

**DEPARTMENT OF BUSINESS & MANAGEMENT**

**Chair of Corporate Strategies**

**FROM PRODUCT INNOVATIONS TO STRATEGY  
INNOVATIONS – THE CASE OF THE SMARTPHONE  
INDUSTRY**

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## INTRODUCTION

Strategy and an innovative mentality are vital to the sustainability and performance of today's businesses. The world is moving very fast and businesses that do not act adequately cannot survive, and it is true for both established international firms and for smaller companies with the intent to grow.

Whenever a business organization is settled, it employs a particular business model, which defines the framework by which the enterprise delivers value to customers, induces customers to pay for that value, and converts those payments into profits.

Today more than ever, without a right-developed business model, innovators will fail to adequately either deliver or capture value from their innovations. It is particularly evident in today's Internet companies, which must conceive novel revenue streams methods for many services that nowadays customers expect to be free. This means that a tight correlation between innovation and strategy is crucial.

Nowadays, corporations must develop the right business strategies around their innovations in order transform them into tools to achieve success and a sustainable competitive advantage. Successful value creation through innovation requires organizations to search for unexploited markets, consumer insights or new business platforms. For this kind of activities, innovation is simply not enough. That is why strategy and innovation should be combined together in a virtuous connection in order to lead organizations to achieve growth, profitability and sustainability.

The topic of this work is to give a tangible example of this strong relationship between strategy and innovation and to show the "*disruptive*" impact that could generate from it.

I will present the specific case of the mobile phone industry and the profound revolution that occurred after the introduction of the first iPhone in the market. I will show that the iPhone introduced a new concept of "smartphone" that, since

the product launch in 2007, became the benchmark for the whole industry from that moment on.

Leveraging on this fantastic product, Apple was able to build, with the introduction of the App store in 2008, an innovative strategy that, based on the creation of a new self-reinforcing ecosystem, was able to reshape the paradigms of the industry.

In 2006, 64 million smartphones were sold around the world<sup>1</sup>. In 2013, more than 1 billion “new generation smartphones” have been sold surpassing sales of feature phones.<sup>2</sup>.

Apple’s innovations have radically transformed the way people use or even consider mobile phones and smartphones. From low-functioning devices, they became companions that many people feel they cannot live without.

The release of the App Store in 2008, give birth to what today is called the “app economy”, a dynamic and expanding sector that had a tremendous economic impact in the whole world economy. Mobile devices, apps and wireless connectivity are driving the current wave of innovation in ICT (Information and Communications Technology) and are fostering productivity, growth and jobs.

I will depict the iPhone case as the master evidence that, today, conceiving innovative technologies and products is not enough anymore. What determines success today is how effective you are in building a powerful ecosystem around a key innovation and in controlling the bottlenecks of this ecosystem architecture.

I will start my study describing, in the first chapter, the smartphone’s history, presenting it as the natural evolution of mobile phones and PDAs.

I will give an overall picture of the mobile phone industry illustrating how it was structured until the introduction of the first iPhone and how it changed after it. I will demonstrate that, starting from 2008, a revolution in the entire industry scenario occurred, forcing different industries, with its different industry architectures and its different players, to converge.

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<sup>1</sup> Source: [www.canalys.com](http://www.canalys.com) (Canalys - Press Release, 2007)

<sup>2</sup> Source: [www.idc.com](http://www.idc.com) (IDC - Press Release, 2014)

I will depict the current smartphone industry scenario, describing first the smartphone penetration within the mobile phone industry since 2006 and then the actual smartphone industry structure, which can be essentially divided between operating system and device makers. According to this distinction, I will present the current main players in both these two sectors of the “new smartphone industry”.

I will give a glance on the mobile platform evolution and then I will show how the mobile *application platform* introduced by Apple with its App Store in 2008, gave birth to the App Economy.

In the second chapter, following the innovation theories of the Harvard Professor Clayton Christensen stated in its famous work “The Innovator’s Dilemma”, I will try to explain why, in my opinion, the iPhone represents, for the mobile phone industry, what the Harvard Professor calls a “*disruptive innovation*”. I will subsequently explain how Apple was able to create what the authors Argyres, Bigelow and Nickerson call the “*conpositio desiderata*”<sup>3</sup>, creating new standards for hardware design, software capabilities and business models.

In the third chapter, I will describe how Apple was able to leverage *on an innovative product to build an innovative strategy*. I will highlight that, even if the iPhone completely reshaped the smartphone standards on both the hardware and software concepts, the transformative impact that its App Store has had in the world economy has been even more astonishing. The entire business world has been shocked.

I will demonstrate how Apple, perfectly following, consciously or unconsciously, strategy and innovation literature on platforms and industry architectures, has been able to introduce in the industry a new business model paradigm that led the company to its current success.

In the last chapter, I will focus the attention on the different strategic approaches that the other main players adopted to face the industry revolution. I will explain the reasons of the entrance of the new players in the industry (Google and Microsoft) and the reactions of the incumbents (BlackBerry, Nokia and Samsung).

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<sup>3</sup> Argyres, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower’s Dilemma*. Washington University



I will evidence that the different strategies pursued by the different actors and the related results reflected their own core competencies and historical backgrounds.

I will conclude the work giving a look at the foreseeable future of the smartphone industry.

# CHAPTER 1 – OVERVIEW OF THE SMARTPHONE INDUSTRY

## 1.1 SMARTPHONES AS THE NATURAL EVOLUTION OF MOBILE PHONES AND PDAS

It was as early as 1973 when devices started to be conceptualized to combine telephony and computing. However, they started to be sold only at the beginning of the nineties and the word “smartphone” did not arise before 1997, when the Ericsson Mobile Communications company marketed its Ericsson GS 88 model as a Smart Phone.

While there is no standard definition of the term "smartphone" across the industry, the description that probably satisfied the most the general opinion is “*a handheld device that integrates mobile phone capabilities with the more common features of a handheld computer or PDA. Smartphones allow users to store information, e-mail, install programs, along with using a mobile phone in one device.*”<sup>4</sup>

From this definition we can clearly perceive smartphones as the natural outcome of the evolution of two kind of devices, one is mobile phones and the other is personal device assistant (PDAs). Some could say that smartphones are the evolution of mobile phones with PDA’s integrated functions, while others consider it more as the evolution of PDAs that add features of phones ( for this also called PDA -Phones ).

The first cellular phone with PDA features integrated was an IBM prototype called Simon Personal Communicator, developed in 1992 and sold in 1994.<sup>5</sup> The Simon was the first device that can be properly regarded as a “smartphone”, even if the term was not yet determined. Other than making and receiving



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<sup>4</sup> Source: [www.cellphone.com](http://www.cellphone.com) (Cassavoy, 2013)

<sup>5</sup> Source: [www.businessinsiders.com](http://www.businessinsiders.com) (Kovach, 2011)

calls, Simon, through its touchscreen display, was also able to send and receive emails and pages, and included applications such as a calendar, an appointment agenda, an address book, a calculator, games, a note pad, a handwritten annotation etc.



In 1996, Nokia announced the Nokia 9000, a palmtop computer-style phone coupled with a PDA from HP. It was part of the Nokia Communicator line, and it became the Nokia's best-selling phone of that time.<sup>6</sup>

At the end of the nineties though, most of the mobile phones still had only standard phone features. It was common in fact for people, mainly within businessmen, to carry a separate dedicated PDA device, running primary versions of operating system such as Palm OS, BlackBerry OS or Windows CE/Pocket PC. These operating systems would later improve into the *mobile operating systems* that run nowadays into our smartphones.



In 1997, the Ericsson Mobile Communications release its Ericsson GS 88, the first device labeled as a “smartphone”.<sup>7</sup> In 2000, the touchscreen smartphone R380 was released. IT combined mobile phone and PDA functions. It supported limited web browsing through the use of a stylus on a resistive touchscreen.<sup>8</sup>



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<sup>6</sup> Source: [www.press.nokia.com](http://www.press.nokia.com) (Nokia - Press Release, 1996)

<sup>7</sup> Source: [www.techinfo2.com](http://www.techinfo2.com) (Yousuf, 2013)

<sup>8</sup> Source: [www.geek.com](http://www.geek.com) (Bowman, 2000)

In early 2001, Palm, Inc. introduced the Kyocera 6035. Even in this case mobile phone features were combined with PDA functions and supported limited web browsing.<sup>9</sup>



Between 2002 and 2004, the Windows Mobile “Pocket PC” Operating System was incorporated in many HTC models that gained much popularity in Europe.

In 2004, HP released the iPAQ h6315, a device that added cellular capability to their previous PDA, the HP 2215.<sup>10</sup>

It is in 2007 when the iPhone appears in the market. The following image gives us a clear picture of how, with the entrance of the iPhone, a new standard for the smartphone category emerged, combining design, performance, utility and functionality (Burgelman, Silverman, Wittig, & Hoyt, 2009).



Since the introduction of the iPhone in 2007, and even more after the birth of the App Store in 2008, the Apple’s product has become the benchmark for smartphone makers on device attributes, contents, user experience, application ecosystem and browser capabilities.

Until the introduction of the first iPhone in 2007, the mobile phone industry and the internet were essentially separated. Even if, as we have seen, some mobile telephones were already able to deliver internet services incorporating some PDA functions, such as emails, app downloads and internet access, it was with the iPhone that these services became realistically and completely usable on a smartphone device. Apple, with its iPhone, completely reshaped the smartphone category, where mobile telephony, the internet and personal computing merged,

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<sup>9</sup> Source: [www.pcmag.com](http://www.pcmag.com) (Segan, 2010)

<sup>10</sup> Source: [www.gsmarena.com](http://www.gsmarena.com). (GSM Arena, 2005)

substantially for the first time, into a single device. This new situation forced different industries, with its different industry architectures and its different players, to converge.

Firms coming from different industries, with its own histories and its own backgrounds, have been pushed and driven to a complex new landscape of competition.

## 1.2 A NEW INDUSTRY SCENARIO

In 2006, the global **mobile phone market** was essentially an oligopoly, dominated by six companies, which accounted for 85% of the market. Nokia and Motorola alone accounted for 56%.

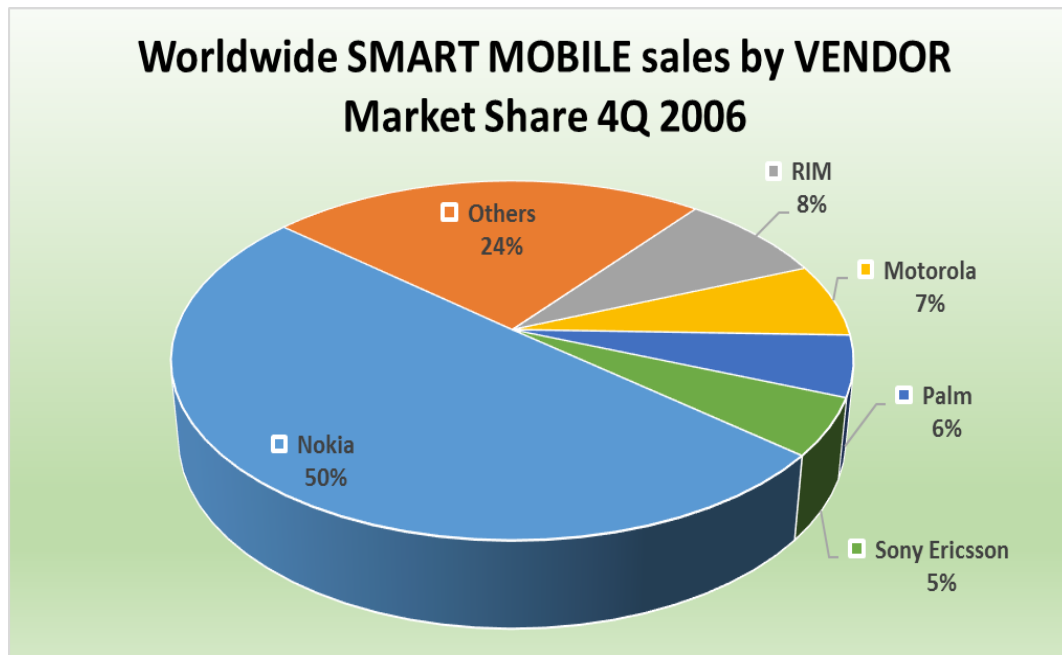


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Nokia at the time was also the biggest smartphone maker driven by its own operating system, the Symbian OS. It was in the right place, at the right time.

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<sup>11</sup> Data source: [www.gartner.com](http://www.gartner.com) (Gartner - Press Release, 2006)

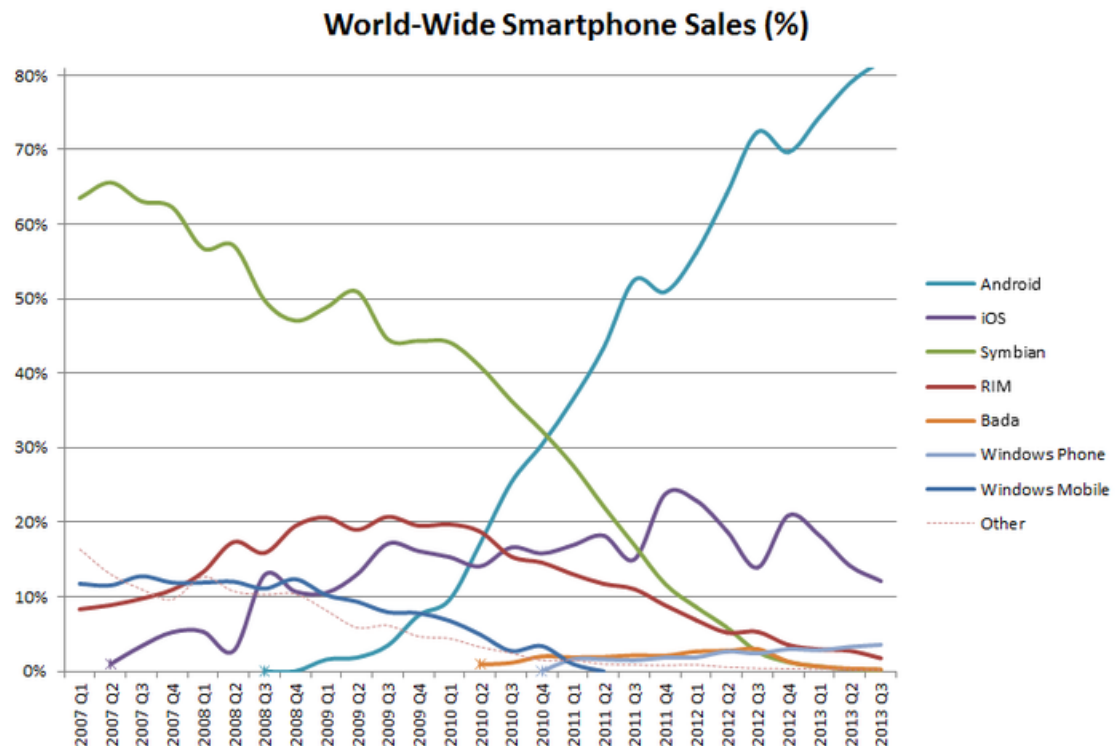


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As these three graphs illustrate, at the end of 2006 Nokia's **smart-mobile market share** accounted for 50% in terms of proprietary devices sold and for 65% in terms of smart-mobile OS (Symbian OS, in fact, run also in other devices other than Nokia's). Starting with the release of the Apple iPhone in 2007, after being the leader of the "**smartphone**" market since 1996, Nokia's operating system share began to fall.

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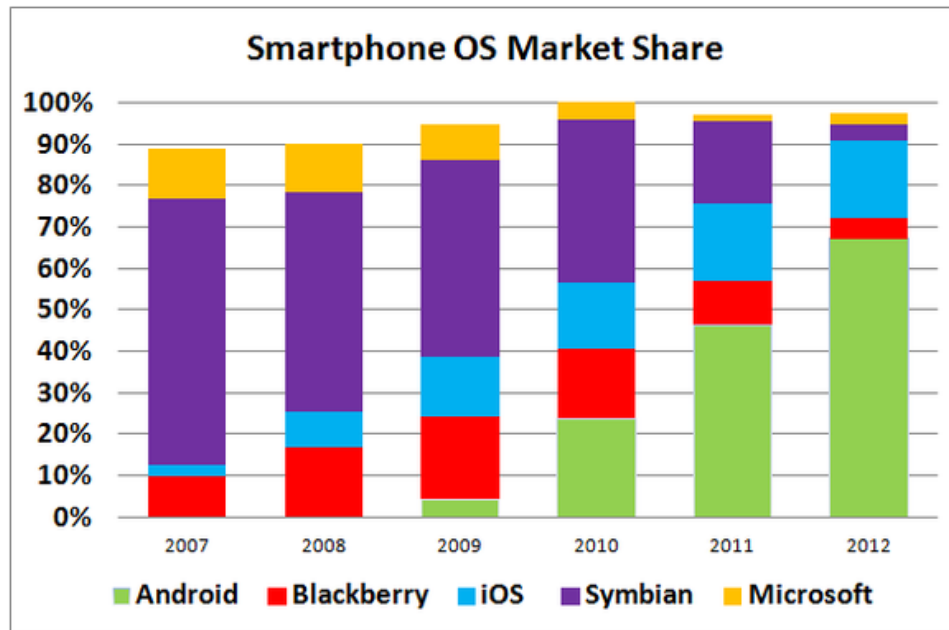
<sup>12</sup> Data source: [www.canalys.com](http://www.canalys.com) (Canalys - Press Release, 2007)



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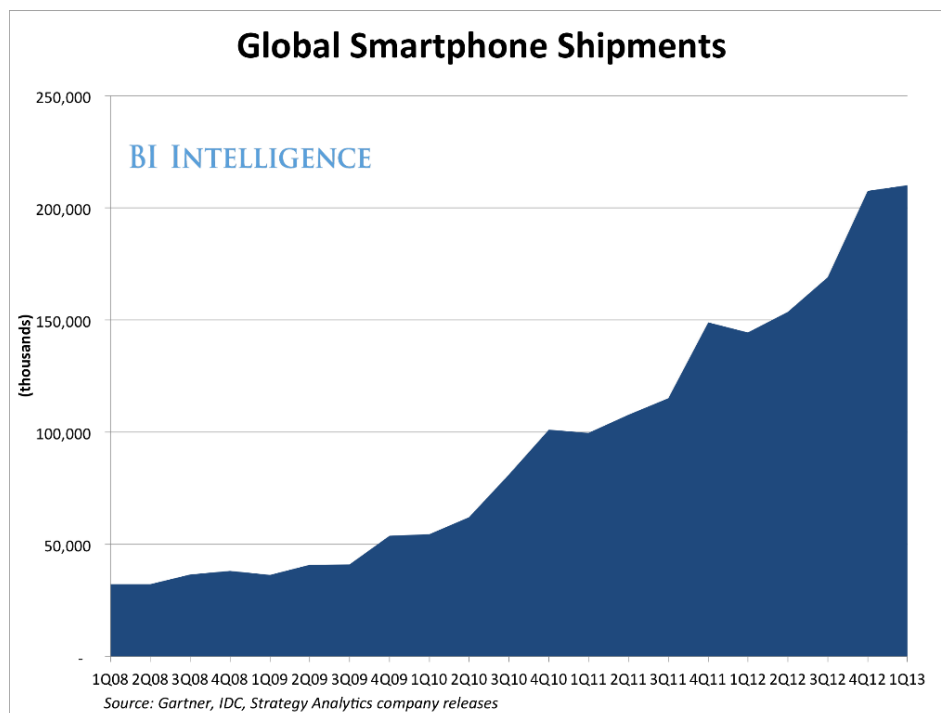
In 2007, Symbian had about 65% of the operating system market; in 2008, its share dropped to 45%. Like Windows Mobile, Symbian was damaged first by Apple and Blackberry (RIM), later it was hit even more by the rise of Android as the leading competitor in 2010.

