,000 users. A lot are coming from Africa where the cellular network is still in its first generation. For these people to still be able to use Skype with such poor network conditions is a real feat in service for Skype.

If you look at the table below you can see that for a simple Skype call the recommended bandwidth is only 100kbps, however the minimum is 30kbps. This is extremely low which allows third world countries to be able to use Skype and broaden the reach of its network. On the opposite, if you live in a highly developed/modern network nation, like Korea, you will be able to seamlessly have video calls with 7 or more people at the same time. This is extremely important in a business setting where conference calls commonly take place. We will talk more about Skype's customers later in the chapter when we cover the switching cost advantages that Skype has developed.

Call Type	Minimum Speed	Download/Upload	Recommended Speed	Download/Upload
Calling	30kbps / 30kbps		100kbps / 100kbps	
Video Call	400kbps / 400kbps		300kbps / 300kbps	
Video Call (HD)	1.2Mbps / 1.2Mbps		1.5Mbps / 1.5Mbps	
Video Call (3ppl)	512kbps / 128kbps		2Mbps / 512kbps	
Video Call (5ppl)	2Mbps / 128kbps		4Mbps / 512kbps	
Video Call (7+ppl)	4Mbps / 128kbps		8Mbps / 512kbps	

Table 3: Skype Recommended Bandwidth for Call Types

Source: <https://support.skype.com/>

5.2 Mechanism 2: Preemption of Resources

This mechanism is driven by a company's ability to preemptively allocate, purchase, or acquire scarce resources. Because any market has a given amount of profitable firms, the first mover can take strategic actions in a niche market and have an advantage by limiting the amount of capacity available for later entrants (Economides, 1996). In many cases, this is achieved by establishing geographical locations or product volume. However in Skype's case, the resources were preemptively gathered through investment costs aimed at enlarging their capacity to handle a "freemium" VoIP service. This made it almost impossible for late entrants to compete and acquire a piece of the market. Next we will look at the technological resources that Skype was able to obtain and preserve through the use of patent legislation.

5.2.1 Patents and Legislation

The actual number of patents owned by Skype is difficult to determine because some are owned by individuals who work or have worked for Skype, and some are now owned by Microsoft. All these patents, however, have been instrumental in keeping Skype's technologies proprietary and in the overall value of the company. When Microsoft acquired Skype they also obtained Skype's patents and technology. Without these patents Skype would have seen its innovations copied by competitors. With patents Skype was able to reinforce its technological leadership on its competitors over a longer period of time. As Suarez and Lanzolla determined, with a smooth technological development curve, patents give the first mover and owner of such patents a strong advantage. Next we will look at some of Skype's most significant patents. (The following patents were all taken from the European and United States Patent Archive)

EP 1649676 A2: Peer-to-peer telephone system and method: July 16, 200

There is provided a peer-to-peer telephone system comprising a plurality of end-users and a communication structure through which one or more end-users are capable for communication purposes. The system is distinguished in that: (a) the communication structure is substantially de-centralized with regard to communication route switching therein for connecting said one or more end-users; (b) said one or more end-users are operable to establish their own communication routes through the structure based on exchange of one or more authorization certificates, namely User Identity Certificates (UIC), to acquire access to the structure; and (c) said structure includes an administration arrangement for issuing said one or more certificates to said one or more end-users.

US 8175091 B2: Communication system: 27 Nov 2007

A method of transmitting messages from a network node in a communication network to a first user device can be provided. The network node transmits to a second user device a message-waiting notification. The first user device is identified, and a node holding the message is identified. In response to that notification, the second user device transmits a connection request to the first user device. The connection request is acted on by the first user device to establish a connection. With the identified node, the message can be optionally transmitted to the first user device.

US 8681873 B2: Data compression for video: Feb 19, 2010

A method of transmitting video data from a transmitter to a receiver, the method comprising: receiving data values of a video signal at a higher resolution; at the transmitter, combining groups of the data values into one or more first units of a first lower-resolution arrangement; encoding and transmitting the first lower-resolution arrangement to the receiver; at the transmitter, combining groups of the data values into one or more second units of a second lower-resolution arrangement, wherein the second units are offset from the first units by a fractional shift such that each second unit partially overlaps with at least one first unit; encoding and transmitting the second lower-resolution arrangement to the receiver; and transmitting an indication of said shift to the receiver; and at the receiver, combining the first and second lower-resolution arrangements based on the indication so as to reconstruct an image of at least a higher resolution than that of the first and second lower-resolution arrangements.

US20100275007: Secure Transmission System and Method: 8 Jul 2010

A method is provided for transmitting information from a user to a first network entity over a communications network. The user enters information into a browser executed at a user terminal. The browser generates a first message comprising the information using a first communication protocol for dispatch over the network via a network port, the first message including an identifier of the first network entity. A client executed at the user terminal receives the first message before the first message reaches the network port. The first message is wrapped in a second message of a second communication protocol used for transmitting messages between the client and a second network entity. The second message is transmitted to the second network entity over the communications network. The first message is unwrapped from the second message at the second network entity, the identifier of the first network entity translated to a network address of the first network entity and the first message is transmitted to the first network entity over the communications network.

US 8548125 B2: Call re-establishment: 28 Mar 2011

Method and user terminal for handling a call over a communications network between a first user terminal, usable by a first user, and at least one other user terminal, usable by a respective at least one other user, wherein a client is executed at the first user terminal for participation in the call. The client determines a condition of a respective at least one network connection used in the call between the first user terminal and the at least one other user terminal over the communications network. The client also determines that the call has been dropped, and responsive to the determination that the call has been dropped, the client automatically attempts

to re-establish the call in dependence upon the determined condition of the at least one network connection.

US 20120144051 A: System and method for detection of data traffic on a network: 6 Dec 2011

Systems and methods are described for detecting data traffic of a specific type, such as voice-over-IP traffic, on a network. A detector connected to the network is used to identify a set of data packets traveling across the network that conform to at least one signature describing data complying with a data transmission protocol. The detector is used to manipulate the set of data packets or create a record of data associated with the set of data packets. Such record can be analyzed or transferred to an external billing system to capture revenue for the transmission of the data.

4.3 Mechanism 3: Development of Switching Costs

Switching costs work in two ways; (a) by causing late entrants to invest more money than the first mover to attract customers, and (b) by making it difficult or inconvenient for customers to switch to other brands for various reasons (Lieberman & Montgomery, 1988). Switching costs can greatly affect the consumer's decision in what, where, when, and why to buy a product. Switching costs can also be related to learning, finding alternatives, compatibility costs, uncertainty costs, psychological costs, transaction costs, or contractual costs.

5.3.1 Switching Costs and Network Effects

For Skype, their greatest advantage in developing switching costs worked hand in hand with the network effect we discussed earlier. Basically, as more users adopt Skype's services, the incentives to adopt increases. As the number of users of a communication service such as Skype increase, the more valuable the service is to each user. When value increases, the cost to switch to another communication service increases as well. You must consider that bringing all users or friends to another carrier is almost impossible. In a business environment where your customers are your contacts, there is an even stronger deterrent to switching. In any business setting, the ultimate goal is to increase revenue while bringing down the costs. Skype

has capitalized on this idea with their services and has reached the stage of being an incumbent company.

5.3.2 Switching Costs and Competitive Pricing

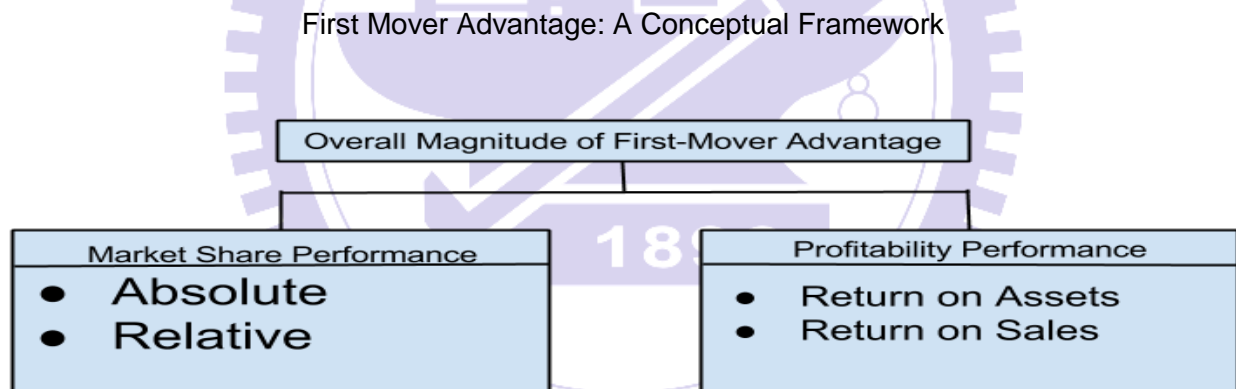
Many consumers will look at switching costs in relation to their needs. If the product or service is meeting their needs then the costs incurred by switching are usually a disincentive. However, if the rewards to switching will increase over time, then a consumer can be more easily persuaded to switch. In Skype's case, because their services are free, there is no future value in another service, and therefore no need to adopt a new service. For businesses that pay for Skype's conference services, they also do not see the advantages in switching to a cheaper service, because they will need to make many changes in IT and communication to their customers. Again, when there is a network effect present, the number of adopters makes a valuable asset.

As mentioned, the "freemium" model of Skype's cost structure is also a large player in developing switching costs, and is covered in the next section. Lieberman and Montgomery say, "When scale economies are large, first mover advantages are typically enhanced (Lieberman & Montgomery, 1988). Skype was able to procure its most important resource (users), before any other VoIP service could. Skype preemptively acquired these resources with their cost structure and technology leadership; however they were able to retain them with high switching costs.

VI. First Mover Advantages

6.1 Performance Outcomes

“The rewards for positional advantage rising from moving first to the market, are ultimately scored in terms of market share and profitability” (Kerin, et al., 1992). It is important to note that these two advantages are distinct from each other. The evidence that these two factors share a relationship with one another is very little (Kerin, et al., 1992) In the figure below, you can see a first mover framework similar to the much more consolidated framework I mentioned in Chapter 3 by Lieberman and Montgomery. The difference regarding the advantages is that Lieberman and Montgomery put market share and profitability in the same category. The problem with doing this is that each firm’s profits and market share don’t have the same correlations. This is why the conceptual framework in Figure 3 is more accurate in determining not only the true advantages, but also the mechanisms that led to certain advantages.



Kerin, et al., 1992

Figure 3

6.2 Profitability Advantage

Pioneering companies, on average are unprofitable, however; this doesn’t mean that they don’t see other advantages in play. The cost differentiation advantage can be expected to be much higher (Moore, 2002). In using the mechanisms of technology leadership, preemption of resources, and switching costs, a pioneering company can leverage having a higher price to the consumers. The differentiation in products between first movers and later entrants also

works to the pioneering firm's advantages because the consumer may already trust their first brand with higher quality and less risk they are therefore willing to pay more to have it (Moore, 2002). It has been difficult for researchers to rely solely on empirical data to show a direct relationship with profitability and entry timing; however it's impossible to discount this factor on the basis that the entry timing has no relationship (Lieberman & Montgomery, 1988). Profitability is integral to the health of any company. However, what the data shows is that there is less of a link between pioneering firms and improved profits. What it does show, are the cost advantages due to being a first mover. In turn, these cost advantages may be able to result into higher profits.

Accurate figures as to Skype's profitability are difficult to attain given that they have never been a public company on their own. Nonetheless, we can see that Skype was able to increase their net profits year over year exponentially beginning in 2005 after the acquisition of Skype by a public company, eBay Inc (**See Exhibit 7**). Since Microsoft acquired Skype in 2011, they have contributed significant revenues to Microsoft. In 2012 they added 292 million in revenue to Microsoft. Skype now plays an integral part of Microsoft's new Lync server network.

Revenue increased primarily due to strong sales of Server and Tools products and services and the 2010 Microsoft Office system, offset in part by a decline in Xbox 360 entertainment platform sales. Revenue for the three months ended March 31, 2012 also included Skype revenue.

Source:<http://www.microsoft.com/investor/EarningsAndFinancials/Earnings/Performance/FY12/Q3/Performance.aspx>

In 2013 Skype was integrated into Microsoft's other products and software to produce the "Skype Unit" and its revenue is now approaching 2 billion in 2014 (Bass, 2013).

6.2.1 Profitability and Later Entrants

Over time a pioneering firm should see its profitability slow as the later entrants become more established (Lieberman & Montgomery, 1988). Some studies have shown that often 2nd movers have higher profits than first movers because of lower R&D and marketing expenses. Moreover, the high pioneering costs from the first mover and the lower costs by the later entrants begins to cancel out the first movers cost advantages. This is referred to as free-riding.

Sometimes a firm may choose to not pioneer due to investing restraints, slow market growth, or an unbalanced assortment of resources in the market. In any case a firm must be a pioneer if it wants to establish a higher share in an emerging market, however if profitability is a goal more worthwhile to the firm, the timing of entry isn't always a large factor, and it should focus on more cost effective strategies. In the case of Skype, they are not experiencing this slow down simply because they are now an incumbent player in the VoIP industry and a part of Microsoft. These two entities (Microsoft and Skype) together cover 90% of the VoIP market (Pope, 2013).

6.3 Market Share Advantages

Research in the area of entry of timing and first mover advantages show that market share can produce a dominating and sustaining advantage, given that the firm can capitalize on its mechanisms for pioneering. We discussed these earlier as: (a) a lucky asymmetry in the market or industry, (b) a leadership or proprietary dominance over technology, and (c) being able to hold product-market externalities to maximize market share (Lieberman & Montgomery, 1988). Skype has used all three of these to obtain a remarkable amount of international IP traffic. Skype is growing its market share in the VoIP industry as well as total international phone traffic (**See Exhibit 5**). Skype for a long time has been eating away at the national carriers for long distance calls and VoIP services. They compete well against these companies by looking at their user growth over time and a rapid increase in market share for international calling minutes from 5% in 2006 to approximately 20% in 2010 according to telegeography research efforts (**See Exhibit 5**). During 2010, Skype users made 207 billion minutes of voice and video calls. In the fourth quarter of 2010, video calls accounted for approximately 42% of all Skype-to-Skype minutes, and in 2010, users sent over 176 million SMS text messages (Rao, 2011). In 2013, Skype now has over 250 million users worldwide (**See Exhibit 6**). The amount of users who are concurrently online during peak hours year by year has increased at a staggering rate. This increase in concurrent users gives you a better idea of how many people are actually using Skype. Recently, other firm's have entered into the VoIP industry and attempt to steal some of the market share from Skype however the main distinction is that most of these competitors offer voice and messaging, but not video.