<sup>13</sup> Image source: (Wikimedia Commons, 2013), based on Gartner actuals.



14

The smartphone penetration, from 2007 on, gives us a clear picture of the revolution that occurred in the mobile industry.



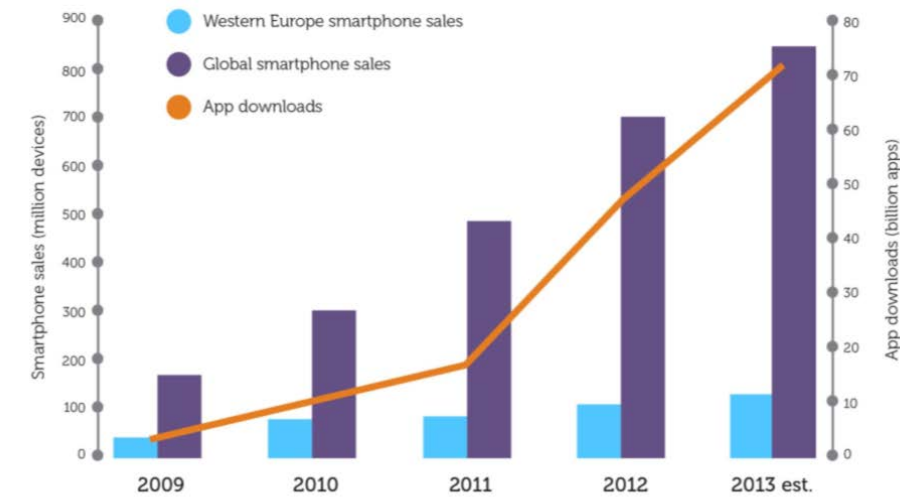
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<sup>14</sup> Image source: [www.dailytech.com](http://www.dailytech.com) (Mick, The History of Normandy: How Nokia Plotted a Low-End Android Line, 2013)

<sup>15</sup> Image source: [www.bullfax.com](http://www.bullfax.com) (Business Insider, 2013)



## SMARTPHONES SALES AND APP DOWNLOADS



Source: Gartner, IDC, Plum Consulting, VisionMobile

In 2006, the actual players of the market, Android, iOS, Windows Phone and Bada did not exist and just 64 million smartphones were sold.<sup>16</sup> The main players at that time were Nokia, Sony Ericsson, RIM, Palm, and Motorola.

As of 2011, approximately 10 times as many smartphones were sold annually.

At the end of 2013, the smartphone penetration has reached 55% of the total sales of the mobile phone industry, and the previous main players have being smashed out and replaced by new actors.

According to “*Digitimes Research Special Report (2014 global smartphone market forecast)*”, global smartphone shipments are expected to reach 1.24 billion units at the end of 2014.

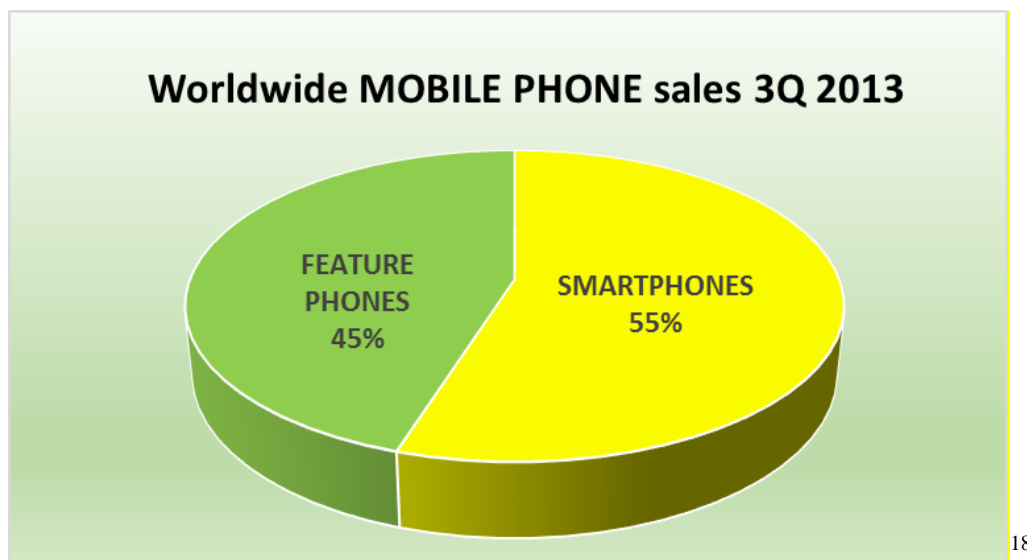
<sup>16</sup> Source: [www.canalys.com](http://www.canalys.com) (Canalys - Press Release, 2007)

## 1.3 CURRENT SITUATION

### 1.3.1 Smartphone Penetration

The production of feature phones (a retronym generally intended for “a mobile phone that incorporates features such as the ability to access the Internet and store and play music but lacks the advanced functionality of a smartphone”<sup>17</sup>, e.g. downloading apps from an online marketplace), has nowadays become a commodity business of low-margin.

The smartphone price floor, settled by the Android handsets, is continuing to drop and it is directly affecting the shipments of feature phones. Future phones’ sales, in fact, are experiencing a steady and predicable decline and, in 2013, have been surpassed, for the first time, by the smartphone sales.



This picture clearly evidences why all the main handset manufacturers have translated their production activities pulled by smartphones sales. Within the main handset makers in fact, Nokia is the only that is still selling more feature phones than smartphones and, looking at the recent deal between Nokia and Windows, it is clear that also these two companies are refocusing on smartphones.

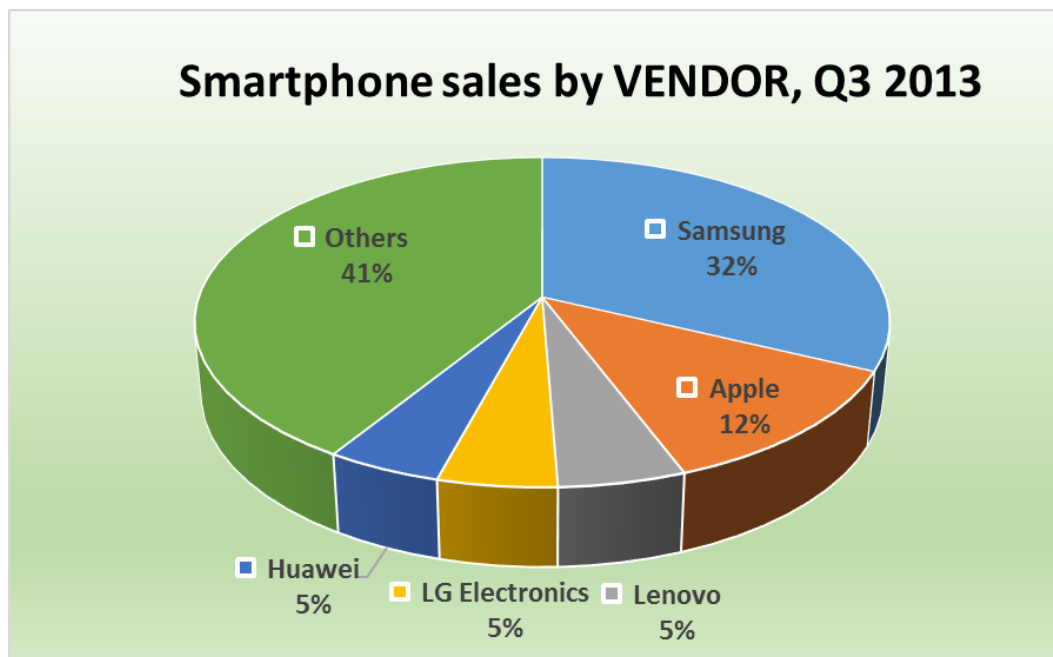
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<sup>17</sup> Source: [www.oxforddictionaries.com](http://www.oxforddictionaries.com)

<sup>18</sup> Data source: [www.gartner.com](http://www.gartner.com) (Gartner - Press Release, 2013)

### 1.3.2 Platforms and Device Makers

Today, the smartphone industry is essentially structured this way: on one side, there are device makers, on the other operating systems (platforms)<sup>19</sup>. From the next two graphs<sup>20</sup> we can have a look at which are the main players of the industry considering these two parts of the smartphone industry.



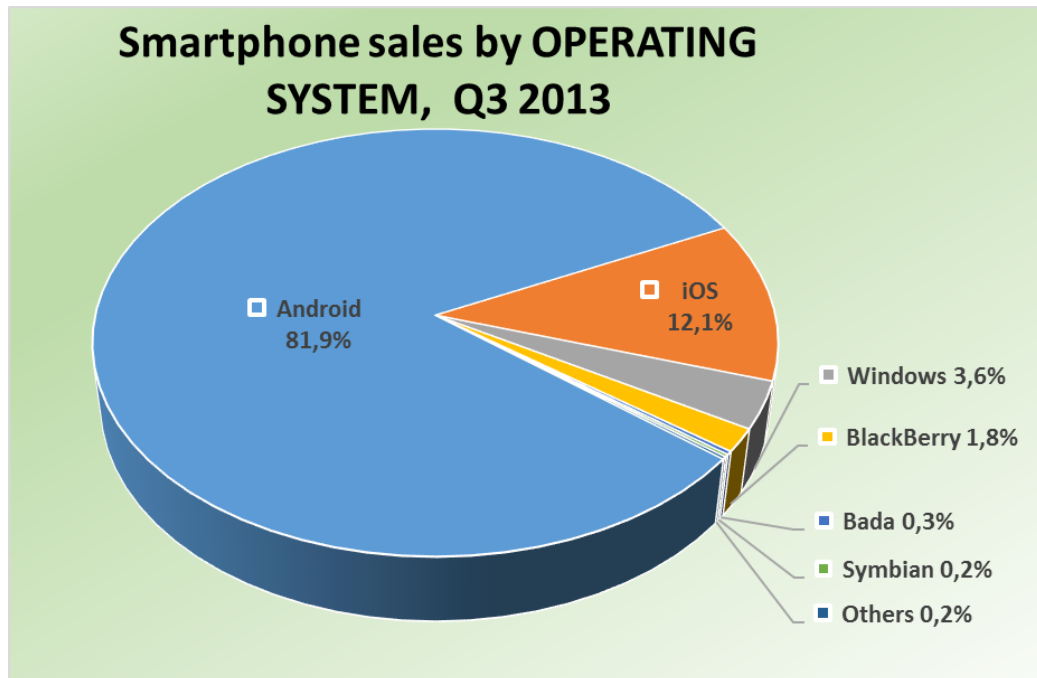
Among handset makers, the dominant player is Samsung, with about 32 % of total sales, followed by Apple with its 12% of market share. The interesting portion of the pie is what is called “others”, which sales a little less than Samsung and Apple together. It is made of hundreds of Android handset producers, using hardware platforms such as Qualcomm and Mediatek. In this sense, Samsung’s biggest competitor in terms of market share is not Apple, but these hundreds of handset

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<sup>19</sup> The mobile operating system is the platform on top of which other programs can run on mobile devices. For the rest of this chapter I will use the term platform as synonymous of operating system.

<sup>20</sup> Data source: [www.gartner.com](http://www.gartner.com) (Gartner - Press Release, 2013)

producers able to deliver customized Android handsets to Asia and Africa, with small production teams and private distribution networks.



Considering the smartphone sales by platform, Android dominates with around 82% of the total sales, followed by iOS with 12%. The other major players are Windows Phone with 3.6% of market share and BlackBerry, with less than 2%.

These two sector of the industry are highly correlated, but in some sense also independent. Basically, what happened is that, with the entrance of IT companies in the industry, the platform market gained much more weight within the industry. In fact, as I will demonstrate in the following chapters, iOS and Android are winning thanks not only to their technological innovations, but primarily to the power of their application ecosystems. The stories of both iOS and Android are two successful examples of what are called “*application platforms*”, that are platforms designed to link two previously disjointed markets: users and applications developers.

#### 1.4 PLATFORM EVOLUTION

#### ***1.4.1 From Legacy Platforms To Next-Generation Platforms***

To understand the history and evolution of platform in the mobile phone, it could be interesting to start from a research made by Vision Mobile on November 2011<sup>21</sup>. According to this study, mobile platforms can be divided in two generations: “*legacy*” platforms and “*next-generation*” platforms.

**Legacy platforms** embrace those operating systems created for smartphones produced in the 2000-2009 decade. It includes Symbian, BlackBerry OS, BREW and Windows Mobile.

**Next-generation platforms** are those deeply influenced by the pioneering iOS platform and designed for the requirements of the Internet age and developer economics. These include Android, webOS, Windows Phone and Bada.

Within the legacy platforms, none of them was able to compete successfully:

- Symbian experienced an unsuccessful open-source experiment, and it has been phased out by Nokia.
- RIM was forced to acquire the QNX operating system and replace its BlackBerry OS.
- BREW failed to attract both developers and handset makers.
- Microsoft replaced Windows Mobile with the new Windows Phone platform, based on a new ecosystem paradigm.

On the other hand, a peculiar characteristic of all major next-generation platforms is that none of them was created by telecom or mobile companies and they were all designed by US companies with similar and related DNA:

- IOS: Apple’s origin comes from personal computers, consumer electronics and digital content.
- Android: Google is specialized in Internet-related services and products and it is owner of Google Search, the dominant search engine of the World Wide Web.

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<sup>21</sup> VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*.

- Microsoft Phone: Microsoft is the dominant PC software maker.

Platform	Platform owner	Company origins	OS origins	Initial product launch	Geographic origins
Symbian	Nokia	Mobile phones	PDA	2000	Europe
BlackBerry OS	RIM	Wireless messaging	Two-way pagers	2000 (Java)	Canada
BREW	Qualcomm	Wireless chipsets	Feature phones	2001	US
Windows Mobile	Microsoft	PC software	PDA	2002	US
iOS	Apple	Personal computers	Personal computers	2007	US
Android	Google	On-line advertising	Acquisition of smartphone OS startup	2008	US
webOS	HP	Consumer electronics	New development	2009	US
Bada	Samsung	Mobile phones	Evolution of proprietary feature-phone OS	2010	South Korea
Windows Phone	Microsoft	PC software	New development	2010	US

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#### 1.4.2 Communication Platforms, Software Platforms, Application Platforms

Another important classification of platforms highlighted in the Vision Mobile dissertation is between *software platforms*, *communication platforms* and *application platforms*.

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<sup>22</sup> Image source: VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*, p.

Platform type	Purpose	Primary audience	Network effects	Examples
Software platform	Sharing of software development costs and risks	Device makers	None	Symbian, BREW
Application platform	Connecting app developers and users (and handset OEM in some cases)	Developers	<ul style="list-style-type: none"> <li>- Users to developers</li> <li>- Users to users</li> <li>- Developers to developers</li> </ul>	Android, iOS, Windows Phone
Communication platform	Facilitating communication between users	Users	<ul style="list-style-type: none"> <li>- Users to users</li> </ul>	Telephone, fax, BlackBerry Messenger

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Operating System developers have always been part of the smartphone ecosystem, but in very different ways, depending on the nature of the platform they worked with.

The first platform that has been seen in the smartphone industry was the *software platform*. “Software platforms are used for building multiple variations of products, with maximum reuse of the platform technology. As such, software platforms are optimized for flexibility and sharing of development costs across multiple products. Symbian is a typical example of a software platform that has been used for building a wide range of mobile phone models. Until 2009, developers were not the focus of the platform”.<sup>24</sup> An example of this is the widely known Symbian O.S., the one upon which Nokia built its success.

The second type is the so-called *communication platform*, aimed at creating connection among users. An essential example of this kind of platform is the Blackberry messenger, developed in-house and with the main objective to easily connect users with other users.

<sup>23</sup> Image source: VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*, p. 20

<sup>24</sup> Source: VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*, p. 20

The third type is the *application platform*. These platforms are designed for connecting two disjointed markets: users and application developers. The way it works is as simple as effective: applications give solutions to different users' needs but, because applications are locked to the platform, users must acquire the platform to benefit from those applications. An explicative and classic example of a successful application platform is Microsoft Windows in the PC industry: PC are useless without applications, but since many important PC applications are design for the Windows operating system, it is necessary to purchase a license for Windows to use these PC applications.

Platform	Originally designed as
Android	Application platform
Bada	Application platform
BlackBerry OS	Communication platform
BREW	Software platform
iOS	Application platform
Symbian	Software platform
Windows Phone	Application platform
webOS	Application platform

25

What is crucial for applications platforms success is that they are characterized by very strong network effects. That is because each new application adds value to the platform from the end-user perspective and, from the application developer perspective, each new user adds value to the platform. When the number of developers, apps and users reach the critical mass, a virtuous cycle begins, letting the platform start to grow exponentially.

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<sup>25</sup> Image source: VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*, p. 24



The exceptional success of iOS platform is a demonstration of the advantages of applications platforms. The strong network effects coming from the implementation of the iOS application ecosystem have demonstrated to be stronger than Nokia's supply chain and distribution channel networks, that have been unable to avoid the dismissal of Symbian.

All the other operating systems introduced after the iOS implementation tried to copy Apple's application platform recipe. It is not a surprise that the company that succeeded is Google, a company with the right kind of experience and DNA, with plenty of experience with advertising platform, connecting on-line users and advertisers.

## 1.5 THE BIRTH OF THE APP ECONOMY

The mobile application platform recipe, introduced by Apple with its App Store in 2008, reshaped completely the mobile phone industry, but the wave of innovation that it introduced has gone even beyond that. It generated a new and expanding sector, which today is called the App Economy.

An extract of relevant report prepared on September 2013 by VisionMobile and Plum Consulting and sponsored by ACT4Apps , titled "*The European App Economy, Creating Jobs and Driving Growth*", can help us to have a clear picture of what the App Economy is.