6.3.1 Market Share and Late Entrants

The mechanisms through which late entrants can outsell pioneers are somewhat ambiguous. Two general ways for late entrants to outperform are: (1) A late entrant can beat a pioneer at the pioneer's own game, and (2) a late entrant can overtake a pioneer through innovation (Shankar, et al., 1998) Late entrants do have a worthwhile opportunity if they can position themselves strategically. However, in most technology markets, outperforming the incumbent with existing technology is difficult. Making an innovative development is the most likely way to be a successful late entrant. In other words, an innovative late entrant can free-ride on the category awareness and buyer education created by the pioneering firm and appeal to a greater pool of adopters than the pioneer if it offers greater value through superior positioning (Lieberman and Montgomery 1988). Recently there are more firms offering the same services as Skype; however they have only been mildly successful. Positioning is a variable factor for late entrants, and the costs are usually high. Marketing effectiveness of late entrants is also not as high as that of the pioneer (Bowman and Gatignon 1995).

6.4 Acquisitions, Buyouts, and Stock Incentives

Skype has been acquired twice over its lifespan and both times the price tag was for multi-billion dollars and stock rewards for employees. The first acquisition was by eBay Inc. in 2005 and later Microsoft in 2011. For many startups the exit strategy is to either go public or be bought out by a larger company. Skype has even received offers from companies like Facebook, Google, and even Cisco. Despite some difficulties by eBay in implementing the acquisitions for max profits, Skype has maintained its massive market presence over the years. Their technology, patents, and overall market share of registered users has allowed them to continue to gain value. Next we will look at the two acquisitions of Skype.

6.4.1 eBay Inc. acquires Skype in 2005

This deal was designed to help eBay move into new business areas while allowing Skype to broaden its customer base. At the time of the acquisition Skype had 54 million members in 225 countries and was adding 150,000 new users each day. eBay was looking to improve communications between buyers and sellers by allowing them to speak with each other about their transactions. Buyers would have an easier way to talk to sellers and receive the

information they need to purchase items. Sellers should benefit by being able to build relationships with customers and close deals quicker (Belson, 2005). This hypothesis actually turned out to be not so important to their users. eBay paid \$2.6 billion for Skype which involved \$1.3 billion in cash and the remaining was dealt out as stock options for the employees and investors. Ultimately, eBay said that there were “limited synergies” between them and Skype and eventually put the company up for sale. eBay, Inc. then sold 65% of Skype to Silver Lake Investors and Canada Pension Plan Investors Committee for \$2.75 billion. eBay continued to own 35%, and received approximately \$1.9 billion in cash and a note from the buyer in the principal amount of \$125 million. The transaction closed in the fourth quarter of 2009. In the end eBay paid \$2.6 billion for Skype and sold it for \$2.75 billion. Most think that eBay didn’t do enough marketing in the USA and that eBay should have been able to implement Skype into their business model better. They acted too slowly and Skype became a complacent entity within their business unit. Even though eBay took a \$1.4 billion write-down on the deal, Skype was still able to continue adding users and generating revenue.

6.4.2 Microsoft Acquisition of Skype in 2011

The acquisition of Skype for \$8.5 billion in cash was the largest takeover in Microsoft’s history. The aims for Microsoft were to leverage Skype’s multi-million users and integrate the company’s technologies and patents into its already vast communications division. The communications industry did not react lightly to the acquisition. Cisco Systems headed an appeal to the EU general court on the grounds that the merger would allow for a monopolistic environment for the communications industry (Garcia, 2012). At the time, Skype and Microsoft made up 90% of the internet communications market and Cisco felt they had no chance to compete. Ultimately, the court decided to turn down the appeal saying, "Microsoft's acquisition of Skype is compatible with the (European Union's) internal market. The merger does not restrict competition either on the consumer video communications market or on the business video communications market," (Sinner, 2013).

The plan for Skype by Microsoft was a vertical integration into a good portion of its existing software and hardware. Skype is now found on the Xbox, Lync Cloud Services, Windows 8, and others. Even though they are far behind Apple and Samsung in the smart phone market, Microsoft is still hoping to entice more users to use Windows mobile operating system with applications like Skype. Only 7.5% of smart phones were running Windows in 2011.

In 2011, Skype had contributed revenue of \$859.8 million to the communications division at Microsoft and has almost doubled its number of users from 170 million to over 300 million since the acquisition.



VII. Skype's Disadvantages

Although Skype has certainly been the industry leader for the past decade in VoIP and P2P communications which has led to some very positive economic advantages, recently Skype has faced some difficult issues regarding competitors entering the market and the incumbent inertia that the Microsoft acquisition has caused.

7.1 Competitors and Technology Growth

As we talked about in the earlier chapters, when technology and market growth are on a smooth and equal growth pattern, a pioneering firm has the best chances to secure a majority market share and develop successful barriers to entry. These may include technology leadership and the development of switching costs. We have explored Skype's proprietary technology and the switching costs that have led to a huge market share. If we look back at that growth curve, most notably in technology growth, we can see the curve begin to level out toward the end. When this point is reached the technology has become cheaper and easier to produce. This is what we are seeing in the smart phone industry as well as the service providers of cellular networks which are now in their 5th generation. We have seen other VoIP service providers appear, and also disappear, as a result of technology leadership becoming more balanced.

7.1.1 Mobile VoIP Competitors

WhatsApp is the largest competitor of Skype at the moment, however they only offer a portion of what Skype is offering. For messaging services they compete very well with Skype, most notably in the American market. WhatsApp has over half a billion users and can be used on a number of mobile platforms. The area where Skype is able to gain a competitive advantage over WhatsApp is in their server network. WhatsApp doesn't have an internet client server; therefore any chats that take place on a mobile system are unable to be continued on the web. Also, just as Skype has been scrutinized over its security, WhatsApp has also been investigated by some governments over their methods of uploading user's data automatically from their contacts and address books. Nonetheless, WhatsApp is in a solid spot at number 2

behind Skype and are sure to improve with new backing from the acquisition by Facebook in February, 2014.(www.whatsapp.com)

Viber is another competitor who is offering some of the same features that Skype has used to maintain its market share advantage. Like WhatsApp, Viber can send messages over the web, however unlike WhatsApp, Viber is available to be seamlessly used on mobile and desktop platforms. Viber also has the ability to make free VoIP voice calls to others. The quality of these calls must be questionable given the vast amount of server networks it takes to make a VoIP call that is of good quality and without delay.(www.viber.com)

Line is a Japanese service that is similar to that of Viber. They offer messaging and free voice calls. Again, the quality of these voice calls is questionable. What Line has done to attract a customer base in Asia is made their messaging service both fun and revenue generating. They have a large variety of stickers for free and premium ones for purchase. These stickers are the smart phone equivalent of emoticons. You can share them with your friends and convey your feelings and thoughts without typing a word. This style of messaging has become very popular in Asia. (www.line.me)

WeChat is probably the closest thing to Skype out of all their competitors, and may even add more features than Skype does, however their growth has been primarily in China. WeChat attempts to combine the features found on Facebook and Twitter into their service. Customers can share pictures and comments throughout their social network. They offer a similar service to that of Instagram as well. They have managed to create a one stop social networking service that is even more comprehensive than Facebook because they offer the same VoIP services that WhatsApp, Line, Viber, and Skype offer. (www.wechat.com)

7.1.2 Business VoIP Competitors

Vonage is Skype's main competitor in the paid subscription market. They provide businesses of any size with international phone service. Their rates are very competitive to that of Skype's and even offer some of the same features such as conference calling, HD video calling, call waiting, and voice mailbox. Vonage has roughly 2.4million subscribers in Canada, USA, and UK. Possibly the only advantage of Vonage over Skype is the ability to make emergency calls via Vonage. Vonage has seen success in their market share and profitability in recent years and is now a publicly traded company on the New York Stock Exchange. Their 2010 revenue was \$885 million with \$47 million in net profits. (www.vonage.com)

Other competitors include Lingo, VoIP.com, Broadvoice and many others. Even the larger landline based companies like AT&T, Sprint, and Verizon are beginning to offer a VoIP service. Although these companies offer a total solution to calling, they are still unable to take a substantial grab of market share from Skype. The reasons for this include Skype's free downloadable software and the fact that there is no need to purchase any hardware as well. For example, if you would like to use Vonage to replace your landline telephone, then you will need to purchase their hardware.

7.1.3 Skype Comparison

At this point in time, Skype still has some large advantages over all the service providers that I previously mentioned both mobile and subscription based. Skype, now backed by Microsoft has a much more extensive server network than these smaller companies and that allows for more reliability. Some of these new services don't work well outside their country of origin, most importantly in the VoIP category. It's very important for voice calling for the connections between the individuals communicating be of high enough bandwidth to stream the data with little delay. This becomes more and more difficult with the increased distance between the users and the servers. The biggest advantage is that Skype has the largest network of users which makes for very important switching costs. Even though these companies have the same technology, getting them to switch from Skype to their service is the most difficult part.

7.2 Skype's Incumbent Inertia

One of the disadvantages that big established firms always need to deal with is incumbent inertia. In Skype's case the acquisition by Microsoft may have left Skype vulnerable to this disadvantage. The causes of this come from a firm being unable to cannibalize their own products to make way for newer ones, they may be locked in to fixed assets and unwilling to change, or they may become internally inflexible for a number of reasons (Lieberman & Montgomery, 1988)

Since the acquisition of Skype, Microsoft has been trying to figure out how to best use Skype's assets and vertically integrate them into their own existing business model. In the past Skype was an opportunistic company that innovated quickly and implemented their innovations even quicker. Now that they are controlled by Microsoft, they have innovated less and put fewer

resources into R & D. This is typical of a monopolistic company with such a large market share (Ghemawat,, 1991).



VII. Findings and Implications

The first mover advantage framework has been a debated topic since Lieberman and Montgomery's original paper in 1988. Since then the topic has endured many follow up research efforts by scholars from around the world. Entry timing into the market has always been a mysterious variable in management's decisions. Researchers have taken many approaches to attempt to explain this variable with little success. Empirical research has yet to expose the strategies behind becoming a pioneering firm. However, because of these shortcomings on the empirical side, more research has been done on the market conditions and consumer behaviors related to a first mover. As I mentioned earlier, it's often unreliable when using the same methods to analyze firms in different industries. Each case should be subjectively looked at and compared to similar examples.

Fast paced industries with a linear growth pattern seem to be best fitted for a firm to gain first mover advantages, while abrupt or unpredictable industries are not. As Suarez and Lanzolla explained, the relationship between the market and the industry may very well explain why firms are able to gain first mover advantages in the technology industry. The barriers to entry and the high R&D costs benefit a first mover in such business environments.

The network effect is another tool that Skype has used to gain significant first mover advantages. Without it, Skype would not have been able to spread as quickly and broadly as it did. We have recently seen other companies capitalize on this market strategy to gain a larger customer base. I used Facebook and Google in earlier examples of network effects. Neither of these companies were first movers, however they were able to acquire a large market share and maintain it even today. Skype is even more remarkable in that they were an early pioneer of emerging technology in P2P and VoIP services. After they had a strong capacity to develop this technology they were then able to employ the network effect paradigm to bring it to the masses.

VIII. Conclusions

This research paper was an attempt to recommend that Skype has gained advantages in market share and profitability from being a first mover in the P2P and VoIP industries. As in most cases of first movers advantages the answers are never definitive due to the amount of variables at play. As Lieberman and Montgomery stated in their 1988 paper, all first movers are subject to scrupulous debate as to what advantaged were the result of being a first mover. In adding the idea of luck it's difficult to take an empirical approach because luck is something that is immeasurable. However it is indeed a factor that cannot be overlooked. In any business environment, luck is something that is impossible to predict and the decisions from managers has little effect on how lucky a firm can be. Skype indeed had a certain amount of luck in regards to their entry timing. While Skype was developing their technology, the consumer market for international telecommunications was in growing demand and the need for a low cost service was rising quickly.

The network effect played another significant role in the implementation of Skype's services because the internet was becoming more accessible around the world. Without this, Skype would not have been able to obtain such a vast amount of the market in such a short amount of time. By doing this they created barriers for other VoIP service providers that would be increasingly difficult to overcome. This in turn led to high switching costs that consumers couldn't justify.

The cost advantage of Skype's service also created entry barriers and added value to their service. A "freemium" service is an unbeatable price for any consumer and with help from the network effect they were able to procure users worldwide. Skype eventually added a paid subscription service for conference calling which appealed to the business community which balanced out their customer base and allowed them to generate revenue.

The proprietary technology that Skype developed was probably the most important piece to their success. They realized with their original file sharing software that others could easily imitate or free-ride to the market and take some of their market share with very little startup costs. By patenting their technology, Skype was able to maintain their technological leadership during the times of imitation. This also allowed them to develop a high quality of service in their P2P software. With all these factors combined, Skype introduced a disruptive technology in the

telecommunications industry and forever changed the way we communicate. They set out with a goal in mind which is portrayed in a quote from co-founder Janus Friis, “We hope that one day, instead of saying 'I'll call you', people will say 'I'll Skype you.’” As it turns out, this tagline did eventually take hold with the masses and Skype has maintained its dominance since first moving to the market with their service at the turn of the century.