*The App Economy began with the launch of the Apple App Store in 2008.*

*Today the App Economy is a dynamic and expanding sector with several competing stores and platforms, including offerings from Apple, Google, Microsoft, BlackBerry, Amazon and others. Downloads of applications – “apps” – total around 100 billion with nearly 1 million apps available across an increasing number of app stores. The economic impact is significant and growing. In the EU28, we estimate that the App Economy contributes:*

- *794,000 jobs across the whole economy;*
- *529,000 direct App Economy jobs, 60% of which are developers;*
- *22% of the global production of app-related products and services comes from the EU;*
- *Revenues of more than €10 billion per annum”.*

*This represents only the beginning – further advances in the App Economy are anticipated as a result of increased apps availability and functionality, and improvements in devices and connectivity.*

*Mobile devices, wireless connectivity and apps together make up the current wave of innovation in information and communications technology (ICT) and are driving productivity, growth and jobs. Mobile devices give us access “on the go” to computing power and applications thus hugely extending what is possible compared with the fixed PC era.*

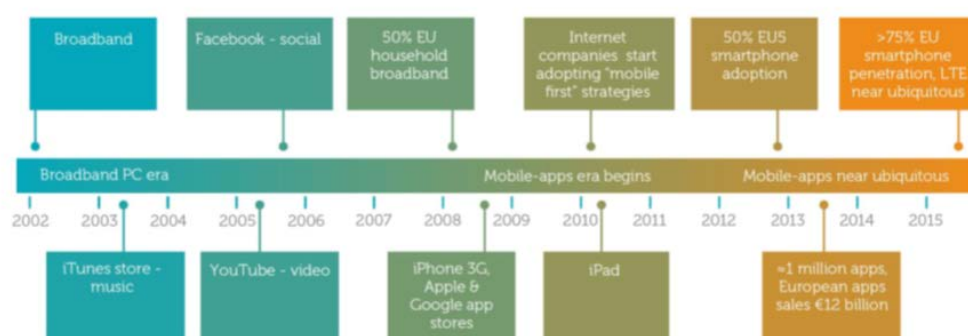
*Mobile platforms and app stores have lowered entry barriers for developers. At the same time, app stores provide global market access, discoverability, low cost distribution and monetisation. Consumers can download an enormous variety of purpose-built apps at low prices from various types of stores. App stores serve a wide range of users and promote choice through app curation and recommendations.*

*While the app development sector of the economy is large and growing, the contribution of the App Economy to the overall economy through app use is much wider. Time spent using apps is a measure of the value placed on them – both in terms of time spent on communication and entertainment, but also time saved for businesses and individuals through messaging, maps and other productivity tools. Wider social benefits are also becoming clear with apps for education, health and transport.*

*Source: Plum Consulting and VisionMobile. (Sep. 2013). The European App Economy, Creating Jobs and Driving Growth, p.2-3*

As it is evident from the previous important extract, the real boost for mobile applications began in 2008 with the launch of the app store. It, subsequently supported by even more powerful smartphones and by tablets in 2010, unleashed an exceptional wave of innovation, moving the entire ICT ecosystem toward mobile and apps.

## FROM PC TO MOBILE-APPS ERA



Source: Plum Consulting

The timeline above illustrates that we are in a historical transition phase from desktop computers to smartphones and other devices regularly connected and always with us. Improvements in devices and connectivity are supporting a virtuous circle that drives innovation that meets customers and enterprises' needs. The ecosystem has also evolved, and now it is characterized by massive variety, short time to market, lower costs and competitive pricing.

The App Economy had such a tremendous impact that can be considered from many point of views. As highlighted in the previous extract, the economic impact of the App Economy is impressive and can be measured in a number of ways: number of jobs created, contribution to GDP, efficiency gains through the use of mobile apps, etc.

Nevertheless, the App Economy had also a profound impact in the way people use mobile phones. The access to informations is now available with just a fingertip, going from weather to transports, from finance to sports, etc. Social networking apps such as Facebook and Twitter allow people to keep in touch with family and

friends. Communication apps such as Skype or WhatsApp are completely reshaping the telecommunication sector. The important phenomenon of the “sharing economy” enables people to share personal resources, from cars to homes (e.g. ZipCar and CouchSurfing.) All of this is contributing to the disruption of traditional business models in many sectors, increasing competition and paving the way for new market entrants.

What we have pictured out at this point of the chapter is that, after the launch of the iPhone in 2007 and after the release of the App Store in 2008, a revolution in the entire mobile phone industry occurred.

In the following two chapters, I will analyze in depth the various innovations that the Apple company brought into the mobile phone industry with its iPhone. I will base my study on the innovation theories of the Harvard Business School Professor Clayton Christensen, and I will illustrate why, in my opinion, the iPhone should be considered as a “*disruptive innovation*”. Furthermore, I will explain why it represents, for the entire mobile phone industry, what Argyres, Bigelow and Nickerson called the “*conpositio desiderata*”.

## CHAPTER 2 – THE IPHONE: A BREAKTHROUGH INNOVATION

**Apple Inc.** is an American multinational corporation headquartered in Cupertino, California. The company was founded by Steve Jobs, Steve Wozniak, and Ronald Wayne on April 1, 1976 and it was incorporated on January 3, 1977. The company designs, produces and sells consumer electronics, personal computers and computer softwares.

As we have seen in the previous chapter, Apple is the world's second-largest company in terms of smartphones shipments by both the operating system and the device. The iPhone is, in 2014, the most profitable player of the smartphone industry.<sup>26</sup> *Fortune* magazine named Apple the most admired company in the world from 2008 to 2012.<sup>27</sup> On September 30, 2013, Apple surpassed Coca-Cola to become the world's most valuable brand<sup>28</sup>.

Its best-known products are the Mac computers, the iPod media player, the iPad tablet and, obviously, the iPhone smartphone and the iOS mobile operating system.

No doubt that when Apple launched the iPhone in 2007, the company introduced in the market an innovative product. But could this innovation be labeled as “*disruptive*”, according to Christensen’s innovation theories?

In order to respond to this question, in this chapter I will firstly describe Christensen’s theories on disruptive innovations stated in its famous work “The Innovator’s Dilemma”. Then, I will illustrate the innovations that the iPhone brought into the mobile industry in order to show why, in my opinion, the iPhone should be considered the disruptive innovation that changed the paradigms of the mobile phone industry.

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<sup>26</sup> Source: [www.forbes.com](http://www.forbes.com) (Bradley, 2013)

<sup>27</sup> Source: (Fortune Magazine, 2012)

<sup>28</sup> Source: (The New York Times, 2013)

At the end of the chapter I will also explain why the iPhone represents, for the mobile phone industry, what Argyres, Bigelow and Nickerson called the “*compositio desiderata*”, determining, for the other players of the industry, a “*follower’s dilemma*”.

## 2.1 CHRISTENSEN’S THEORY: DISRUPTIVE INNOVATIONS AND TECHNOLOGICAL TRAJECTORIES

Clayton Christensen is the Kim B. Clark Professor of Business Administration at the Harvard Business School, where he teaches the course “Building and Sustaining a Successful Enterprise”<sup>29</sup>. He is considered as one of the world’s highest experts on innovation and growth and his theories have been widely followed in enterprises and organizations throughout the world. His most famous book, *The Innovator’s Dilemma*<sup>30</sup>, articulates his theory of disruptive innovation. According to this theory innovations can be classified in two different categories: *sustaining technologies* and *disruptive technologies*<sup>31</sup>.

The first category (**sustaining technologies**), considers those technologies that tend to follow a rate of improvement on those attributes that customers already value. “*Some sustaining technologies can be discontinuous or radical in character, while others are of incremental nature. What all sustaining technologies have in common is that they improve the performance of established products, along the dimensions of performance that mainstream customer in major markets have historically valued*”.<sup>32</sup>

The second category (**disruptive technologies**), on the other hand, introduces a completely new set of attributes that the main customers of the industry generally

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<sup>29</sup> Source: [www.claytonchristensen.com](http://www.claytonchristensen.com) (Clayton Christensen, 2013)

<sup>30</sup> Christensen, C. (1997). *The Innovator’s Dilemma*. Harvard Business School Press

<sup>31</sup> In the “Innovator’s Dilemma” work, the word *technology* is used to describe “the processes by which an organization transforms labor, capital, materials, and information into products and services of greater value”. “This concept of technology therefore extends beyond engineering and manufacturing to encompass a range of marketing, investment, and managerial processes”. In his sequel with Michael E Raynor, *The Innovator’s Solution* Christensen replaced the term *disruptive technology* with *disruptive innovation*. That is because they recognized that few technologies are intrinsically disruptive or sustaining in character, while, it is the *business model* that the technology enables that creates the disruptive impact. I will therefore use the two terms as equivalent for the rest of my thesis.

<sup>32</sup> Christensen, C. (1997). *The Innovator’s Dilemma*. Harvard Business School Press. p. xviii

do not value initially. They are “*innovations that result in worse product performance, at least in the near-term*”. “*Disruptive innovations bring to market a very different value proposition that had been available previously. Generally, disruptive technologies underperform established products in mainstream markets.*

*Therefore, disruptive innovations tend not to outperform within the mainstream customers at the introducing phase.”*<sup>33</sup>

To understand when and why a disruptive innovation changes the patterns of an industry, the idea of *performance trajectories* should be taken in account.

A *performance trajectory* shows “*the rate at which the performance of a product has improved and is expected to improve over time*”.<sup>34</sup>

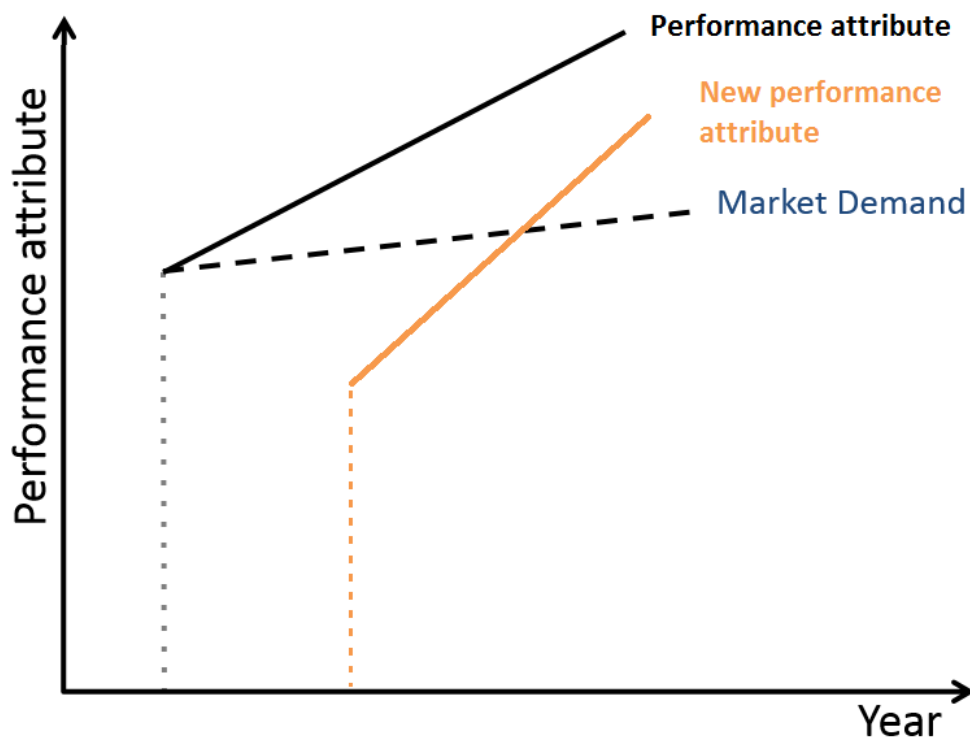
Almost every industry has his critical performance trajectories: in photocopiers, for example, a critical trajectory is the number of copies per minute; in disk drives, the Moore’s law (that says that the storage capacity doubles approximately every two years) identify a critical performance trajectory.

The following graph helps to understand the linkages between disruptive innovations and performance attributes.

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<sup>33</sup> Christensen, C. (1997 ). *The Innovator’s Dilemma*. Harvard Business School Press. p. xviii

<sup>34</sup> Bower, J. L., & Christensen, C. (1995, January-February). Disruptive Technologies: Catching the Wave. *Harvard Business Review*. p. 45



The straight black line shows the rate of sustaining innovations on a critical performance attribute for a generic industry (e.g. number of copies per minute). We can notice that the rate of improvement is much steeper than the rate at which market demands that advances in that attribute (the dotted line).

At a specific point in time, a new performance attribute is born. As we can notice, at the beginning, it does not reach market demand, but soon it intersects the market demand line. That means that the new technology has now invaded the established market, and only at this point the mainstream customers will want the new technology. Unfortunately, for the incumbent firms by that moment it is often too late: the pioneers of the new technology dominate the market. *“Each time a disruptive technology emerged, between one-half and two –third of the established manufacturers failed to introduce models employing the new architecture [...]. Three waves of entrant companies led these revolutions; they first captured the*



*new markets and then dethroned the leading companies in the mainstream markets”<sup>35</sup>.*

### **2.1.1 The Author's Dilemma**

Since the creation of the first iPod, Apple has long been Christensen's major “dilemma”.

In January 2006, in an interview for BusinessWeek<sup>36</sup>, Christensen predicted the forthcoming end of the iPod era:

To the question: “*Can Apple keep it up?*” Christensen answered: “*I don't think so. Look at any industry — not just computers and MP3 players. You also see it in aircrafts and software, and medical devices, and over and over. During the early stages of an industry, when the functionality and reliability of a product isn't yet adequate to meet customer's needs, a proprietary solution is almost always the right solution — because it allows you to knit all the pieces together in an optimized way. But once the technology matures and becomes good enough, industry standards emerge. That leads to the standardization of interfaces, which lets companies specialize on pieces of the overall system, and the product becomes modular. At that point, the competitive advantage of the early leader dissipates, and the ability to make money migrates to whoever controls the performance-defining subsystem.*”

In another interview in June 2007<sup>37</sup>, Christensen restated that the iPod was still condemned, and also predicted that the iPhone would not be successful:

“*The iPhone is a sustaining technology relative to Nokia. In other words, Apple is leaping ahead on the sustaining curve [by building a better phone]. But the prediction of the theory would be that Apple won't succeed with the iPhone. They've launched an innovation that the existing players in the industry are heavily motivated to beat: It's not [truly] disruptive. History speaks pretty loudly on that, that the probability of success is going to be limited.*”

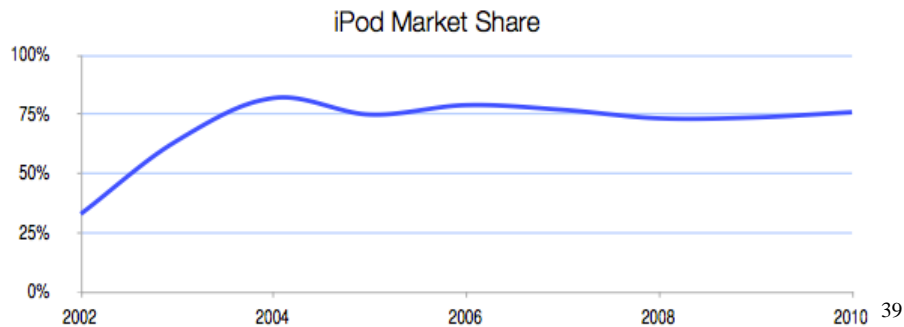
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<sup>35</sup> Bower, J. L., & Christensen, C. (Jan.-Feb.1995). *Disruptive Technologies: Catching the Wave*. Harvard Business Review. p. 46

<sup>36</sup> Source: [www.businessweek.com](http://www.businessweek.com) (Burrows, 2006)

<sup>37</sup> Source: [www.businessweek.com](http://www.businessweek.com) (McGregor, 2007)

It is evident that the history, by the time I am writing this thesis, has proved Christensen to be wrong. As a matter of fact, the iPod was an unprecedented success, reshaping the entire music industry, and the Apple is still in 2014 the most profitable player of the “new” smartphone industry.<sup>38</sup>



For the intention of my analysis, the most important point of the statements above is that Christensen considered the iPhone no more than a sustaining innovation: “The iPhone is a sustaining technology relative to Nokia. In other words, Apple is leaping ahead on the sustaining curve [by building a better phone]”.<sup>39</sup>

From a pure technological point of view, it can be seen exactly as the opposite. Even if it could be hard to imagine now, when the original iPhone was launched, it was actually well behind the other premium devices offered in the market on a strict feature-by-feature comparison. From an interesting analysis made by Ian Fogg in 2012, “Five years of iPhone disruption”<sup>40</sup>, a clear picture of that can be depicted. According to this analysis, the iPhone:

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<sup>38</sup> Source: [www.forbes.com](http://www.forbes.com) (Bradley, 2013)

<sup>39</sup> Image Source: [www.stratechery.com](http://www.stratechery.com) (Thompson, Apple and the Innovator's Dilemma, 2010)

<sup>40</sup> Source: [www.screendigest.com](http://www.screendigest.com) (Fogg, 2012)

- **Was 2G, not 3G as the industry expected.** This was a time when competing smartphones such as the Nokia N95 or HTC TyTn were fully broadband 3G, and in some cases offered 3.5G HSPA speeds.
- **Lacked the ability to install Apps as competitor models could.** It's perhaps astonishing given Apple's subsequent success with its App Store to remember that in 2007 Apple believed native apps to be unimportant. Instead, Apple positioned the iPhone to be a web platform with only web apps. By contrast, all competing smartphones could run native apps, although the installation process was cumbersome and usually involved a PC to sync apps.
- **Included a very poor 2MP camera unlike rivals' 5MP cameras.** At just 2 megapixels it compared very poorly with the standard 3 to 5 megapixel cameras of rivals. And, unlike all leading Nokia's the iPhone lacked video recording, had primitive optics unbranded -- rather than Carl Zeiss -- and had poor colour accuracy.
- **Had no physical keyboard.** Competing smartphones were defined by their reliance on physical buttons. BlackBerry and Windows Mobile devices almost universally offered a full QWERTY keyboard. Nokia's smartphones split between full keyboard designs and consumer-centric models with extra media buttons such as the two way slider N95.
- **Lacked enterprise connectivity.** The iPhone was unsuited to business because it had no ability to connect to corporate Microsoft Exchange email systems or be administered by IT departments.
- **Had poor signal performance.** Early iPhone adopters complained of dropped calls and network connection issues. This issue re-surfaced with the controversy over the iPhone 4 antenna. Neither appears to have had any impact on iPhone sales.

Source: [www.screendigest.com](http://www.screendigest.com) (Fogg, 2012)

Other than these six dimensions pointed out by Ian Fogg, the iPhone also<sup>41</sup>:

- didn't support multitasking,
- couldn't copy or paste text,
- couldn't attach arbitrary files to emails,
- didn't support MMS,
- didn't support Exchange push email,

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<sup>41</sup> Source: [www.theverge.com](http://www.theverge.com) (Bohn & Aaron, 2013)

- didn't have a customizable home screen, it didn't support tethering
- didn't support editing Office documents,
- didn't support voice dialing.

This feature-by-feature comparison clearly demonstrate that Christensen was not right in considering the iPhone a sustaining innovation. In fact, it is evident that, according to the parameters of the industry at that time, the iPhone did not build a “better phone” at all. It was, indeed, behind its competitors on many aspects. Therefore, how could a product, that was inferior to many “performance attributes” considered crucial for the industry at that time (and therefore it was not “leaping ahead on the sustaining curve”, as Christensen asserted), have been so disruptive for the industry?