IX. References

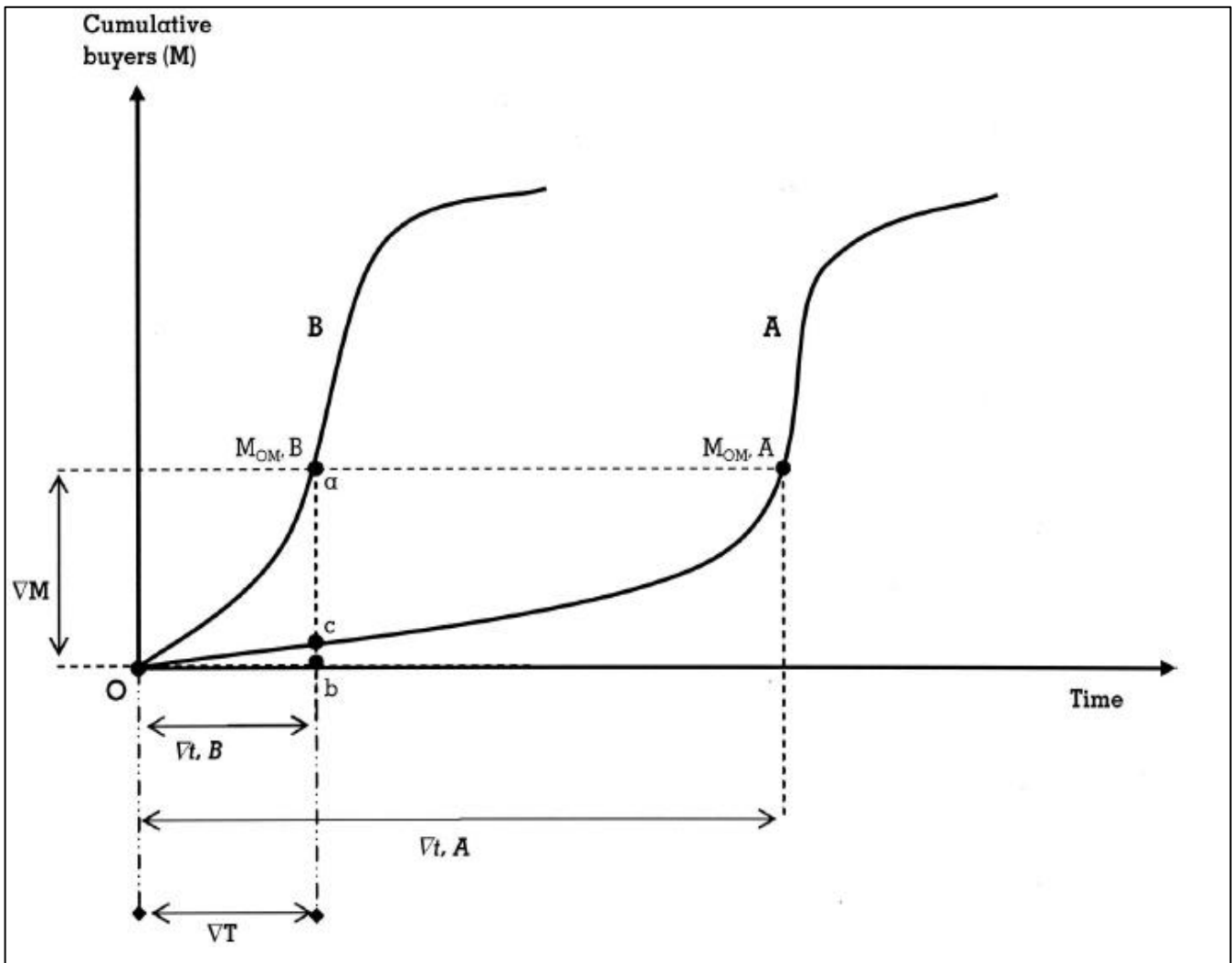
- Baset, Salman A., and Henning Schulzrinne. "An analysis of the skype peer-to-peer internet telephony protocol." arXiv preprint cs/0412017 (2004).
- Bass, Dina "Microsoft Skype Unit Approaching \$2 Billion in Annual Sales." Bloomberg.com. Bloomberg, n.d. Web. 13 July 2014.
- Beard, Stuart E. "Computer Networking: The impact of all-IP networks on convergence in the Telecommunications industry." (2010).
- Belson, Ken. "EBay to Buy Skype, Internet Phone Service, for \$2.6 Billion." The New York Times. The New York Times, 12 Sept. 2005. Web. 13 July 2014.
- Bowman, Douglas, and Hubert Gatignon. "Determinants of competitor response time to a new product introduction." *Journal of Marketing Research* (1995): 42-53.
- Cave, Martin, and Robin Mason. "The economics of the Internet: infrastructure and regulation." *Oxford Review of Economic Policy* 17.2 (2001): 188-201.
- Chandler, Alfred Dupont, Takashi Hikino, and Alfred D. Chandler. *Scale and scope: The dynamics of industrial capitalism*. Harvard University Press, 2009.
- Diffie, Whitfield, and Susan Eva Landau. *Privacy on the line: The politics of wiretapping and encryption*. MIT Press, 1998.
- Economides, Nicholas. "The economics of networks." *International journal of industrial organization* 14.6 (1996): 673-699.
- Gal-Or, Esther. "First mover disadvantages with private information." *The Review of Economic Studies* 54.2 (1987): 279-292.
- Garcia, Gonzalo. *European Union*. London: H.M.S.O., 1994.

- Good, Nathaniel S., and Aaron Krekelberg. "Usability and privacy: a study of Kazaa P2P file-sharing." Proceedings of the SIGCHI conference on Human factors in computing systems. ACM, 2003.
- Ghemawat, Pankaj. "Market incumbency and technological inertia." *Marketing Science* 10.2 (1991): 161-171.
- Hüsig, Stefan, Christiane Hipp, and Michael Dowling. "Analysing disruptive potential: the case of wireless local area network and mobile communications network companies." *R&D Management* 35.1 (2005): 17-35.
- Joshi, Yogesh V., David J. Reibstein, and Z. John Zhang. "Optimal entry timing in markets with social influence." *Management Science* 55.6 (2009): 926-939.
- Lieberman, Marvin B., and David Bruce Montgomery. *First-mover advantages*. Stanford: Graduate School of Business, Stanford University, 1987. Print.
- Madden, Gary, Grant Coble-Neal, and Brian Dalzell. "A dynamic model of mobile telephony subscription incorporating a network effect." *Telecommunications Policy* 28.2 (2004): 133-144.
- McKenzie, Richard B., and Dwight R. Lee. *Microeconomics for MBAs: the economic way of thinking for managers*. Cambridge: Cambridge University Press, 2006. Print.
- Moore, Geoffrey A. "Crossing the chasm." (2002).
- Popa, Bogden. "Skype Yearly Sales Skyrocket to \$2 Billion (€1.5 Billion) [Bloomberg]." *Skype Yearly Sales Skyrocket to \$2 Billion (€1.5 Billion) [Bloomberg]*. N.p., n.d. Web. 13 July 2014.
- Rao, Lina. "Skype Revenue Up 20 Percent To \$860M In 2010; Paid Users Up 19 Percent | TechCrunch." *TechCrunch*. N.p., n.d. Web. 13 July 2014.

- Rao, Bharat, Bojan Angelov, and Oded Nov. "Fusion of Disruptive Technologies:: Lessons from the Skype Case." *European Management Journal* 24.2 (2006): 174-188.
- Rappaport, Theodore S. *Wireless communications: principles and practice*. Vol. 2. New Jersey: prentice hall PTR, 1996.
- Richardson, Matthew, and Pedro Domingos. "Mining knowledge-sharing sites for viral marketing." *Proceedings of the eighth ACM SIGKDD international conference on Knowledge discovery and data mining*. ACM, 2002.
- Ricketson, Sam, and Jane C. Ginsburg. "Inducers and Authorisers: A Comparison of the US Supreme Court's Grokster Decision and the Australian Federal Court's KaZaa Ruling." *Columbia Public Law & Legal Theory Working Papers* (2006): 0698.
- Rossi, Dario, Marco Mellia, and Michela Meo. "Understanding skype signaling." *Computer Networks* 53.2 (2009): 130-140.
- Shankar, Venkatesh, Gregory S. Carpenter, and Lakshman Krishnamurthi. "Late mover advantage: How innovative late entrants outsell pioneers." *Journal of Marketing research* (1998): 54-70.
- Sinner, Michele. "Cisco Loses Court Challenge to Microsoft's Takeover of Skype." *Reuters*. Thomson Reuters, 11 Dec. 2013. Web. 13 July 2014.
- Stadler, Josephine. "An investigation into Skype Technologies SA." (2006).
- Suarez, Fernando F., and Gianvito Lanzolla. "The Role Of Environmental Dynamics In Building A First Mover Advantage Theory.." *Academy of Management Review* 32.2 (2007): 377-392. Print.
- Weitzel, Tim, Oliver Wendt, and Falk V. Westarp. "Reconsidering network effect theory." (2000).