My answer relies exactly on what Christensen asserts in his “The Innovator’s Dilemma” and that I already quoted at the beginning of this chapter when I defined the *disruptive innovations*: “*innovations that result in worse product performance, at least in the near-term*”. “*Disruptive innovations bring to market a very different value proposition that had been available previously. Generally, disruptive technologies underperform established products in mainstream markets.*”<sup>42</sup>

My answer is that, according to Christensen’s definition, the iPhone was a disruptive innovation because it based its novel value proposition on a specific performance attribute that, in my opinion, Christensen did not give the right consideration. It is what I call “**usability**”.

### **2.1.2 Ben Thompson’s Critic**

An interesting theory in support of my idea about the “usability” trajectory followed by Apple for the creation of the iPhone, comes from the critic made by the independent blogger, Ben Thompson in its two articles: “Apple and the

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<sup>42</sup> Christensen, C. (1997 ). *The Innovator's Dilemma*. Harvard Business School Press. p. xviii

Innovator's Dilemma"(Thursday, December 9, 2010) <sup>43</sup> and "What Clayton Christensen Got Wrong" (Sunday, September 22, 2013) <sup>44</sup>.

What Ben Thompson principally argues is that Christensen's theories presume two fundamental hypothesis in his models:

1. *Buyers are rational*

2. *Every attribute that matters can be documented and measured.*

What Ben Thompson wants to demonstrate is that these two hypothesis can consistently hold in the business-to-business market, but fails in the consumer market.

This idea is also supported by Christensen's words in the first assessment presented before (from 2006): "*You also see it in aircrafts and software, and medical devices, and over and over.*" As Ben Thompson rightly pointed out: "*Consumers don't buy aircraft, software, or medical devices. Businesses do.*"

Let's see why.

1. "Buyers are not rational". What Ben Thompson highlights in his papers is that consumers are not "rational buyers" (persons who consistently and accurately weighs benefits and costs and chooses accordingly).

While business buyers must be generally very rational (they must justify purchases based on rigorous analysis on features and prices), in a consumer market, purchasing activity is determined by many other motivations and pressures (customers are susceptible to advertising, lack of product knowledge, they often need instant gratification, etc.) As Ben Thompson writes: "*I prefer to think that consumers are actually perfectly rational, but our definition of rationality needs to dramatically expand beyond what is easily quantified.*"

The Thompson's critic to the second hypothesis is strongly connected with the first one.

2. "Every attribute that matters cannot be documented and measured" (In my opinion, the right sentence would have been "not every attribute that matters can be documented and measured").

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<sup>43</sup> Source: [www.stratechery.com](http://www.stratechery.com) (Thompson, 2010)

<sup>44</sup> Source: [www.stratechery.com](http://www.stratechery.com) (Thompson, 2013)

As Ben Thompsons says: *“the attribute most valued by consumers, assuming a product is at least in the general vicinity of a need, is ease-of-use. It’s not the only one – again, doing a job-that-needs-to-be-done is most important – but all things being equal, consumers prefer a superior user experience”*.

The theories of Ben Thompson put an important emphasis on the role that the “user-experience trajectory” had in Apple’s strategy and to the success of the iPod in the music industry. I do not only completely agree with these theories, but I actually add an additional value to them. I consider, in fact, the *“easy-of-use”* trajectory (which I call *“usability trajectory”*) as the performance trajectory that permitted the iPhone to become the disruptive innovation of the mobile phone industry. I will now explain how.

## 2.2 USABILITY TRAJECTORY: THE ATTRIBUTE ON WHICH THE TRUE INNOVATION LIES

Before 2007, every player of the smartphone industry was concerned in delivering a product that could offer the best combination in terms of “increase variety” and “increase quality” of *functions*. Functions is a very general word and, indeed, I use it to refer to a wide spectrum of services, those typical of a smartphone. Camera, user connectivity, internet browsing, email, gps, mp3, video recording, games, etc. I refer to all these functions together, just to have a point of view comprehensive of the entire smartphone industry.

Before 2007, there were also many devices focused in performing a specific function, or a set of them. These devices are very important to the extent of my analysis; in fact, they make us understand that it was widely known that there was an issue: a tradeoff between how many things a smartphone could do and how many of them could be properly done. You design an mp3 smartphone only if you think that focusing on that single feature you can build something better than your competitors, not only in terms of quality, but also in terms of user experience. A typical example are the Blackberry smartphones, which gave up competing on a complete set of functions to offer a product that had outstanding performances for

the business segment. Another example is the Nokia N-Gage series, which focused on giving great performances on games but lacked other important features (the Nokia N-Gage Q lacked of both the photo camera and the mp3 player)<sup>45</sup>.

At the presentation made on January the 9th 2007, Steve Jobs introduced the iPhone as three different products in a single device: a phone, an mp3 player (an iPod) and an internet communication device. He says, and instinctively we would agree with him, “*Today Apple reinvents the phone*”.<sup>46</sup>

Jobs was an amazing communicator. But, as we have already seen in the first chapter, it was long ago that smartphones were able to perform these services and the iPhone was even behind its main competitors on many important dimensions for customers at that time. What was the difference then?

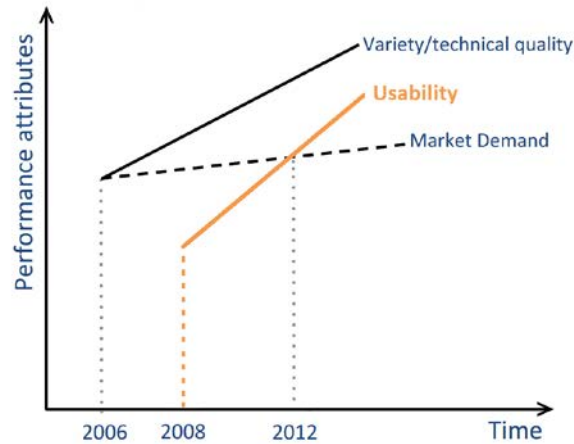
Apple realized that, more than innovating following the trajectory of variety and technical quality, it was important to innovate on the *usability trajectory*. The features named by Steve Jobs in the iPhone presentation were not breakthrough innovations at all. The thing that made the difference is that, with the iPhone, they became really easy to use. And it was not just a case.

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<sup>45</sup> Source: [www.puntocellulare.it](http://www.puntocellulare.it)

<sup>46</sup> Steve Jobs. (Jan. 2007). Extract from the video *Steve Jobs iPhone 2007 Presentation (Full HD)*. Retrieved from <http://www.youtube.com/watch?v=vn4u5fqrodq>

The introduction of the iPhone determined the shift from old generation smartphones to new generation ones.



**USABILITY:** It is the ease of use of anything that humans interact with. In the mobile industry it indicates how easy is to manage the device and all the range of services provided by it.

What I would like to demonstrate with the help of this graph is that the *usability trajectory* was not a complementary attribute of specific functions, but I identify it as a performance attribute *per se* that, according to Christensen's theory, met the latent customers' needs creating a new market.

What Apple decided to do was not to compete on the typical performance followed by the other players of the market. It decided, instead, to innovate following the "usability" performance trajectory.

Every single component, every process, has been considered and measured to make sure that it was truly usable and that it actually enhanced the user's experience.

Now, I will show how Apple strictly followed the *usability trajectory* for the creation and the development of both its device and its operating system and how it has been crucial for the company's success.



### 2.2.1 The Revolutionary User Interface, the Multi-Touch

There are two things that affect how easy-to-use a smartphone is, and they are the physical device and the software.

After the launch of the iPhone in 2007, a high quality multi-touch (or multitouch) screen became the benchmark for all device makers.

However, touchscreen and its evolution, the multi-touch, was not a new invention at all in 2007.

The multitouch pioneer Bill Buxton has made an interesting overview of multitouch history<sup>47</sup>.

In its study, Bill Buxton affirms that he and his group have been working on multitouch at the University of Toronto since 1984<sup>48</sup>. According to him, they were not the first and the multi-touch history could be dated back to at least 1982, and the use of the famous pinch gesture, dating back to 1983.

Buxton reports that the first multitouch screen was produced at Bell Labs in 1984. The screen was created by Bob Boie, and it *"used a transparent capacitive array of touch sensors overlaid on a CRT<sup>49</sup>".* The user could *"manipulate graphical objects with fingers with excellent response time"*.



DiamondTouch, 2001

In the twenty years following, many new technics for building multitouch displays have been experimented. Between others, there is the project called "Digital Desk" made by Xerox PARC in 1991, that used a projector and camera situated above an ordinary desk to track touches. Another creation was the multitouch table called

"DiamondTouch", made by Circle Twelve Inc. in 2001. Its distinctive capacity was that it was able to identify who was touching the screen thanks to a capacitive

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<sup>47</sup> Source: [www.billbuxton.com](http://www.billbuxton.com) (Buxton, 2013)

<sup>48</sup> Source: [www.billbuxton.com](http://www.billbuxton.com) (Lee, Buxton, & Smith, 1985)

<sup>49</sup> Cathode Ray Tube

coupling between a transmitter located in the touch surface and other receivers located in the chair of each user.<sup>50</sup>

At the same time the multitouch hardware was being improved, researchers were also refining the software that worked on it. One of the most important sectors of research was the development of a vocabulary of gestures for the best use of the hardware capacities. The project "Digital Desk" comprised of an application that re-sized images with a "pinch" gesture.<sup>51</sup>

In an article of 2003 ("**Multi-finger and whole hand gestural interaction techniques for multi-user tabletop displays**"), Mike Wu and Ravin Balakrishnan<sup>52</sup> describe a touchscreen system that included a "flick" gesture to send objects across different users around a table.

In 2006, in a famous TED conference<sup>53</sup>, the research scientist Jeff Han presented a number of multitouch applications and gestures that now are common in our

current smartphones. It was presented the "pinch" gesture to re-size and rotate photos, a multitouch keyboard and an interactive map that allowed the user to rotate and zoom within it.



Jazzmutant Lemur 2005

Multitouch devices began to be commercialized in 2004, when the firm Jazzmutant launched "Lemur", a music device that many consider the world's first commercial multitouch

product. It was marketed for more than \$2,000. Jeff Han started to commercialize his research in 2006, founding Perceptive Pixel in 2006. It focused on building large, high-end multitouch displays.

Also the DiamondTouch was launched in the market in 2006. According to Microsoft, the company has been working on multitouch technologies since 2001.

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<sup>50</sup> Source: [www.circletwelve.com](http://www.circletwelve.com) (Circletwelve Inc., n.d.)

<sup>51</sup> Source: [www.arstechnica.com](http://www.arstechnica.com) (Lee T. B., 2012)

<sup>52</sup> Wu, M., & Balakrishnan, R. (2003). *Multi-Finger And Whole Hand Gestural Interaction Techniques For Multi-User Tabletop Displays*. University of Toronto.

<sup>53</sup> TED (Technology, Entertainment, Design) is a global set of conferences owned by the private non-profit Sapling Foundation, under the slogan "ideas worth spreading".

In 2004, Microsoft announced Touchlight,<sup>54</sup> a multitouch technology using cameras and a rear projector.

In 2007, a few months after the iPhone was unveiled, Microsoft marketed “Microsoft Surface<sup>55</sup>”. It was a tabletop touchscreen system, which used a similar combination of display and cameras. It also used, as the Touchlight, dragging and pinching gestures to manipulate contents on the screen.



Microsoft's Touchlight in 2004 [Microsoft](#)

Another important company in the history of multitouch was Fingerworks, a US company founded by Wayne Westerman and John Elias in 1998, mainly known for a sophisticated multitouch input device, the TouchStream, particularly helpful for people suffering from RSI (Repetitive Stress Injuries). The company was acquired by Apple in 2005 and its influence has been crucial for the sophisticated multitouch capabilities of Mac trackpads and obviously for the advanced multitouch capabilities of the iPhone and then of the iPad.

Regarding the first touchscreen mobile phones, as I have already illustrated in the



IBM's Simon, introduced in 1993

first chapter, IBM is recognized as the company that launched the first smartphone in 1993, the Simon. It not only had many of the features we associate with current smartphones (such as a calendar, agenda, alarm clock, e-mail), but it is also widely considered as the first touchscreen phone. It was made with a black-and-white screen, lacked multitouch capabilities and needed the use of a stylus.

The Simon was not a big success, but, since then, touchscreen phones kept on improving.

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<sup>54</sup> Source: [www.research.microsoft.com](http://www.research.microsoft.com) (Wilson A. D., 2004)

<sup>55</sup> Source: [www.arstechnica.com](http://www.arstechnica.com) (Reimer, 2007)

Since the beginning of 2000s, phones started to be provided by colored screens, new applications and new features. They were still single-touch devices, and many of them required a stylus for inputs.

In the first quarter of 2005, the Neonode N1m was released<sup>56</sup>. It was one of the first phones to rely almost completely on software buttons as input. Even if it was not sophisticated as the iPhone, it supported similar swiping gestures in addition to individual taps.

From 2006, more sophisticated touchscreen interfaces began to appear.

In October, Synaptics unveiled the Onyx<sup>57</sup>, a touchscreen phone to recognize not only points and taps, but also shapes, complex gestures, and proximity to the user's finger or cheek



LG Prada in March 2007

In December 2006, LG announced the LG Prada<sup>58</sup>, beating the launch of the iPhone by nearly a month. The two devices shared several common features. In fact, they both relied on software buttons for most inputs, they provided a touch screen traditional keypad, they both included the ability to play music, a Web browser, a photo storage, email services, etc. However, the most important technological feature that they had in common was their capacitive touchscreens. Since then, in fact, smartphones relied on resistive touchscreens, which have completely different technological

fundamentals. In fact:

- ***“Resistive touchscreens work on the basis of pressure applied to the screen. A resistive screen consists of a number of layers. When the screen is pressed, the outer later is pushed onto the next layer — the technology senses that pressure is being applied and registers input. Resistive touchscreens are versatile as they can be operated with a finger, a fingernail, a stylus or any other object.”***<sup>59</sup>

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<sup>56</sup> Source: [www.gsmarena.com](http://www.gsmarena.com) (GSM Arena, n.d.)

<sup>57</sup> Source: [www.synaptics.com](http://www.synaptics.com) (Synaptics Inc., 2006)

<sup>58</sup> Source: [www.gsmhistory.com](http://www.gsmhistory.com) (Temple, May 2007)

<sup>59</sup> Source: [www.goodgearguide.com](http://www.goodgearguide.com) (Catanzariti, 2010)

- *“Capacitive touchscreens work by sensing the conductive properties of an object, usually the skin on your fingertip. A capacitive screen on a mobile phone or smartphone usually has a glass face and does not rely on pressure. This makes it more responsive than a resistive screen when it comes to gestures such as swiping and pinching. Capacitive touchscreens can only be touched with a finger, and will not respond to touches with a regular stylus, gloves or most other objects.”*<sup>60</sup>

Therefore, the honor of having launched in the market the first capacitive touchscreen smartphone is of the LG Company, even if just for nearly a month. In fact, when the iPhone was finally announced in January 2007, LG accused Apple of copying its design<sup>61</sup> saying that Apple only designed the iPhone after seeing pictures of the Prada phone the previous September, when the company disclosed its product in order to compete for an IF Design Award (which it won). The accusation did not however hold much credibility.

Despite a history of over twenty-five years, it was with the Apple launch of the iPhone in 2007 that people started to use or even hear about multi-touch technology.

What is weird of this story is that it followed a very similar path of the *mouse* input device<sup>62</sup>. Even the mouse, in fact, took around twenty years between when it was invented by Engwlbart and English in 1965<sup>63</sup> to when it hit its tipping point. What it is still more peculiar in this story is that the mouse remained relatively obscure until Apple adopted it in its Macintosh 128K in 1984.

As Steve Jobs states in his well-known iPhone presentation in 2007, in APPLE history **“Revolutionary User Interfaces”** had always been crucial for the pioneering products of the company: the **mouse** for the Mac (1985), the **click wheel** for the iPod (2001) and **“multi-touch”** for the iPhone (2007).

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<sup>60</sup> Source: [www.goodgearchive.com](http://www.goodgearchive.com) (Catanzariti, 2010)

<sup>61</sup> Source: [www.techdirt.com](http://www.techdirt.com) (Weisenthal, 2007)

<sup>62</sup> Source: [www.billbuxton.com](http://www.billbuxton.com) (Buxton, 2013)

<sup>63</sup> Source: [www.inventors.about.com](http://www.inventors.about.com) (Bellis, 2013)



In the same presentation, Steve Jobs declared, "*We have invented a new technology called Multi-touch*", and describe this “new” technology with specific attributes:

- Works like magic
- No stylus→FINGERS
- Far more accurate than any other touchscreen in the market
- Ignores unintended touches
- Multifinger gestures
- Patented

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<sup>64</sup> Image Source: Extract from the video *Steve Jobs iPhone 2007 Presentation (Full HD)*. Retrieved from <http://www.youtube.com/watch?v=vn4u5fqrodq>



The attributes highlighted by Steve Jobs have all a tremendous communication impact. However, at this point of the chapter, we all know, supported by history, that the multi-touch technology was *not* invented by Apple. We can confidently say that Steve Jobs said a “white lie”.

But let’s have a look at the last attribute that he gave to multi-touch: “patented”. Was it also a “white lie”? Not at all! Apple was able to patent more than twenty patents that are crucial pillars for the current Apple success.

At this point, a question arises spontaneously: How could a company, whose product was invented nearly twenty-five years after the first multi-touch product, patents more than 20 claims related to that technology, which still perfectly hold and are key components of the company’s success?

In order to answer this question, we can have a look at the following extract from the patent application “US 7479949 B2”, also known as the “Steve Jobs’ Multi-touch Patent”.

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<sup>65</sup> Image Source: Extract from the video *Steve Jobs iPhone 2007 Presentation (Full HD)*. Retrieved from <http://www.youtube.com/watch?v=vn4u5fqrodq>



## **Touch screen device, method, and graphical user interface for determining commands by applying heuristics**

US 7479949 B2

### **ABSTRACT**

A computer-implemented method for use in conjunction with a computing device with a touch screen display comprises: detecting one or more finger contacts with the touch screen display, applying one or more heuristics to the one or more finger contacts to determine a command for the device, and processing the command. The one or more heuristics comprise: a heuristic for determining that the one or more finger contacts correspond to a one-dimensional vertical screen scrolling command, a heuristic for determining that the one or more finger contacts correspond to a two-dimensional screen translation command, and a heuristic for determining that the one or more finger contacts correspond to a command to transition from displaying a respective item in a set of items to displaying a next item in the set of items.

### **TECHNICAL FIELD**

The disclosed embodiments relate generally to electronic devices with touch screen displays, and more particularly, to electronic devices that apply heuristics to detected user gestures on a touch screen display to determine commands.

### **BACKGROUND**

As portable electronic devices become more compact, and the number of functions performed by a given device increase, it has become a significant challenge to design a user interface that allows users to easily interact with a multifunction device. This challenge is particularly significant for handheld portable devices, which have much smaller screens than desktop or laptop computers. This situation is unfortunate because the user interface is the gateway through which users receive not only content but also responses to user actions or behaviors, including user attempts to access a device's features, tools, and functions. Some portable communication devices (e.g., mobile telephones, sometimes called mobile phones, cell phones, cellular telephones, and the like) have resorted to adding more pushbuttons, increasing the density of push buttons, overloading the functions of pushbuttons, or using complex menu systems to allow a user to access, store and manipulate data. These conventional user interfaces often result in complicated key sequences and menu hierarchies that must be memorized by the user.

Many conventional user interfaces, such as those that include physical pushbuttons, are also inflexible. This may prevent a user interface from being configured and/or adapted by either an application running on the portable device or by users. When coupled with the time consuming requirement to memorize multiple key sequences and menu hierarchies, and the difficulty in activating a desired pushbutton, such inflexibility is frustrating to most users.

To avoid problems associated with pushbuttons and complex menu systems, portable electronic devices may use touch screen displays that detect user gestures on the touch screen and translate detected gestures into commands to be performed.

However, user gestures may be imprecise; a particular gesture may only roughly correspond to a desired command. Other devices with touch screen displays, such as desktop computers with touch screen displays, also may have difficulties translating imprecise gestures into desired commands.

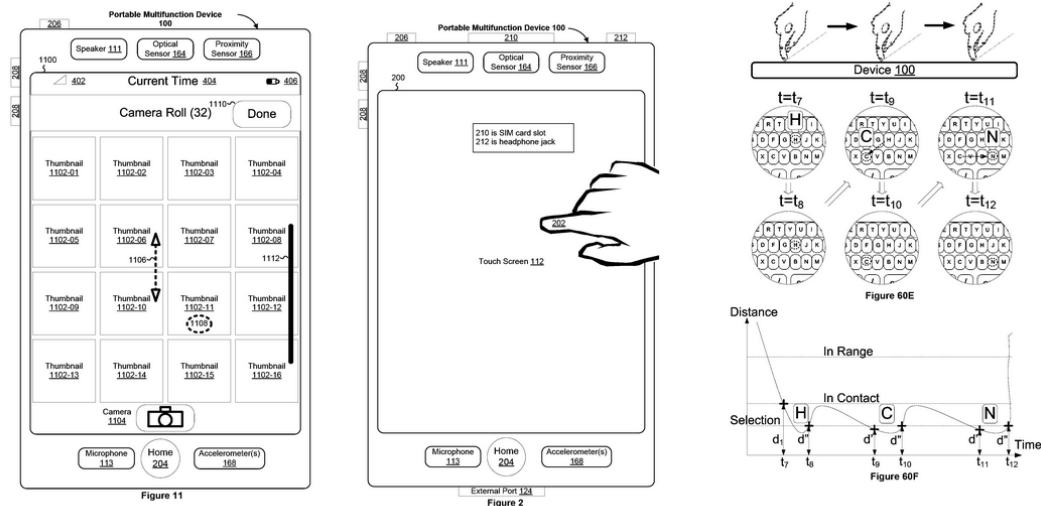
Accordingly, there is a need for touch-screen-display electronic devices with more transparent and intuitive user interfaces for translating imprecise user gestures into precise, intended commands that are easy to use, configure, and/or adapt. Such interfaces increase the effectiveness, efficiency and user satisfaction with portable multifunction devices.

Source: <https://www.google.com/patents/US7479949> (Brevetto n. US7479949 B2, 2008)



As we can see above, the patent title is “Touch screen device, method, and graphical user interface for determining commands by applying heuristics”.

Specifically the “multi-touch patent” protects many gestures that are globally adopted in most of the current on capacitive touchscreen smartphones, such as the “swipe to scroll”, the “pinch to zoom”, the virtual keyboard, etc.



The right to "scroll", "swipe", and type on a modern touch screen are all owned by Apple.

As we have already seen and as Jason Mick evidence in an article for “Dailytech”<sup>66</sup>, “multi-touch and heuristics for detected angular swipes were available on older resistive touch screens. However, modern phones don't use resistive touch, but they use capacitive multi-touch and the current state of U.S. technology patents allows you to repatent virtually identical firmware on a new kind of hardware.”

All the claims filed by Apple in its patent are related to the capacitive multi-touch technology and all of them cover functional aspects of multi-touch screens and interactive functions between users and multi-touch screen. They are all related, in fact, to the implementation of multi-touch in user interfaces that, as stated in the patent itself, “increase the effectiveness, efficiency and user satisfaction with portable multifunction devices”.

<sup>66</sup> Source: <http://www.dailytech.com> (Mick, 2013 )

We can depict, from all these claims, a fundamental point for my analysis on the “*usability trajectory*”. Apple, in fact, was able to create and protect real “**usability innovations**”. The power and influence of these usability innovations are the proof of the impact that the *usability trajectory* had in Apple success.

Now we can answer the question raised before, “How could a company, whose product was invented nearly twenty-five years after the first multi-touch creation, patent more than 20 claims related to that technology that still perfectly hold and are key components of the company’s success?”

The intrinsic answer that Apple would give us would be: innovate following the “usability trajectory”, create your own “usability innovations” and finally protect them.

Therefore, as we have seen, the multi-touch was that “Revolutionary User Interface” that enabled the iPhone to fully exploit its second important component, which is the **operating system (OS)**, the well-known iOS.<sup>67</sup>

### ***2.2.2 The Operating System and the Apple Integrated Approach***

The iPhone Operating System was, since its introduction, a well-designed software perfectly respondent to touch inputs. However, the innovation of the Apple operating system goes much beyond that.

In the official biography of Steve Jobs<sup>68</sup>, the author Walter Isaacson writes, “*He believed that for a computer to be truly great, its hardware and its software had to be tightly linked. When a computer was open to running software that also worked on other computers, it would end up sacrificing some functionality. The best products, he believed, were “whole widgets” that were designed end-to-end, with the software closely tailored to the hardware and vice versa*”<sup>69</sup>. According to the book, it was a “*philosophical component, one that was related to his penchant for control*”. This idea has encompassed the whole business life of the Apple

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<sup>67</sup> Initially the OS was called “iPhone OS” changing the name to iOS only with the release of iOS 4 in 2010.

<sup>68</sup> Isaacson, W. (2011). *Steve Jobs - by Walter Isaacson* . Simon & Schuster. (Isaacson, 2011)

<sup>69</sup> Source: Isaacson, W. (2011). *Steve Jobs - by Walter Isaacson* . Simon & Schuster. p. 137

company, since the first Macintosh through the iPod, the iPhone and the iPad, and it also characterizes, today, the tight control of the App Store.

Steve Jobs strictly followed a famous quote of Alan Key, *“People who are really serious about software should make their own hardware.”*

This strong integrated approach enabled the company to create a perfect integrated product, in which touchscreen and operating systems perfectly worked together. *“Every single component, every process, has been considered and measured to make sure that it was truly useful and that it actually enhanced the user’s experience.”*<sup>70</sup>

It is, not only another evident example of how Apple innovated following the *usability trajectory*, but also another determinant component that drove the iPhone to its initial success. In fact, even if the original iPhone was well behind the competition on a strict feature-by-feature comparison, when it came to actual usability, there was no contest.

As the Verge staff suggest in the article, *“iOS: A visual history”*<sup>71</sup>, there are specific areas on which the perfect integration between hardware and software became revolutionary for the mobile industry:

The core iOS user interface. Apple carefully coupled the new hardware capability of its capacitive touchscreen to a new user interaction model that was much simpler and user-friendly than systems that had come before it. The speed and “directness” of the first version of the iOS was astonishing at that time. The “swipe to scroll” and the “pinch to zoom” gestures, together with the virtual keyboard, had no precedents in terms of sensibility and precision.

In addition, they removed all the physical buttons (except for the “home” button), making the touchscreen the only interaction way between user and device. *“The problem of other smartphone was the keyboard. It doesn’t work because “buttons and controls can’t change”. They can’t change for each application, they can’t change if you have a new great idea you wanna add to this product”*<sup>72</sup>.

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<sup>70</sup> Jony Ive. (Sep. 2013). Extract from the video *Introducing iPhone 5*. Retrieved from <http://www.youtube.com/watch?v=xNsGNiDb6xY>

<sup>71</sup> Source: [www.theverge.com](http://www.theverge.com) (Bohn & Aaron, 2013)

<sup>72</sup> Steve Jobs. (Jan. 2007). Extract from the video *Steve Jobs iPhone 2007 Presentation (Full HD)*. Retrieved from <http://www.youtube.com/watch?v=vn4u5fqrodq>

The web browser. “Safari” was the first mobile internet browser that let users feel as using a normal desktop browser. While the other mobile operating systems were used to reformat and reshape the typical desktop web pages, the iPhone mobile Safari presented complete and full web pages. This, coupled with a very wide screen (thanks to the removal of the physical buttons) and the simple zoom and scrolling gestures, gave to users a complete and revolutionary mobile internet experience. *“It let us create desktop class applications and networking, not the crippled stuff you find on most phones. These are real desktop applications [...]. So we're bringing breakthrough software to a mobile device for the first time”*<sup>73</sup>.

The touchscreen and widescreen iPod. Apple used its success coming from the iTunes and iPod ecosystem to provide a driving force for the iPhone launch. The scrolling gesture in fact, enhanced the usability of all the typical functions of an iPod, making the iPhone, de facto, the best iPod produced at that time. Moreover, Apple made the synchronization of iTunes users’ profiles as easy as possible. Just setting the iTunes credentials in the iPhone, in fact, the user could transfer all its music and videos of their previous iPods in their new product.

The first version of iOS also brought a few other apps and features that have been enhanced by the perfect integration software-hardware.

The software keyboard. It was perfectly respondent to touch inputs and was the first keyboard truly usable with fingers. Moreover, iOS gave the users the possibility to hide the keyboard when they needed more screen space for reading.

The “Google Maps” application. It offered, thanks to the new pinch-to-zoom functionality, a radical new experience to users. It became unquestionably better than any other operating system of that time and was even more natural and intuitive than desktop mapping software.

The visual voicemail. It abled users to jump directly from a voicemail to another, permitting them to avoid listening to all of them.

In addition, Apple decided to hide the file system from the users. It completely changed a smartphone tradition. It was a hardly discussed decision that, nonetheless, helped consistently to simplify and make more user-friendly the

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<sup>73</sup> Steve Jobs. (Jan. 2007). Extract from the video *Steve Jobs iPhone 2007 Presentation (Full HD)*. Retrieved from <http://www.youtube.com/watch?v=vn4u5fqrodq>

device. In addition, the “home” button (the only available button on the front of the iPhone), was an essential component for increasing the easiness of using the product, allowing the users to go back to the home screen from wherever they were.

All these features are an example that also the operating system was completely shaped by the Apple “usability” philosophy. The company, in fact, was able to take complicated features, that other companies were not able to offer without stressing and bothering the users, and simplify them to the point of invisibility. All the above mentioned capabilities of the iPhone were astonishing from a pure “usability” point of view. However, there were some shortcomings in the original iPhone OS, such as the absence of multi-task capability (except for the music abled in background) and, much more important, the inability to support third party apps.

These deficiencies have been perfectly resolved in the iPhone future updates, beginning in September 2007, just some months after the initial launch of the product.

The first software update that Apple released was notable primarily because it established continuous future updates of the iOS with new versions and new features. Moreover, those updates would have been offered across as much devices of the iOS product line as possible. In addition, in this case the integrated approach enabled the company to facilitate the update processes.

In the following update, in January 2008, the most important point was the introduction of iTunes Wi-Fi Music Store, which allowed users to buy music directly on their phones. This was a turning point for the success of the iPhone. Verge Staff, in the article “iOS - A visual history”<sup>74</sup>, wrote, *“I distinctly remember at the time that the general feeling around the iPhone was a mix of impatience and excitement: impatience because we could clearly see the unfulfilled potential of the iOS platform and excitement because we had already learned by then that Apple was capable of pushing out regular feature updates.*

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<sup>74</sup> Source: [www.theverge.com](http://www.theverge.com) (Bohn & Aaron, 2013)

*Around this time, each new feature that came to iOS was met with a "finally!" because so many of them were obviously lacking and because Apple had demonstrated an ability to deliver. Native apps weren't on iOS yet, but everybody seemed to know they were coming, and soon."*

In July 2008, the next “finally” moment arrived. Apple introduced the App Store. The revolution that came from the App Store has an absolutely similar nature of the other Apple “usability innovations”. Downloading third party apps in a smartphone, in fact, was not new at all. Nonetheless, Apple was able to create a system for developing, searching and downloading apps so astonishingly “usable” that let people feel as it was a complete brand new concept.

In this case, the *usability trajectory* has been strictly followed in two specific ways, that is facilitating downloads for users and facilitating the creation of applications for developers:

Facilitating app downloads: Apple leveraged on its already established base of iTunes music customers. The company allowed those customers to utilize the same user accounts of iTunes, and this allowed them not to re-enter their credit card information needed to make purchases. In addition to that, searching and installing apps became much easier than ever before (just clicking the app and entering a password) and apps quickly became impulse purchases.

Facilitating app creation: Apple provided developers with a sensational software development kit (SDK).

Thanks to this, developers were able to create much more functional apps that were better looking, more advanced, and much easier and faster to program than any other competitor’s platform.

The App Store could be considered, de facto, as the bridge that Apple created to connect its innovative product to its innovative strategy. The birth of the App Store, in fact, is the crucial momentum in which Apple created the other fundamental part of its disruptive innovation: a new business model that marked the birth of the Application Ecosystem. It will be the subject of the following chapter.

I will now summarize the main points of my study in order to provide a clear picture of what drove me in considering the iPhone as a *disruptive innovation*.

The first thing that I demonstrated is **that the iPhone was not a “sustaining innovation”**, contrarily to what Christensen affirms in 2007, (“*The iPhone is a sustaining technology relative to Nokia. In other words, Apple is leaping ahead on the sustaining curve [by building a better phone]*”). I demonstrated in fact, that the iPhone was absolutely behind its main competitors on many of the most important parameters for smartphones at that time, and so Apple was absolutely not “building a better phone”.

**But was the iPhone a “disruptive innovation”? My answer is a soundly yes. I**

have demonstrated it following the guidelines given by Christensen. In his paper “Disruptive Technologies: Catching the Wave” (1995)<sup>75</sup>, Christensen, describing disruptive innovations, states: “*The technological changes that damage established companies are usually not radically new or difficult from a technological point of view. They do, however, have two important characteristics: First, they typically present a different package of performance attributes – ones that, at least at the outset, are not valued by existing customers. Second, the performance attributes that existing customers do value improve at a such rapid rate that the new technology can later invade those of the established market. Only at this point will mainstream customers want the technology. Unfortunately for the established suppliers, by then it is often too late: the pioneers of the new technology dominate the market.*”

What I have illustrated is that the iPhone perfectly comply with those main characteristics of a disruptive innovation described by Christensen. The iPhone, in fact:

1) *Introduced a consistent change in performance attributes:*

I demonstrated that Apple decided not to innovate on those performance attributes on which its competitors were focused on, but to innovate following what I called the “usability trajectory”. I have also shown how this “usability” performance

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<sup>75</sup> Bower, J. L., & Christensen, C. (1995, January-February). Disruptive Technologies: Catching the Wave. *Harvard Business Review*. p. 44

attribute encompassed the creation of the hardware, the software and the App Store of the iPhone.

2) Was Not radically new or difficult from a technological point of view:

I illustrated the multi-touch history, evidencing that the multi-touch technology could be dated back to 1982. However, Apple, in 2007, was able to patent several important “usability innovations” that continue to be crucial for the current company’s success (in October 2013 Apple’s multi-touch “Steve Jobs patent” has been validated in full by USPTO).

I also underlined that the concept of “innovating along the usability trajectory” has been strictly followed by Apple also for the creation of the operating system of the iPhone. For the first time a “mobile phone” was able to offer desktop applications and enjoyable services. The other companies of the industry were not able to provide similar services because their applications were not sufficiently “usable”.

Finally, I affirmed that “usability” was also the crucial performance attribute on which Apple created its App Store. Downloading third party apps in a smartphone, in fact, was not a novel thing at all. Nonetheless, Apple was able to create a system for developing, searching and downloading apps so astonishingly “usable” that let people feel as it was a brand new concept. It was the birth of a new business model and the birth of the App Ecosystem.

Putting all the pieces together, I demonstrated that Apple, innovating following the *usability trajectory* in both the hardware, the operating system and the creation of the App Store, gave birth to the iPhone, a disruptive innovation able to narrow the boundaries between product innovation and strategy innovation.

The birth of the iPhone was able to reshape the paradigms of an entire industry, creating new standards for hardware design, software capabilities and business models.

### 2.3 THE IPHONE: THE *CONPOSITIO DESIDERATA*

At this point of this second chapter what is clear is that Apple was able to create a product that we can confidently define as a “composition of elements that is



widely desired”. This is, according to the theory of Nicholas Argyres, Lyda Bigelow and Jack A. Nickerson<sup>76</sup>, the perfect definition of what they call the “*conpositio desiderata*” of an industry.

The crucial point of the theory is that often it is not the establishment of a dominant design that leads to the shakeout of an industry, but it is the birth of a *conpositio desiderata*.

As the authors state in their work, “*Period of increased exit rates, which is coincident with other firm-level phenomena such as strategic repositioning, often occurs long before a product design or architecture becomes established as dominant in the sense that it accounts for a majority of new product sales in an industry. We thus argue that such periods are in many cases initiated not when a large number of firms in the industry begin producing products based on the same basic design and competing on economies of scale, as dominant design theories suggest. Instead, these periods are initiated by the introduction of a new design by single, pioneering firm: a design that combines product elements in a novel way that immediately sparks a surge in unanticipated demand for that product. We call such a new product or service a conpositio desiderata: a composition of elements that is widely desired.*”<sup>77</sup>

Furthermore, the theory states “*the introduction of a conpositio desiderata acts as an information shock about demand because it represents a combination of product, including price, and service features that stimulates a substantial surge and acceleration in demand for the design but was generally unexpected by market participants [...]. The specific configuration of attributes might include radical or incremental innovations, and it might include attributes developed in-house or by other firms. The critical factor that identifies the conpositio desiderata is not the innovation per se but instead that the composition of*

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<sup>76</sup> Argyres, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University.

<sup>77</sup> Argyres, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University. p. 3

*elements is novel, and generates an unexpected, rapid increase in demand for the product or service that surprises rivals and potential competitors.”*<sup>78</sup>

I see in these words the perfect description of what the iPhone has been for the mobile industry: a novel composition of elements that met the latent needs of customers.

As a matter of fact, the “usability innovations” that the iPhone delivered, both in its hardware and in its software, perfectly met the principal “latent” need of the smartphone and non-smartphone users at that time: the true usability of all the features of a smartphone. Smartphones, in fact, were already in the market in 2007, but they were still a niche product. People did not realize the potentials of the product until the iPhone opened up their eyes. As Steve Jobs stated in an interview 1985<sup>79</sup>, “A lot of times, people don't know what they want until you show it to them.” The “usability” performance trajectory has been always followed by Steve Jobs and the Apple Company and it was the main determinant for the company’s historical ability to create more than one “*compositio desiderata*” during its business life (Mac, iPod, iPhone, iPad).

Another important point of Argyres, Bigelow and Nickerson theory is that, because it is the *compositio desiderata*, and not the dominant design, that shakes the industry, firms can have some time to react. What the authors suggest is that the introduction of a composition desiderata creates what they call “the follower’s dilemma”, for both competitors and new entrants. Specifically, four potential “strategic responses” are possible, that are imitation, repositioning, exit and entry. In the last chapter of my thesis, I will describe more deeply this strategic moves and see if, and how, they have been followed by the main players of the mobile industry after the iPhone entered the market.