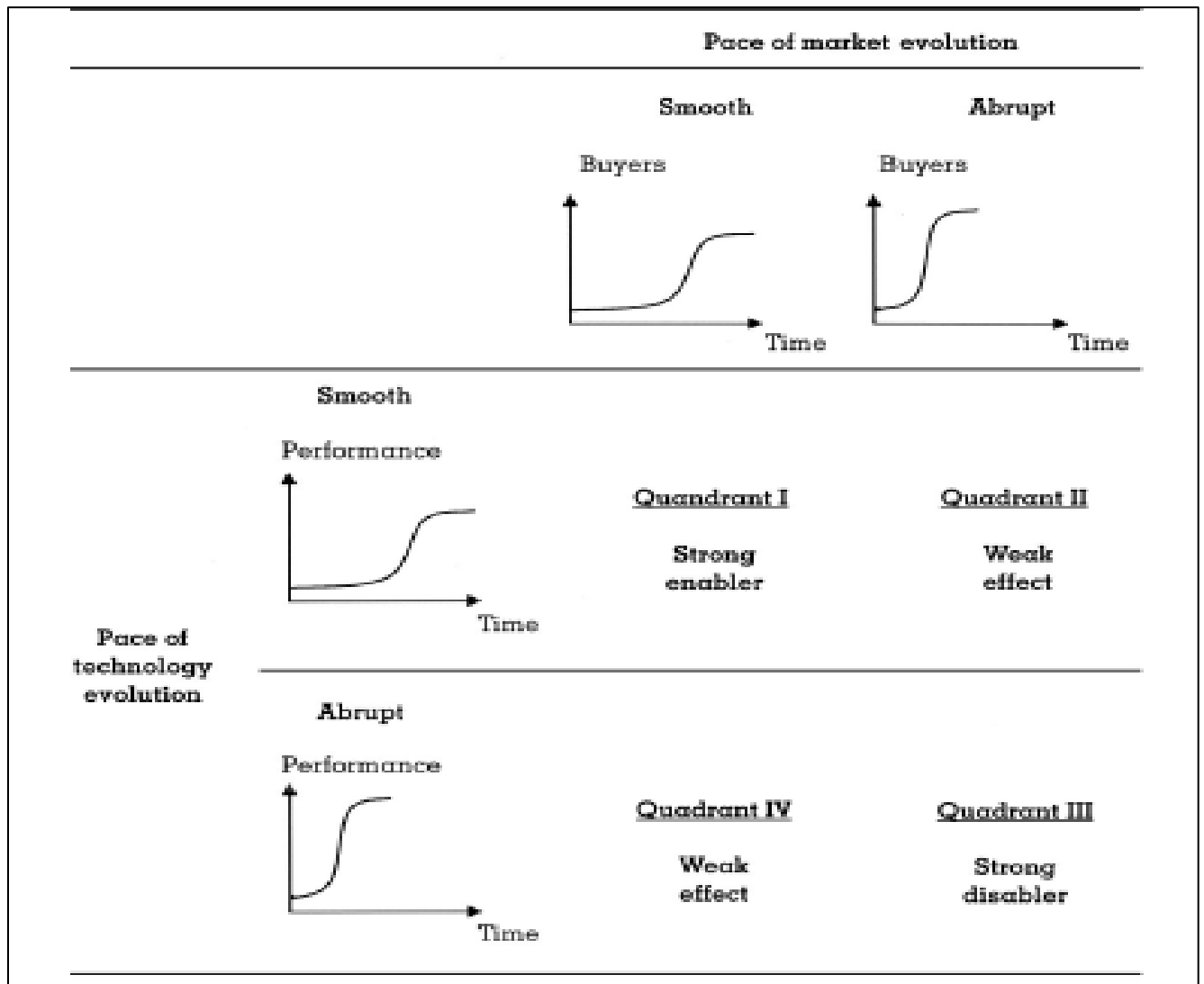
X. Appendices

Exhibit 1 Two Scenarios for Pace of Market Evolution



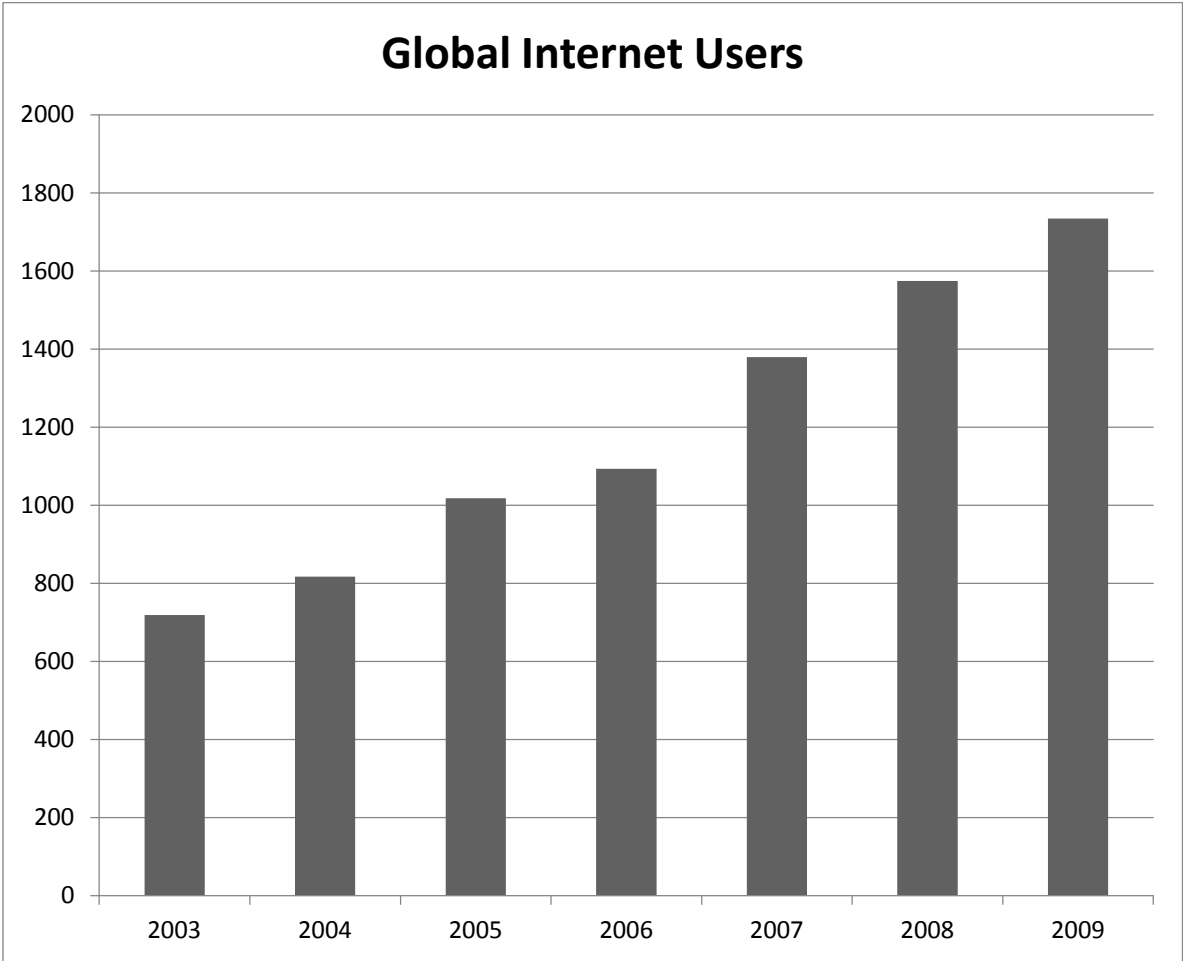
Source: Suarez & Lanzolla, 2007

Exhibit 2 A model of Environmental Dynamics and FMA



Source: Suarez & Lanzolla, 2007