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<sup>78</sup> Argyres, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Compositio Desiderata, and The Follower’s Dilemma*. Washington University. p. 9-10

<sup>79</sup> Steve Jobs. (1985). Extract from the interview *Playboy Interview With Steve Jobs*. Retrieved from <http://www.scribd.com/doc/43945579/Playboy-Interview-With-Steve-Jobs>

Summing up, in this chapter I identified the iPhone, according to specific innovation and business strategy theories, as the *disruptive innovation* and the *compositio desiderata* of the mobile phone industry. In the next chapter, I will describe how Apple was able to leverage *on an innovative product to build an innovative strategy*.

### **CHAPTER 3 – FROM AN INNOVATIVE PRODUCT TO AN INNOVATIVE STRATEGY**

In his sequel with Michael E Raynor, “*The Innovator's Solution*”<sup>80</sup> Christensen replaced the term *disruptive technology* with *disruptive innovation*. They recognized that few technologies are intrinsically disruptive or sustaining in character while, indeed, it is the *business model* that the technology enables that creates the disruptive impact.

My idea regarding the iPhone follows exactly this statement. Even if the iPhone completely reshaped the smartphone standards on both the hardware and software concepts, the transformative impact that its App Store has had in the world economy has been ever more astonishing. The entire business world has been shocked.

In November 2007, Time Magazine declared the iPhone the “Invention of the Year”, stating the significant expression, “*It’s not a phone, it’s a platform*”.<sup>81</sup>

As stated by Brian Patrick Eha, “thanks to Apple's innovation, the way we think about product sales and delivery, about marketing and customer loyalty, and about what a hot new startup looks like will never be the same”<sup>82</sup>. As we have seen in the first chapter, it gave birth to the App Economy.

In this chapter, I will try to describe the innovative strategy that Apple was able to build leveraging on its innovative product. I will show how Apple, perfectly following, consciously or unconsciously, theories of business strategy and

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<sup>80</sup> Christensen, C., & Raynor, M. E. (2003). *The Innovator's Solution: Creating and Sustaining Successful Growth*. Harvard Business Press.

<sup>81</sup> Source: [www.content.time.com](http://www.content.time.com) (Grossman, 2007)

<sup>82</sup> Source: [www.entrepreneur.com](http://www.entrepreneur.com) (Eha, 2013)

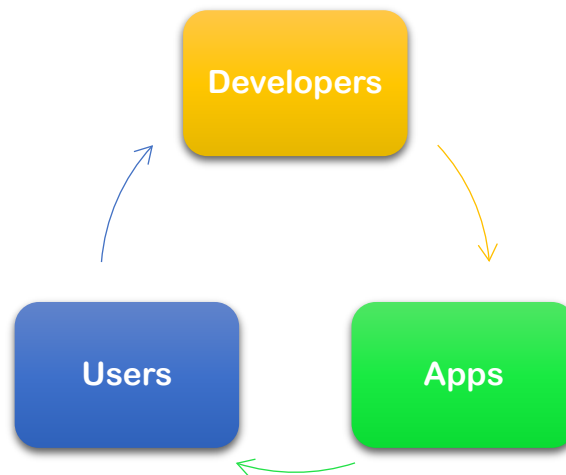
innovation literature, has been able to introduce a new business model paradigm in the industry that lead the company to its current success.

### 3.1 THE APPLICATION ECOSYSTEM: THE VIRTUOUS CYCLE

As I have illustrated in the first chapter, the operating system developers have always been part of the smartphone ecosystem, but in very different ways, depending on the nature of the platform they worked with. We have seen that in the mobile phone industry history, three kinds of platforms have taken place:

- *Software platforms*, which was used for building multiple variations of products, with maximum reuse of the platform technology. There were not network effects. An example of this is the widely known Symbian O.S., the one upon which Nokia built its success;
- *Communication platforms*, aimed at creating connection among users. This is the case of the latest Blackberry, developed in-house, operating systems;
- *Application Platform*. A system where not only users interact with other users, or developers with other developers. The strongest interaction, in fact, is between users and developers, two players that barely got in touch in the former platforms. IOS is the first master example of this kind of mobile platform.

The strong point of this kind of platform is that it creates a **new ecosystem** of consumers, enterprises, developers and businesses investing in or supporting the ecosystem (e.g. handset makers, operators, platform vendors). The main driver of this new ecosystem is, indeed, the users-developers interaction. As I already stated in the first chapter, this relation creates the strong **network effects** necessary for the success of the platform. From the end-user perspective, each new application adds value to the platform and, from the application developer perspective, each new user adds value to the platform. When the number of developers, apps and users reach a **critical mass**, a virtuous cycle begins, letting the platform start to grow exponentially.

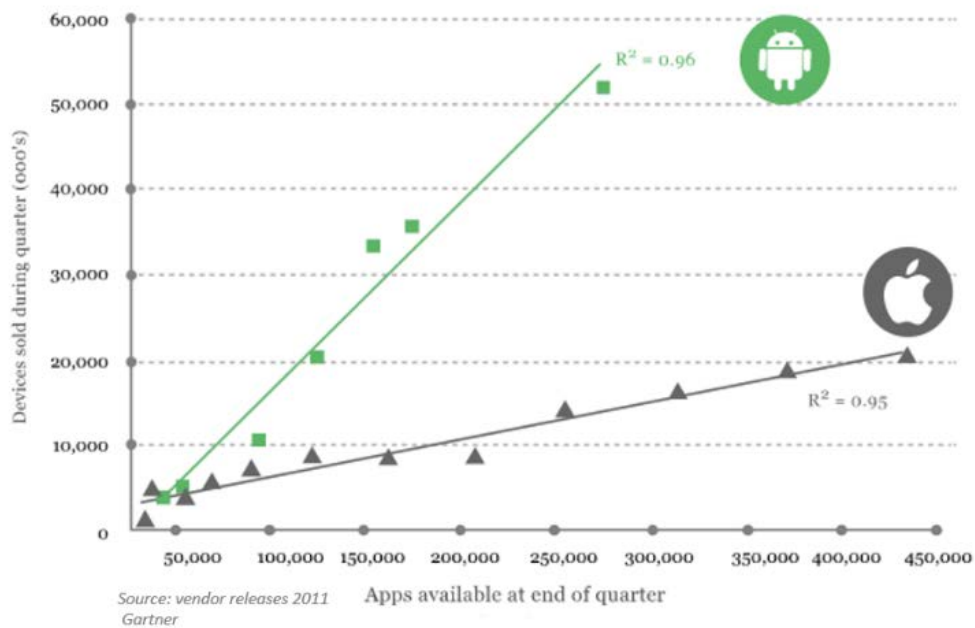


IOS was so successful in setting a benchmark, that all new platforms introduced after the original iPhone attempt to copy Apple's application platform recipe. Some succeed, such as Android. Some others failed. The tight correlation between number of apps available (the platform attractiveness to users) and device shipments (the platform attractiveness to developers) is consistent with Android and iOS being successful application platforms. The next graph<sup>83</sup> shows in fact that, in the three years after the release of the App Store and the Android Market, a strong positive direct relationship existed between the number of apps available on these two platforms at a particular point in time and the number of devices shipped for that platform in the quarter just preceding it.

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<sup>83</sup> The following three graphs, even if constructed about two years ago, still gives the reader a clear image of the crucial relationship between number of apps available and device shipments after a platform achieves the critical mass.

### Is there really a relation between applications and sales?



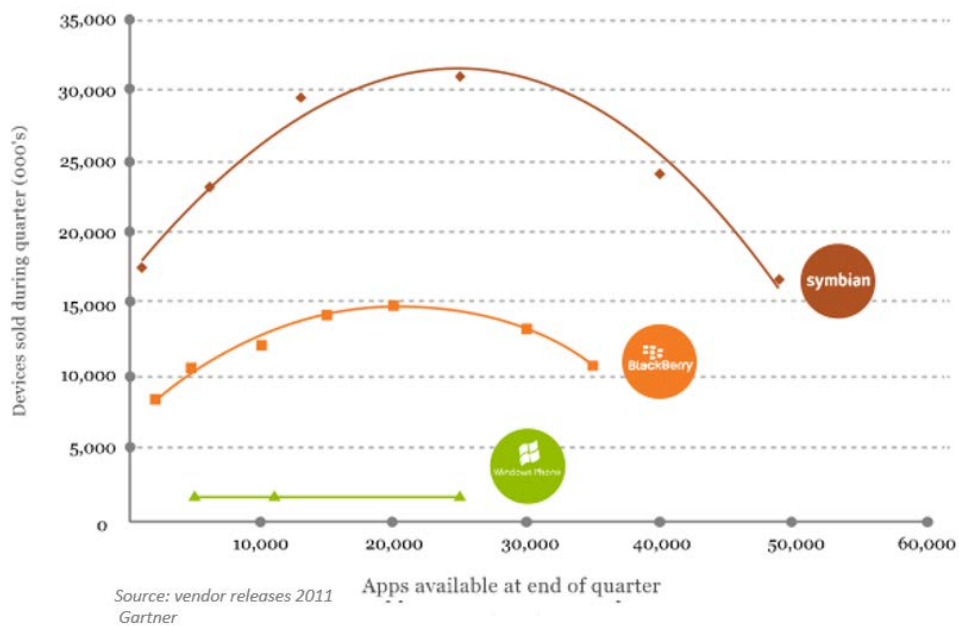
84

IOS and Android are, indeed, the two successful examples of application platforms in the smartphone industry: both application platforms offer users a broad selection of applications for different customers' needs, connecting developers and content providers to a vast audience of platform users.

On the other hand, if we plotted Blackberry, Symbian and Windows Phone on a similar graph we cannot depict the same direct positive relationship between number of apps and device shipments.

<sup>84</sup> Image source: VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*. 22

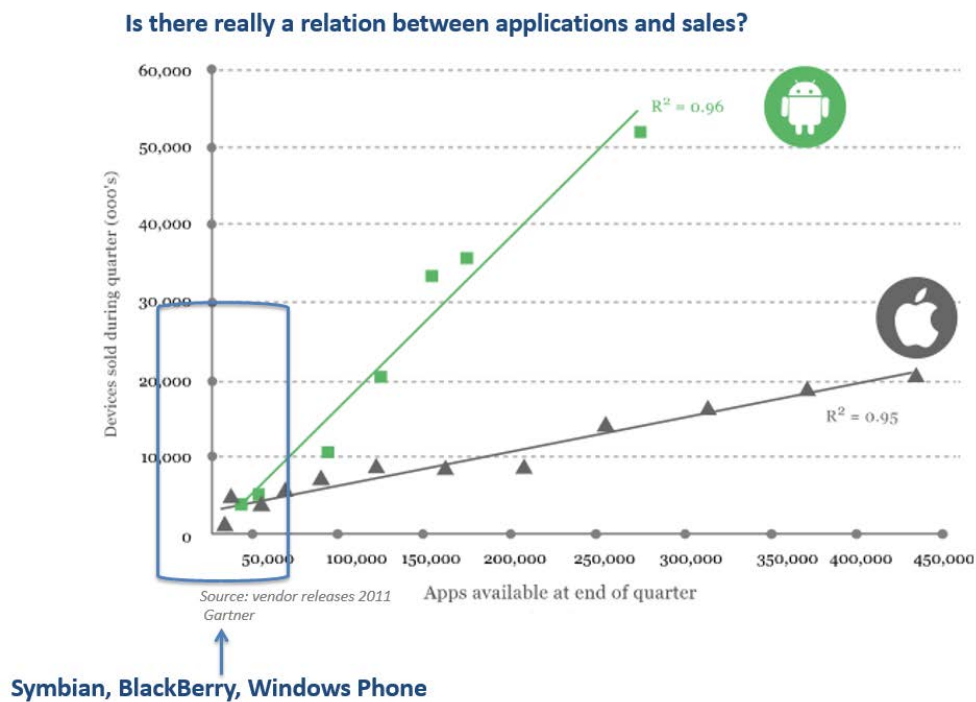
### Is there really a relation between applications and sales?



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The reason, as pointed out before, is the lack of a sufficient base of developers/users interaction: the lack of a **critical mass**. That mass that does not allow a platform to grow and to gain control over the ecosystem.

<sup>85</sup> Image source: VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*, p.23



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Therefore, it is evident that success in application platforms is based on the ability of a company to reach a critical mass to achieve all those previously mentioned positive “network effects”. However, how could a platform reach that “critical mass”, that is a sufficient base of both users and developers?

It is clear that, in absolute terms, a platform begins to be adopted only if there are applications to offer to users (the App Store was launched with more than 500 applications, of which 25% were free.)<sup>87</sup>. Therefore, it is evident that developers drive adoption of an application platform. A platform is only as successful as the developers in building apps. Therefore, the following question arises: How can a platform push developers in writing apps for it?

Of course, a platform can pay developers. It could be a reasonable idea, especially for later entrants with the intention to lower the *switching costs* of developers and attract them to use their platform (it is a practice that Microsoft is partially doing to attract developers for Windows Phone). However, this practice alone would not last long or would have limited effects.

Besides this, a platform must find the right business model that enables the

<sup>86</sup> Image data source: VisionMobile Ltd. (Nov.2011). *Mobile Platforms: The Clash of Ecosystems*

<sup>87</sup> Source: [www.engadget.com](http://www.engadget.com) (Ricker, 2008 )



platform to create value also from outside its boundaries and captures value for the entire system.

It is exactly what Apple did. It gave birth to the App Ecosystem by introducing, in the smartphone industry, a business model new to that industry.

According to literature, we can call it a “platform-based open innovation business model”.

### 3.2 THE PLATFORM-BASED OPEN INNOVATION BUSINESS MODEL: THE BRIDGE BETWEEN VALUE CREATION AND VALUE CAPTURE

I will start describing what a “platform-based open innovation business model” is, beginning from the definitions of **platform**, **open innovation** and **business model**. Then, following an interesting dissertation made by Michael Seminer in 2009<sup>88</sup>, I will give a description of a **platform-based open innovation business model**.

#### 3.2.1 *The Platform*

A review of the literature suggests that product platforms have been defined diversely, ranging from extremely technical and product/industry specific definitions to abstract and generic concepts that try to encompass different industries and innovation processes.

For my purposes, I will follow the clear definition made by Moreno Muffatto and Marco Roveda in 2002<sup>89</sup>, “a product platform is a set of subsystems and interfaces intentionally planned and developed to form a common structure from which a stream of derivative products can be efficiently developed and produced”. Regarding the mobile industry, as pointed out in the first chapter, the mobile operating system is the platform on top of which other programs can run on mobile devices.

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<sup>88</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series.

<sup>89</sup> Muffatto, M., & Roveda, M. (2002). *Product Architecture and Platforms: a Conceptual*. University of Padua.

The operating system is responsible for determining the functions and features available on your device, such as thumbwheel, keyboards, WAP, synchronization with applications, email, text messaging and more.

Many platforms are closed to outside developers. The open innovation paradigm assumes that some degree of outside innovation is being permitted to flow into the platform from outside sources (i.e. third parties' apps).

### **3.2.2 The Open Innovation Paradigm**

“Open innovation” is a term promoted by Henry Chesbrough<sup>90</sup>, a professor and executive director at the Center for Open Innovation at the University of California, Berkeley, in his book, *“Open Innovation: The new imperative for creating and profiting from technology”*.

*“Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology. Open Innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model”*.<sup>91</sup> A more recent definition by Prof. Chesbrough is:

*“Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology.”*<sup>92</sup>

The central idea behind open innovation is that, in a world of widely distributed knowledge, in which the boundaries between a firm and its external environment have become more porous, companies cannot afford to rely entirely on their own research. A company, instead, should allow a more fluid interaction between internal and external innovations activities letting ideas, people and resources flow in, around and out of an organization.

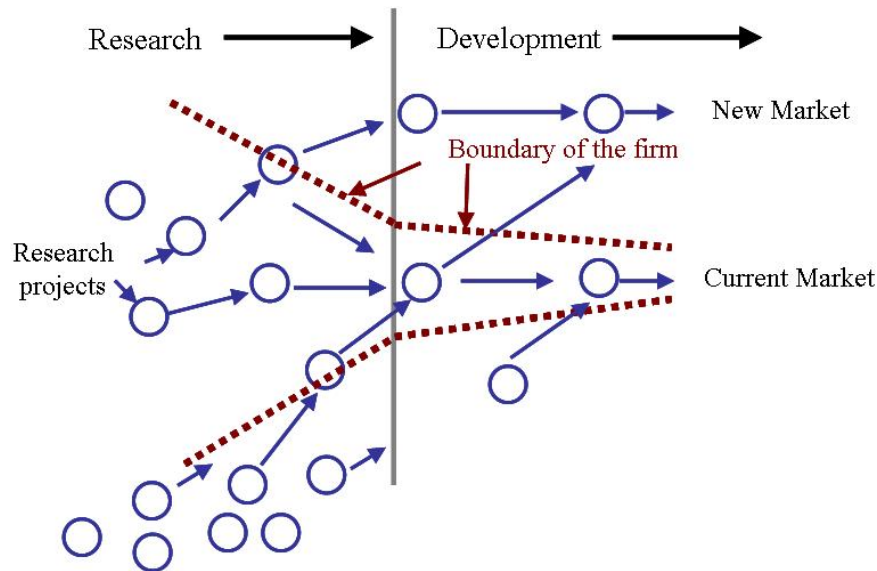
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<sup>90</sup> Source: [www.en.wikipedia.org](http://www.en.wikipedia.org)

<sup>91</sup> Chesbrough, H. W. (2003). *Open Innovation: The new imperative for creating and profiting from technology*. Harvard Business School Press. p. xxiv

<sup>92</sup> Chesbrough, H. W., Chesbrough, H. W., Vanhaverbeke, W., & West, J. (2006). *Open Innovation: Researching a New Paradigm*. Oxford University Press p. 2

A firm should buy or license processes or inventions (i.e. patents) from other companies, and internal inventions used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures or spin-offs).<sup>[3]</sup>



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The paradigm differs from closed models in its will to gain ideas and knowledge also from beyond the boundaries of the company.

The real challenge for companies interested in open innovation strategies is finding right ways to profit from this new value creation pattern. They must balance, in fact, the needs of the outside innovators with the internal need of value capture.

### 3.2.3 The Business Model

*“A business model describes the rationale of how an organization creates, delivers and captures value”*<sup>94</sup>. A business model describes the design or architecture of the value creation, delivery, and capture mechanisms that a

<sup>93</sup> Image source: [www.crowdsourcing.org](http://www.crowdsourcing.org) (Root, 2012)

<sup>94</sup> Osterwalder, A., & Pigneur, Y. (2010). *“Business Model Generation”*. John Wiley & Sons Inc. p.14

business enterprise, explicitly or implicitly, employs. It defines the way by which a firm delivers value to customers, induces customers to pay for that value, and finally converts those payments to profit.

Developments in communication and computing activities have changed the traditional relationship between customers and suppliers. Those developments require business models to be re-evaluated, reconsidering not only the way to address customer needs, but also new ways to capture value from providing new products and services. Without a well-developed business model, innovators could fail either to deliver or to capture value from their innovations.

### ***3.2.4 The Platform-Based Open Innovation Business Model***

In its PhD thesis in 2009<sup>95</sup>, Pieter Ballon affirmed that, in open innovation, the business model is the mechanism used to bridge the gap between outside value creation and value capture.

In order to bridge this gap, the traditional notion of business model needs to be aligned with the complexity and uniqueness of the outside value creation pattern implicit in open innovation strategies.

The peculiar part of the open innovation business model is that it relies on multiple parties working together in a collaborative manner, while their needs and remunerations are often in direct contrast.

In platform-based open innovation ecosystems, the business model is the tool that controls, guides and balance the needs of the value capturer (the platform, also known as the “sponsor”, which often directly controls business model decisions due to its centralized, decision-making abilities), the other value creators and the end-users.

The guiding question of a business model in platform markets has become ““*Who controls the value network and the overall system design?*” just as much as “*Is substantial value being produced by this model (or not)?*””<sup>96</sup>.

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<sup>95</sup> Ballon, P. (2009). *Control and Value in Mobile Communications: A Political Economy of the Reconfiguration of Business Models in the European Mobile Industry*. PhD thesis.

<sup>96</sup> Ballon, P. (2009). *Control and Value in Mobile Communications: A Political Economy of the Reconfiguration of Business Models in the European Mobile Industry*. PhD thesis. p.14

An open platform business model should take into account “insights on the advantages of modular design, the importance of architectural innovation, and the need to exercise a form of control over complementary products, services and components, while reaping the benefits from a strategy aimed at fostering network effects”<sup>97</sup>.

As previously mentioned, in fact, network effects are crucial in open platforms. Therefore, the needs of both third-party developers and end-users must be taken in account when designing a business model to ensure successful open platforms ecosystems. Therefore, specific architectural design challenges arise. Michael Seminer develops an original framework that encompasses the **business model design challenges** of providing for the needs of external innovators participating in open innovation platforms. This framework consists of the following parts: (1) *Motivations*, (2) *IPR* and (3) *Gatekeeper Roles*:

1) *Motivations*: Platform-based open innovation strategies integrate, into the business model, elements of crowdsourcing techniques<sup>98</sup> with an additional variable, the reward system, which gives a further incentive to the crowd. Business models in open innovation strategies must determine an appropriate reward system to attract a vigorous network of developers.

2) *IPR: Cumulative and Collaborative Innovation*: Another key challenge for open innovation business models is finding the right IP balance between external and internal innovators in order to foster cumulative and collaborative innovation. The platform-based open innovation business model tries to manage this task providing the right tools and means to external innovators to develop their own software. Platform sponsors provide in fact SDKs (Service Development Kit), which can be offered to developers in different forms (with different degrees of openness, licensed or freely available, etc.). Different decisions on these parameters can lead to different results of the ecosystem success.

3) *Role of the Gatekeeper*:

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<sup>97</sup> Ballon, P. (2009). *Control and Value in Mobile Communications: A Political Economy of the Reconfiguration of Business Models in the European Mobile Industry*. PhD thesis. p.112

<sup>98</sup> Crowdsourcing is defined as a company or institution providing an open call to a large network of potential laborers to perform a function (Howe, 2006)

The third key challenge for a platform-based open innovation business model regards the ability of the platform to act as a gatekeeper to monitor, filter and guide the whole ecosystem.

The essential part of this guiding role is acting as intermediary between developers and platform users. The main tool used by a sponsor platform to perform this activity is a platform marketplace.

Other mechanisms such as search functions, user-feedback system, user comments, are some of the possible tools that a sponsor platform could use to increase the effectiveness of the gatekeeper role.

The impact of the marketplace architecture on the innovation process could be greater than one could expect. Citing Michael Seminer: *“Efficient and user-friendly systems of distribution can be of immense help to developers. The marketplace acts as a centralized search function for end-users. This helps developers reduce distribution costs and generate audiences in the hopes of generating revenue (Iansiti, 2009). These network effects add significant value for all stakeholders participating on a platform.”*<sup>99</sup>

### **3.2.5 Case Study: the iOS Platform-Based Open Innovation Business Model**

The other interesting part of the study made by Michael Seminer is the research he made through interviews to several developers of the iOS platform. Through this research, the author was able to show the ability of Apple to perfectly manage, in designing its business model, the three architectural challenges just described.

#### **1. Motivations:**

The iOS incentive structure for developers is based on a unique reward system. *“It’s all about the money. If anyone tells you different, they are lying” (Developer #4).”*<sup>100</sup> Developers’ applications, after the required approval of

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<sup>99</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series. p.18

<sup>100</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series. p.26

Apple, are sent to the App Store. The applications prices are freely and directly settled by the developers. Apple takes 30% from the sale of each application, and with this revenue stream the company covers all the activities involved in the functioning of the App Store (i.e. credit card fees, marketing, etc.). The peculiar part of this reward system is that developers' revenues directly come from the end-users purchases, and so each application reward is determined by the popularity of that application. It also means that the limit of the reward of each applications is set by the popularity of the platform.

As Michael Seminer evidences, almost all the developers interviewed quoted the success of the platform (and the implied virtuous cycle) as another fundamental motivation for their participation to the platform. They also often included a comment on the "coolness" of the platform:

““One reason I decided to program for the iPhone is because I bought one and I thought it was really cool. I figured more people would think it was cool and want to discover what it could do. So I started to develop” (Developer #4).”

Finally, Apple was able minimize the learning curves of those developers new to application programming, delivering the right systems of easy tutorials and instructions. This increased extremely many developers' motivation to participate at the iOS ecosystem.

## 2. IPR, Cumulative and Collaborative Innovation:

Apple management of its IPR is far more closed than those of other open platforms. Apple release its own SDK (Software Development Kit) package for developers for 99\$ a year. SDK provides developers with most of the features that the iPhone is able to perform at a given point. However, in using this SDK, developers are contractually bounded to the “Registered iPhone Developer Agreement”, which is a set of term and conditions that strongly limits the degree of openness of the SDK. This contract, in fact, does not allow combining outside innovations or even alterations to the SDK. Developers are not allowed to publicly release source codes of their own apps. It results in an evident limit to cumulative innovation across developers: developers, in fact, do not have access to other developers' innovations. It is evident that a power asymmetry is present.

The research of Seminer found out that *“developers participating in Apple’s iPhone platform are generally passive to the management of IPR. Developers seem accepting of the limitations because of the success of the platform. In other words, the rewards are significant enough that developers are willing to operate under a tightly controlled IPR regime.”*<sup>101</sup> This is an important evidence that, if a platform is able to set the right motivations for developers and to foster these motivations thanks to the platform success and its embedded virtuous cycle, the sponsor could pursue a strong controlled IPR regime, therefore increasing its own value capture abilities.

### 3. Role of the Gatekeeper:

Apple was able to create a system for programming, searching and downloading apps that was “usable” as never before in the industry creating a brand new concept of marketplace for the entire smartphone industry (here again the “usability” concept).

To achieve this result, Apple perfectly used many tools and mechanism that enhanced the effectiveness of its gatekeeper role (clear classification of apps, easy search functions for both users and developers, user-feedback system, etc.).

A developer interviewed by Michael Seminer explicitly states, *“They do it better than anyone else. I’m often confused and annoyed by how other platform sell third-party applications. It’s definitely a turn-off. The app store is by far the most userfriendly of the marketplaces. I think this attracts and retains customers... And I guess for me, I’m able to easily search the store to see if an idea has been done before” (Developer #7).*<sup>102</sup>

The results of Michael Seminar’s research demonstrates empirically that developers believe that a *“well-balanced gatekeeper can add significant value to a platform, while an unbalanced architecture can deter developers and end-users from participating”*.<sup>103</sup>

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<sup>101</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series. p.30

<sup>102</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series. p.27

<sup>103</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series. p.32



The iPhone App Store can be seen as the empirical evidence that gatekeeper's overall architecture is a fundamental source of value for the entire open platform ecosystem.

The study made by Michael Seminer, gives us a relevant framework of the architectural challenges that a platform faces when designing its open platform business model. The author specifies that *“allowing for outside innovators to flexibly create for a corporate sponsored platform, outside value creation can efficiently and effectively be captured by managing and balancing the following three aspects: motivations, IPR, and gatekeeper roles.”*<sup>104</sup>

Moreover, the empirical research that he made on iOS developers, gives us a clear evidence that the success of Apple is linked to the company's ability to successfully implement an open innovation business model, able to *“bridge the gap between value creation and value capture generating value for the platform and participating developers”*.<sup>105</sup>

It shows that the ability of Apple to perfectly manage its gatekeeper role and to build a widespread approved reward system enabled the company to blind external innovators to power asymmetries within the business model, increasing the platform control on the ecosystem.

### 3.3 HOW TO BUILD A PLATFORM LEADERSHIP

Thanks to Michael Seminer's work, we have seen that Apple was able to perfectly manage all the three areas pointed by the author to be essential to achieve success with a platform-based open innovation business model.

The interesting thing is that the iPhone case can be depicted also as a master example of **“how to build a platform leadership”** if we follow the framework

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<sup>104</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series. p.34

<sup>105</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series. p.2

that Cusumano and Gawer depict in their works in 2002<sup>106 107</sup>. In these works, the authors clearly present four levers they consider crucial for a platform to manage in order to become a platform leader. Apple, again, seems to have followed the authors' advices in an extremely concrete and practical manner.

### 3.3.1 *The Platform Leader*

Cusumano and Gawer give a clear definition of what “*platform leadership*” is, and draw a clear pattern of the challenges and pressures that platform leaders typically have to face.

According to their definition, “*Platform leadership is the ability of a company to drive innovation around a particular platform technology at the broad industry level. Whether the dynamic is called “network externalities,” “bandwagon effects” or “positive-feedback effects,” the more people who use platform products, the more incentives there are for complement producers to introduce more complementary products, causing a virtuous cycle*”<sup>108</sup>.

The authors also draw a clear pattern of the challenges that platform leaders typically have to face. These pressures mainly come from *wunnabes* (companies that want to become platform leaders) and *complementors* (developers of complementary products that expands the platform's market).

Specifically, “*Platform leaders face three problems. First is how to maintain the integrity of the platform (the compatibility with complementary products) in the face of future technological innovation and the independent product strategies of other companies. A related problem is how to let platforms evolve technologically (as they must or become obsolete) while maintaining compatibility with part complements. A third problem is how to maintain platform leadership.*”<sup>109</sup>

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<sup>106</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review.

<sup>107</sup> Cusumano, M. A., & Gawer, A. (2002). *Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*. Harvard Business School Press.

<sup>108</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review., p. 53

<sup>109</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 53

### 3.3.2 *The Four Levers of Platform Leadership*

The above mentioned generic issues induced the authors to develop some practical guidelines for platform leaders and for wannabes for managing innovation. They define four different but strongly related *levers of platform leadership* that, if well managed, can help managers in formulating and implementing a successful platform strategy.

1) SCOPE: *“Scope comprises the amount of innovation the company does internally and how much it encourages outsiders to do. Managers of companies that are platform leaders — or that want to be (wannabes) — must weigh whether it is better to develop an extensive in-house capability to create their own complements, let the market produce complements or follow a middle road.”<sup>110</sup>*

Essentially, determining the “scope” means, for a company, assessing which complements make internally and which leave to third parties. With this first and probably most important decision, the company determine how much dependent it will be on external complements. There is not an ease and simple answer on this “make-or-leave” decision. What is sure is that platforms need complements.

2) PRODUCT TECHNOLOGY: *“Platform leaders and wannabes must make decisions about the architecture of a product and the broader platform, if the two are not the same. In particular, they need to decide how much modularity they want, how open their interfaces should be, and how much information about both platform and interfaces to disclose to outsiders who might become complementors — or competitors.”<sup>111</sup>*

Decisions about product technology — overall architecture, interfaces and intellectual property — could have a profound impact on the structure of the industry and on the nature of its value creation process. Modularity can be defined as a design strategy aimed to decomposing complex systems through the

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<sup>110</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 53

<sup>111</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 53

definitions of stable interfaces among its components. It helps to protect the core technology (of both the platform and the components) sharing only interface technology, can reduce innovation costs and encourages the emergence of specialized companies. Keeping control of the architecture is a powerful barrier against companies that might offer a competing architecture with different interfaces. It means, for later wannabes, big efforts to convince complementors to change their designs and accept the related switching costs. *“Successful companies protect their core technology but use modular architectures and disclosure of interfaces to get complementary products and services”*<sup>112</sup>. Investing the necessary resources on designing its own architecture and on promoting industry-wide consensus about interfaces standards can help platforms to shape their environment.

3) RELATIONSHIPS WITH EXTERNAL COMPLEMENTORS: *“Managers must determine how collaborative or competitive they want relationships to be between platform producers and complementors. Platform producers also need to work on creating consensus and handling potential conflicts of interest (for example, how to behave when the move to a complementary market turns former collaborators into competitors)”*.<sup>113</sup>

Platform leaders, o wannabes, must promote consensus among industry players. This is an essential part of the strategy because leadership is possible only when others agree to follow. Platforms should demonstrate that they are acting on behalf of the whole industry. That is why platform leaders should be *“industry enablers”*, helping third parties to innovate around the platform developing supporting technologies such as programming interfaces and SDK. Only this precious consensus from complementors can lead the platform to achieve what the authors call *“ecological control”*, which means that a platform leader must exert control not over complementors’ specific choices but over the premises of choice. To do that, the platform must have a sufficient degree of control over interfaces.

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<sup>112</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 56

<sup>113</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 53

4) INTERNAL ORGANIZATION: *“The right internal structure can help platform producers manage external and internal conflicts of interest.”*<sup>114</sup>

A platform creator must build an internal organization that allows him to effectively manage relationships with complementors. It is not only a matter of organizational design, but it also a matter of organizational culture.

*“Platform leaders need to have a vision that extends beyond their current business operations and the technical specifications of one product or one component. The ecosystem can be greater than the sum of its parts if companies follow a leader and create new futures together. Complementors need to understand the vision of the platform leader in their industry and make some bets on what that vision means for their own future.” “Platform leaders’ managements must understand that a “platform is a complex system calling for a neutral industry broker to oversee development of the system through external collaboration”.*<sup>115</sup>

### **3.3.3 The Apple’s Platform Leadership**

Now, following the above-mentioned theory of Cusumano and Gawer, we can easily see that Apple followed these four levers of platform leadership in an impeccable way.

#### **SCOPE AND INTERNAL ORGANIZATION:**

The central idea behind the birth of the App store was that Apple had clear in mind that it could not rely entirely on their own internal innovation resources. The attention that Apple placed on the open innovation paradigm induced Apple, despite its historical integrated approach in product architecture design, to search for resources of innovation beyond the boundaries of its own organization. This led the company to create the App Store.

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<sup>114</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 53

<sup>115</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 53

## PRODUCT TECHNOLOGY:

The introduction of the App Store transformed the iOS operating system in a modular platform. In general, software could be seen as modular products with several slots where programs, the applications, can be inserted. This was true for software and communication platforms, and it is also for application ones. Application platforms, though, following the example of platform leaders in the computer industry, leveraged on the contribution of outside players to fully exploit the advantages of a modular product architecture. Stable interfaces and explicit design rules are basic components of modular products. Interfaces, in fact, is where all the necessary information is placed to connect the platform to components. Explicit design rules are those instructions that platform gives to complementors in order to let them create a product conformed to the platform standards.

Apple followed this design strategy releasing to complementors (app developers) its own SDK (Software Development Kit), which provides developers with the necessary design rules, the APIs (Application Programming Interfaces). As the authors mentioned in their work, *“Successful companies protect their core technology but use modular architectures and disclosure of interfaces to get complementary products and services.”*<sup>116</sup>

Moreover, the modular architecture could encourage the emergence of specialized companies. In other words, a modular platform pushes the industry to become modular as well. It is exactly what happened after the introduction of the App Store in 2008 with the birth of the App Economy.

## RELATIONSHIPS WITH EXTERNAL COMPLEMENTORS:

In the previous paragraph we have seen the great ability of Apple to manage the relationship with developers managing the three challenging areas of *motivations, IPR and gatekeeper roles*.

Perfectly managing its gatekeeper role and building a widespread approved reward system, Apple was able to create a perfect open innovation business model

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<sup>116</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 56

that encourages the flow of external innovation and that, at the same time, blind external innovators to power asymmetries within the business model, increasing the platform control of the ecosystem.

The picture that comes out from this chapter is that the mobile phone industry has been completely reshaped by the introduction of a new way of competition.

The birth of the iPhone in 2007 changed the performance attributes on which the players were competing at that time. The introduction of the iPhone App Store in 2008 pushed the level of innovation at a next level. It changed the paradigm of the competition itself: firms do not only compete in a sector anymore, they compete to shape the structure of a sector.

The “platform-based open innovation business model” introduced, in the mobile phone industry, a new way of thinking about competition, in which the key driver of success for firms has become redefining “who does what” and “who takes what”.

It is exactly what Michael G. Jacobides calls “*architectural advantage*”, that is “*the ability to control an industry without even owning it*”<sup>117</sup>. It is based on creating an ecosystem of interdependent actors and control the critical parts of the new architecture.

Successful companies have understood that the greatest part of value redistribution in today’s economy comes from re-defining sectors and find innovative business models that change the way the value is created and captured.

Conceiving innovative technologies and products is not enough. What determines success today is how effective you are in creating a powerful ecosystem around a key innovation and in controlling the bottleneck of this ecosystem architecture. As Jacobides writes in his paper, “*Innovation is not about the creative genius of a solitary inventor; it’s about new ways of orchestrating and managing the benefits we can create*”; “*It is about a new way of thinking about strategy*”.

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<sup>117</sup> Jacobides, M. G. (2008). *Creating and Capturing Value: From Innovation to Architectural Advantage*. LBS Business Insight.

The interesting idea of Michael G. Jacobides is that, even if a firm is able to build an architectural advantage and become a platform leader, it does not mean that it is far from challenges and pressures from competitors and wannabes. It is a never-ending battle to redefine sectors. The PC industry gives us a clear example of it, where Google is trying to erode the leadership of Microsoft introducing innovative types of business models. The same happened and is still happening in the smartphone industry. In the next chapter, I will provide an overview of the today's competitive landscape of the smartphone industry.



## CHAPTER 4 – THE PLAYERS’ DIFFERENT APPROACH IN FACING THE INDUSTRY REVOLUTION

### 4.1 THE NEW COMPETITIVE LANDSCAPE

We have seen how Apple, with the introduction of the iPhone, has been able to redefine the “smartphone” category, merging the internet, personal computing and the traditional mobile telephony in a new industry. As these sectors fused in a single device, previous separated industry architectures and players have been pushed into direct competition.

I already tested theories of industry architecture and platform strategy, and I showed how the iPhone App Store in 2008 changed the paradigm of the industry competition.

In this chapter, I will show how specific platform strategy decisions have driven Google to the creation of a successful platform strategy that enabled the company to respond quickly to Apple and become, nowadays, the leader of the operating systems scenario of the smartphone industry.