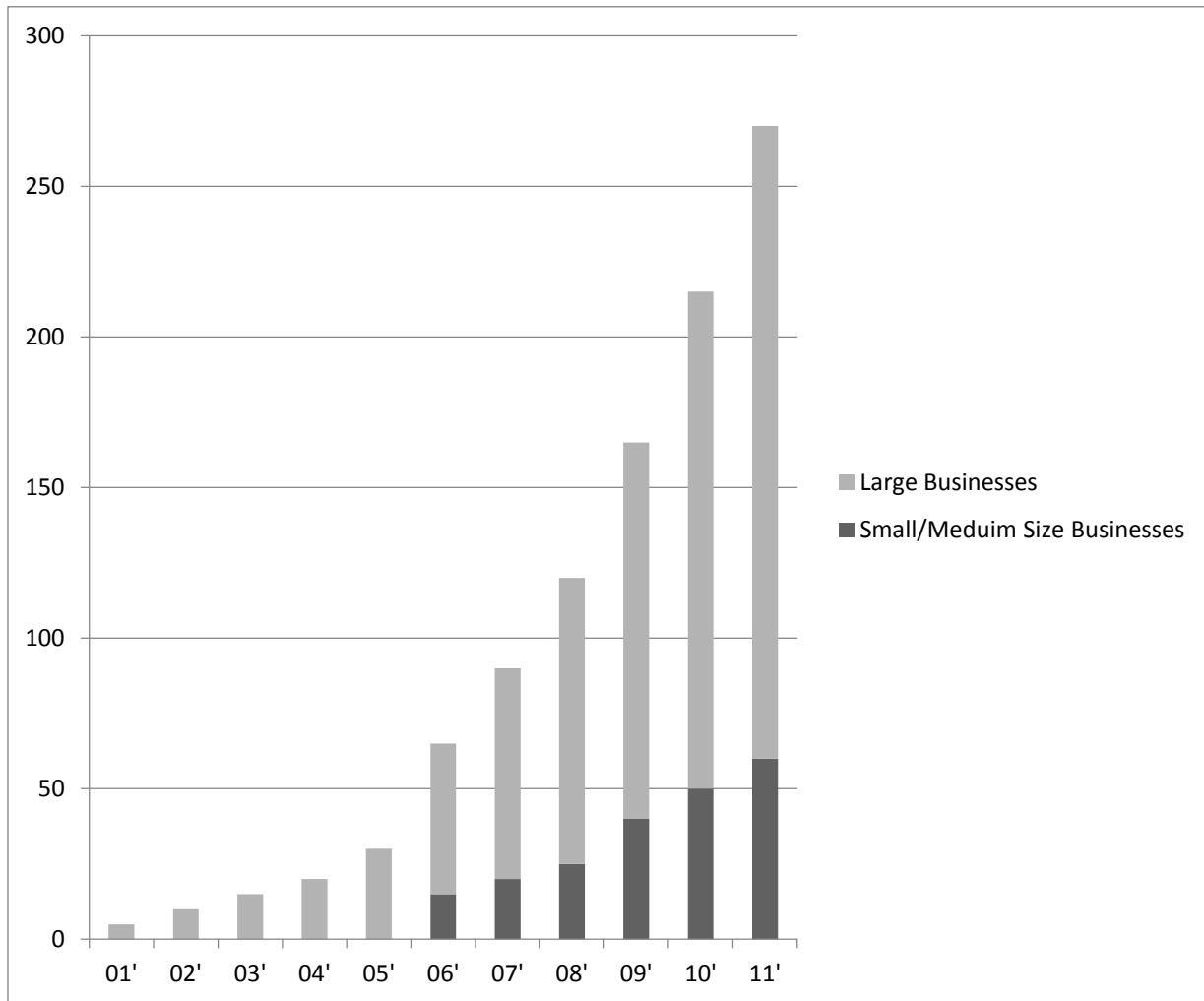
Exhibit 3 Global Internet Users (2003-2009)



Source: Nielsen, ITU. A.T. Kearney Analysis



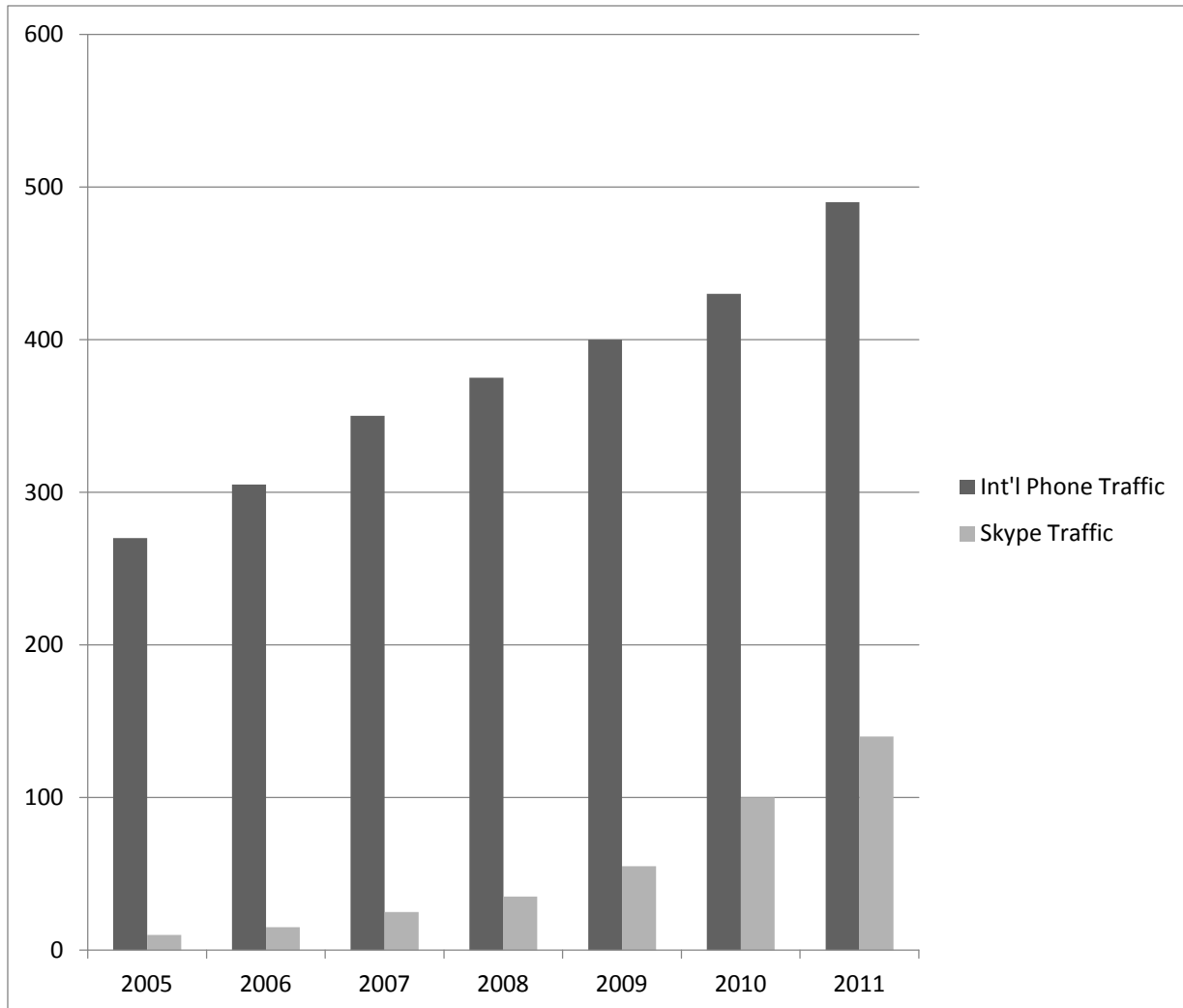
Exhibit 4 Number of VoIP Phone Lines for Small/Medium Size Businesses and Large businesses, worldwide, in millions



Note: Numbers for small/medium size systems were too low to report between 2001 and 2005

Source: Dell Oro Group

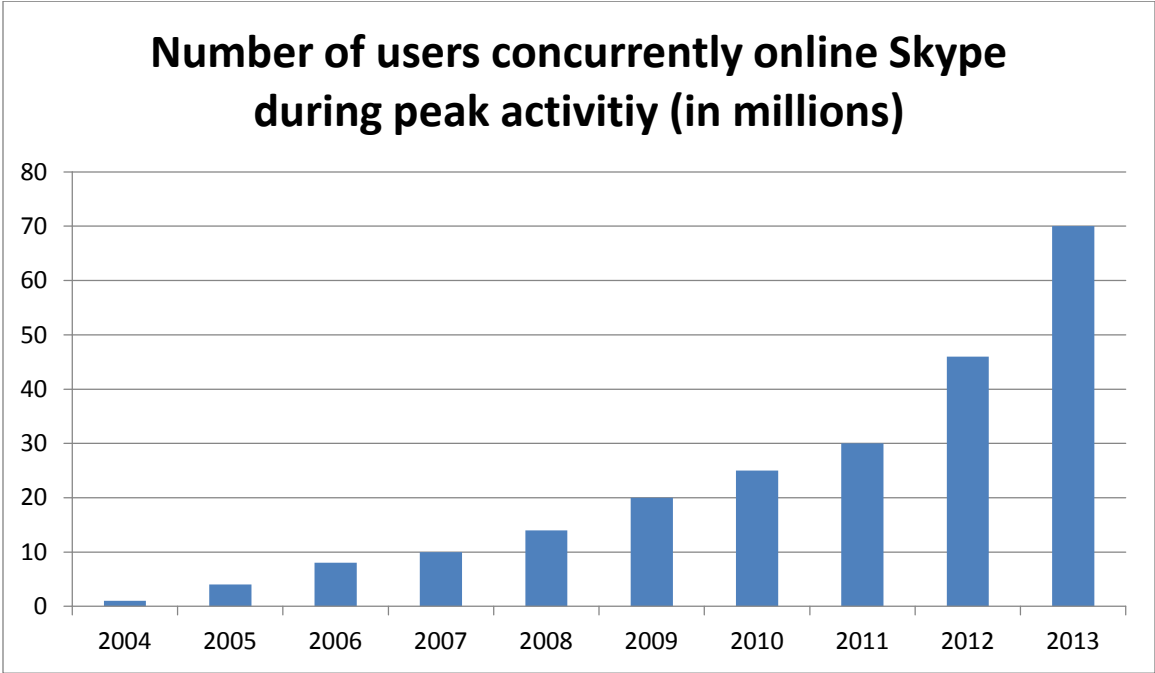
Exhibit 5 Total International Phone and Skype Traffic in billions of minutes, 2005-2011



Note: Total traffic reflects TDM and VoIP telephone traffic transported by carriers, and international PC to PC Skype traffic. Traffic from Skype to phone service is included in telephone traffic totals

Source: Telegeography, Primetrica Inc., 2011

Exhibit 6 Number of users concurrently online on Skype during peak activity (in millions)



Source: Skype Numerology Blog (<http://skypenumerology.blogspot.tw>)



Exhibit 7 Skype S.A. Financial Statements in thousands (2005-2009)

	2005	2006	2007	2008	2009
Income Statement					
Net revenues	71,885	193,696	381,551	551,364	718,903
Cost of net revenues	51,571	140,107	228,638	290,053	338,369
Gross profit	20,314	53,589	152,913	261,311	380,534
Operating expenses:	-	-	-	-	-
Sales and marketing	27,297	59,787	67,195	85,630	128,296
Product development	11,563	38,900	22,078	31,124	40,802
General and administrative	17,375	37,865	41,169	51,863	163,492
Amortization of acquired intangible assets	13,694	60,156	65,514	69,832	68,737
Litigation settlement	-	-	-	-	343,826
Impairment of goodwill	-	-	1,390,938	-	-
Total operating expenses	69,929	196,708	1,586,894	238,449	745,153
(Loss)/Income from operations	(49,615)	(143,119)	(1,433,981)	22,862	(364,619)
Interest Income and other (expense), net	765	2,029	5,303	10,297	2,943
Interest expense	-	-	-	-	(10,387)
(Loss)/Income before income taxes	(48,850)	(141,090)	(1,428,678)	33,159	(372,063)
Income tax (benefit)/expense	(1,239)	(22,044)	(23,342)	(8,447)	(3,259)
Net Income (loss)	(47,611)	(119,046)	(1,405,336)	41,606	(368,804)
	-	-	-	-	-
Basic and diluted net loss per share (Class A through J)	-	-	-	-	(11)
Weighted number of shares, basic and diluted (Class A through J)	-	-	-	-	9,414,600
Balance Sheet					
Cash and cash equivalents	88,156	92,837	115,884	260,187	114,077
Other current assets	19,196	29,116	38,350	59,617	88,368
Total current assets	107,352	121,953	154,234	319,804	202,445
Property and equipment, net	1,023	7,123	9,075	6,040	13,238
Goodwill	2,312,359	2,575,931	1,919,341	1,836,562	2,372,779
Intangible assets, net	263,406	235,711	188,204	112,934	788,118
Correction to assets (data missing in case)	146	4,040	4,556	7,195	33,124
Total assets	2,684,286	2,944,758	2,275,410	2,282,535	3,409,704
Accrued expenses and other current liabilities	20,187	39,658	46,359	65,159	90,852
Deferred revenue and user advances	22,429	56,219	89,419	108,012	142,600
Current liabilities (data missing in case)	10,068	15,863	34,685	46,722	68,794
Total current liabilities	52,684	111,740	170,463	219,893	302,246
Long term debt	0	0	0	0	772,220
Other Long term liabilities (data missing in case)	63,010	38,990	15,544	2,600	97,665
Total liabilities	115,694	150,730	186,007	222,493	1,172,131
Total invested / shareholders' equity	2,568,592	2,794,028	2,089,403	2,060,042	2,237,573
Total liabilities and invested/share holders' equity	2,684,286	2,944,758	2,275,410	2,282,535	3,409,704
Summary Statement of Cash Flows					
Net cash provided by (used in) operating activities			80,220	148,801	\$ (22,864)
Net cash provided by (used in) investing activities			(536,020)	(4,964)	(1,970,714)
Net cash provided by (used in) financing activities			468,354	13,305	1,818,711
Net cash flow			12,554	157,142	(174,867)

Source: http://investor.ebayinc.com/financial_history.cfm