In addition to this, I will try to explain the reasons of the entrance of the new players in the industry (Google and Microsoft) and the reactions of incumbents (BlackBerry, Nokia and Samsung) following the outlines depicted by the “Follower’s Dilemma” theory of Argyres, Bigelow and Nickerson.

#### **4.1.1 The “Follower’s Dilemma”**

Argyres, Bigelow and Nickerson, in their paper “Dominant Design, *Conpositio Desiderata* and The Follower’s Dilemma” explicitly suggest that “*the introduction of a conpositio desiderata generates four possible “strategic responses” for rivals and potential entrants: (1) imitation; (2) repositioning (or differentiation); (3) exit; (4) entering the market by either copying the conpositio desiderata or choosing a positioning distant from it. [...] the choice of which response to adopt will be driven to a large extent by a firm’s positioning at the*

*time of the conpositio desiderata's arrival and the comparative adjustment costs associated with adapting to each of the four strategic responses.”*<sup>118</sup>

1. IMITATION: *“Imitating the innovator's composition of elements can lead to capturing a share of newly discovered profit pool. [...] Additionally, if rivals don't respond with imitation the risk allowing the innovator to gain a longer – term competitive advantage and resources that can be used against them.”* This could make it *“virtually impossible for those who are late to imitate to successfully challenge the innovator”*.<sup>119</sup>

2. DIFFERENTIATION: *“Rivals could choose to avoid direct competition by repositioning distantly from the conpositio desiderata. With the rapid increase and acceleration in demand, rivals positioned in a niche near the conpositio desiderata before it was introduced will likely experience decreasing demand as its customers flock to the composition of elements demanded. In other words, the closer the niche is to the conpositio desiderata when it was introduced, the smaller demand it will realize once the innovator launches the new product or service [...]. The more successful the conpositio desiderata the more distant be the rival differentiated position. Of course, distant differentiation requires the existence of residual demand not served well by the conpositio desiderata.”*<sup>120</sup>

3. EXIT: *“Competition will drive rivals to pursue sources of competitive advantage leaving those organizations without such advantages or those unable to accumulate advantage to be selected out”*.<sup>121</sup>

4. ENTRY: *“First, firms operating in other industries may choose to enter if they possess resources and capabilities that are sufficiently re-deployable or fungible to compete with the innovator.”* *“De novo entry also can be stimulated [...] because the composition of product and service elements that attracts a profit of pool is known, firms with technology that can advance the technology trajectory*

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<sup>118</sup> Argyles, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University. p. 4-5

<sup>119</sup> Argyles, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University. p. 11

<sup>120</sup> Argyles, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University. p. 12

<sup>121</sup> Argyles, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University. p. 12

*defined by the conpositio desiderata now can calculate with greater precision than before the net benefit of entry.*”<sup>122</sup>

What the authors suggest is that, even if firms understand the strategic urgency of responding to the *conpositio desiderata*, not all of them will be able to respond promptly. Many firms, in fact, remain subjected to *inertia*, a force that “*makes it difficult to transform the organization, leading to increases in adjustment costs*”<sup>123</sup>.

The greater the firm’s inertia, generally linked to factor as age and size, the slower the company will be to change and adapt. The theory clearly explains that a company’s response is likely determined by the “*firm’s initial position and comparative adjustment costs*”.

The theory depicted three main determinants of adjustment costs: (1) *internal resources and capabilities*, (2) *internal organization structure and incentives*, and (3) *relationships with external parties such as suppliers, buyers, and regulators*.

In the next paragraphs, I will describe the different reactions of the main players of the mobile phone industry after the introduction of the *conpositio desiderata* (the iPhone).

We can consider the following description as divided in two parts. The first section that shows the entrance of two new players in the industry (Google and Windows). The second part analyzes the reaction of the incumbents, putting particular attention on BlackBerry in quality of integrated firm (both OS and device maker), and giving an overall picture of two device makers’ reactions, Samsung and Nokia.

We will see that companies’ different strategic decisions and their different outcomes have been strongly linked, as suggested by Argyres, Bigelow and Nickerson, to the “*firm’s initial point and comparative adjustment costs*”.

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<sup>122</sup> Argyres, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower’s Dilemma*. Washington University. p. 13

<sup>123</sup> Adjustment Costs: “The costs associated with making changes in the variables we have control over”. Source: [financeglossary.com](http://financeglossary.com)

I will demonstrate how the different strategies and business model used by the industry players reflect their diverse historical core competencies and backgrounds: the incumbents BlackBerry and Nokia both come from mobile phone and PDA industries; Windows and Google come from the PC and the internet world; the handset maker Samsung had a powerful and unique organizational structure.

The new mobile phone ecosystem required each of these firms to leverage on their core competencies in order to forge the right strategic partnerships and alliances that, with different degrees of control, would lead each of the firm to their preferred strategic solution.

## 4.2 GOOGLE AND THE ANDROID OS

### *4.2.1 History Background*

Google Inc. was founded as a private company in 1998 and, through continuous growth, went public in 2004. Its incredible expansion has been due to a series of aggressive moves, such as partnerships, acquisitions and new product developments, which lead the company to own one of the top valuable brand in the world<sup>124</sup>. Google is positioned as a top-tier search company that acts as the main gatekeeper of the world internet information. The company mission is “to organize the world's information and make it universally accessible and useful”<sup>125</sup>. Google’s main revenue stream comes from targeted advertising and other services correlated and linked to its internet search engine. The great focus that Google relies on innovation strongly repays the company with frequent launch of innovative and successful products, such as Gmail, Google Maps, Google Chrome, etc.

Google’s initial move towards its official entrance in the smartphone industry is dated back to 2005, when the company acquired the mobile software firm Android

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<sup>124</sup> Source: [www.forbes.com](http://www.forbes.com) (Forbes.com LLC, 2013)

<sup>125</sup> Source: [www.google.com/about/company](http://www.google.com/about/company) (Google Inc., n.d.)

Inc. This acquisition provided the company with the needed competences that enabled the firm to gain a foothold in a market in which it had no previous experience and the right kind of expertise. This fundamental decision lead the company to the creation of the industry consortium that, in 2007, gave birth to the operating system called **Android**. The first device running Android was sold on October 22, 2008<sup>126</sup>.

The Android operating system has been built, since its birth, to be truly open. Android offers a royalty-free license, so sales of devices running Android do not bring direct revenues to Google. It is an open source platform, meaning that its source code is free to be used, distributed, modified and studied. OEMs<sup>127</sup>, in fact, are not only allowed to use the operating system on its own devices. They are also allowed to personalize the entire operating system, for example adding own alternative app stores. Android source code are available both in private and public source branches. Private branches usually are some months ahead of the public branch and they are available only to a small number of selected OEMs. However, even if the base platform is available in open source, other applications, such as Google Play (the Android app Store), Google Maps, YouTube, Gmail, are not available open source and they are licensed to OEMs under commercial agreements. *“Since the Android source code is open, anyone can use it to build any kind of device. However, if a manufacturer wishes to use the Android name with their product, or wants access to Google Play, they must first demonstrate that the device is compatible”*<sup>128</sup>.

Google Play offers free and paid applications. Google Play revenue stream consists of the 30% share of revenues from each application sales.

The activation of an Android device generally involves entering a Google Account ID that connects the user to multiple personalized Google’s services, such as Google Plus, Gmail, Google Play, Calendar, Contacts, You Tube, Google Maps, etc. It positions Android as an open Internet platform.

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<sup>126</sup> Source: [www.gizmodo.com](http://www.gizmodo.com) (Wilson M. , 2008)

<sup>127</sup> OEM: Original Equipment Manufacturers. In the contest of my thesis, this term is referred to the handset producers.

<sup>128</sup> Source: [www.source.android.com](http://www.source.android.com) (Android Open Source Project, n.d.)

Android targets high-end, mid-range and low-end devices. In early 2011 Android started to expand into tablets and connected TVs. Nowadays it accounts for more than 80 percent of the smartphone operating system market share. Both Google and Apple announced over 1 million applications available in their app store.<sup>129 130</sup>

#### ***4.2.2 Google's Reasons for Entering the Smartphone Industry: "Why"***

In order to understand the reasons that pushed Google to enter the smartphone industry, it is essential to keep in mind the nature of the company, with its background on advertising and Internet services.

Following an interesting article made by Benedict Evans in January 2013,<sup>131</sup> I will define three main strategic reasons why Google decided to enter the smartphone industry.

- Firstly, as the author analyzes in his study, "Google entered with the publicly stated objective of making sure that Google was not somehow shut out from the mobile internet by a dominant OS provider that chose to exclude it." Google, in fact, could not let the smartphone world in the hands of other companies such as Microsoft or Apple. Once they become dominant leader in the smartphone industry, in fact, they could go back to Google's core business and erode it. Just imagine if Microsoft took the 80 percent of the smartphone market share as Android has today. It could easily replace Google Search with Bing as the main search engine of the internet world.

We can absolutely affirm that this proactive strategy had been a definite success for Google, which followed the idea that *"the best defense is a good offense"*. It is difficult to imagine today another company that could lead the mobile OS market except for Google.

- The second strategic goal, strictly related with the first one, was to extend the company's revenues from web advertising thanks to mobile web advertising. The

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<sup>129</sup> Source: [www.mashable.com](http://www.mashable.com) (Warren, 2013)

<sup>130</sup> Source: [www.theverge.com](http://www.theverge.com) (Ingraham, 2013)

<sup>131</sup> Source: [www.ben-evans.com](http://www.ben-evans.com) (Evans, 2012)

iPhone, in fact, introduced the first “real internet experience” on a mobile device. From that moment on, introducing smartphone to people meant more users with effective internet access, which meant more time on line, which represented more possibilities for Google to increase revenues from Google Search and advertising. Therefore, the Android platform became crucial for the rapid smartphone penetration of the mobile phone industry, helping OEMs to produce smartphones able to give the right mobile internet experience to users.

- The third strategy was based on the idea that a mobile device, constantly connected to Google Apps and services, would give a much more powerful stream of “signaling informations” than those the company received from desktop computers. Google Maps app, for example, gives the users a fantastic service but, on the other side, gives the company important sources of information able to increase advertising effectiveness and relevance.

#### ***4.2.3 Google’s Strategic Approach to Enter the Smartphone Industry: “How”***

The way Google entered the smartphone industry disappointed many tech journalists. The company in fact, did not introduce a new powerful device able to compete head-to-head with the iPhone. It decided, indeed, to introduce an open-source operating system that would be free to use for both device manufacturers and app developers.

Google entered the market trying to change the rules of the game. Google had clear in mind that it was impossible to create a proprietary product able to compete with the iPhone. In 2007, Google did not have any experience in mobile phone hardware design, while Apple was founded on an “integrated approach philosophy” based on enhancing perfect interactions hardware-software and great user-experience. Any efforts to compete with Apple on this ground would have been a failure.

Google understood that its chances to compete with Apple in this new environment relied on its ability to re-create the virtuous cycle embedded in the App Store, thus creating its own platform ecosystem of interdependent actors and controlling the critical bottlenecks of the new architecture.

This idea pushed the company to create the right strategy to rapidly attract the main interdependent actors needed to reproduce the smartphone platform ecosystem: developers, users, OEMs and operating providers. Let's see how:

- OEMs: As soon as Android was announced in the market, it became immediately attractive to all those handset makers that did not have the right software know-how and the needed market power to create its own powerful operating system. Android gained in fact rapid success within East Asia handset makers and soon was able to attract a broad ecosystem of OEMs including top device makers such as Samsung, LG, Motorola, Sony-Ericsson, Huawei, etc.

The new Google's royalty-free platform became soon the main option for all these OEMs that, before Android, had the only alternative to pay Windows for its operating system or use the Symbian software platform. Moreover, the Android open source code gave a high differentiation potential to the platform because enabled the OEMs to customize the operating system and so a substantial part of the handset user experience. Android initial adoption success within handset makers was driven by the OEMs' desire to compete with the rise of iPhone smartphones. The success experienced by Android was extraordinary. In the fifteen months after the sale of the first Android device, the OS accounted for nearly 25% of the smartphone market share. Between 2009 and 2010, it reached a year-on-year increase of 1,300%.<sup>132</sup>

- Developers: The growing number of handset running Android drove a mass arrival of developers into the new platform. This trend was coupled with the considerable effort that Google put in promoting and encouraging innovation from developers. When the Android co-founder and Google group manager for mobile platforms Rich Miner announced the Android Market (now re-named Google Play), he explicitly stated, "It's called Market, not a store, so developers can reach consumers directly, with no middleman"<sup>133</sup>. The Android Market in fact, has been developed with the stated intention to give much more freedom to developers than

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<sup>132</sup> Source: [www.canalys.com](http://www.canalys.com) (Canalys - Press Release, 2010)

<sup>133</sup> Source: [www.techhive.com](http://www.techhive.com) (Perenson, 2008)



the iPhone App Store. It was characterized, for example, by much more freedom in coupling applications and services between developers. The app store gave developers an easy monetization channel, and it was provided with a feature-rich and easy-to-learn application framework and powerful SDKs. In addition to this, the Android Market was not the sole app store allowed to run in the Android operating system. Apps, in fact, could be downloaded from other app stores launched by different actors, such as mobile operators (i.e. Vodafone) or OEMs (i.e. Samsung).

- Users: The introduction of Android in the smartphone industry and the new OEMs ecosystem built on it gave consumers the possibility to benefit from the wide variety of Android hardware options. The different handsets offered by the diverse OEMs, from high-end to low-end devices, gave users the flexibility to choose a phone with the features that best meets their needs and possibilities. We can basically assert that Apple, with the iPhone, introduced the new “smartphone concept” and Google, through Android, made it accessible to the vast majority of users.

- Mobile operators: Finally, because of strong conflicts of interest with Apple, mobile operators started immediately to be very excited about Android because it increased, thanks to its differentiation potential, their bargaining power in the context of their “competition” with Apple.

Summing up, Google decided to enter for three main reasons:

1. Make sure that Google was not somehow shut out from the mobile internet by a dominant OS provider that chose to exclude it (protect the core business from ECOSYSTEM CHURN)
2. Hugely increasing the number of people with access to the mobile internet, which means Google web search and revenue for Google.
3. Gain from the endless stream of little bits of 'signaling' information coming from an Android device running Google Apps.

The way the company decided to enter the market was pursuing a platform strategy based on an open-source operating system that could become the main alternative for all those actors (i.e. OEMs, developers, users and operating system)

that have been threaten or just not satisfied by the introduction of the iPhone. Google decided not to fight Apple at its own game, but to change the rules by taking a very diverse approach, a more open and, at first look, more traditional platform strategy. Its free licensing approach was intended to quickly build market share with the clear intention of taking advantage of “network effects”. As Cusumano and Gawer clearly declare, “*Decision about product technology – architecture, interfaces and intellectual property – are critical to platform leadership*”; “*it’s a delicate balance, and disclosing too much information can be dangerous. Finding ways to stimulate innovation involves a trade off between secrecy and disclosure*”<sup>134</sup>. The Google’s open source strategy has, obviously, specific kind of problems, such as fragmentation between device makers for specific features or for software updates. It is difficult, in fact, for an open source platform, to deliver, at least at the beginning, the same totally planned and integrated experience that Apple was able to deliver from the moment you walk in the store to the moment you download an app. So, in order to rightly estimate Google’s strategy, we should well keep in mind the backgrounds, capabilities, and strategic intention of the company. Considering the three strategic reasons highlighted above and watching at the Android current 80% of OS smartphone market share, we can easily depict Google’s strategy as a smashing and brilliant success.

## 4.3 MICROSOFT AND THE WINDOWS PHONE OS

### 4.3.1 History Background

Microsoft Corporation is an American multinational company founded in 1975 by Bill Gates and Paul Allen. The company went public in 1986. It is today one of the world's most valuable companies.<sup>135</sup> As of 2014, Microsoft is market

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<sup>134</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review. p. 56

<sup>135</sup> Source: [www.im.ft-static.com](http://www.im.ft-static.com) (Financial Times, 2013)

dominant in both the PC operating system (with Microsoft Windows) and the productivity suite market (with Microsoft Office). The company produces many other software products and services such as the search internet engine Bing, the Xbox videogame consoles and, obviously, Windows Phone OS, the mobile operating system. Microsoft entered the mobile computers with the emergence of PDAs introducing the Windows CE operating system. Subsequently, when PDAs started to merge with mobile phones to create smartphones, the OS evolved to Windows Mobile and, in 2010, into the new application platform Windows Phone OS. Microsoft began the development of the new Windows Phone OS when it became evident that the legacy Windows Mobile OS could not compete any longer with the new application platforms iOS and Android. It was, in fact, a radical departure from the previous platform. Since its launch, the platform offer included a complete value stack, from the core operating system to a large bulk of built-in applications, an app store, integrated Windows services and a complete set of SDKs. The initial versions of the OS targeted high-end and middle-range smartphones. Microsoft monetizes Windows Phone through a combination of a licensing fee, that varies from OEM to OEM, and indirect revenue streams from its Windows, Office and Xbox product lines. Windows Phone Marketplace is the only app store allowed in the Windows Phone OS. Developers' revenue share from selling their apps is set at the industry standard of 70%. Applications must go through an approval process based on specific policies and rules managed and controlled by Microsoft. In November 2013, Windows Phone Marketplace has reached more than 190.000 apps.<sup>136</sup> On September 2, 2013, Microsoft announced a deal to acquire Nokia's mobile phone division.

#### ***4.3.2 Microsoft's Reasons for Entering the Smartphone Industry: "Why"***

The licensing fee was not the unique and main reason for Microsoft to develop Windows Phone OS. The key driver was, as it was for Google, the need to protect the company's core businesses (Windows and Office suite PC software licensing) from "ecosystem churn". Microsoft core products and services came under intense

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<sup>136</sup> Source: [www.windowsphoneitaly.com](http://www.windowsphoneitaly.com) (Tech Crunch, 2013)

danger from the brilliant success of both Android and iOS platforms and their powerful ecosystems. The Microsoft Office started to be seriously threatened by Google office software suites such as Google Docs and Google Apps. Users using the iOS iPhones were more likely to adopt Apple computer at the expense of Windows-based PCs. Moreover, Microsoft saw in Windows Phone OS as the new and right way to capitalize on existing Microsoft cloud services, such as Bing Search, Xbox Live and Windows Live. In addition to this, the company searched, in a possible smartphone success, for a possible “Halo Effect” (it is when the perceived positive features of a particular item extend to other products of the same brand) for the other lines of the business. The company in fact, admitted this strategy in its “*Strategic Rationale*” press materials<sup>137</sup>, in which it clearly states “*Success in phones is important to success in tablets*” and “*Success in tablets will help PCs*”.

#### ***4.3.3 Microsoft’s Strategic Approach to Enter the Smartphone Market: “How”***

As it became clear after the launch of the Apple App Store, the only possibility for Microsoft to compete in the new reshaped smartphone industry was building the right platform strategy that could allow the creation of a self-sustaining ecosystem of interdependent actors. As I depicted for the Google case, Microsoft had to find the right methods to attract developers, users, OEMs and operating providers:

- OEMs: When the Windows Phone 7 platform was launched in October 2010, it entered essentially as the only alternative, other than Android, for OEMs to produce smartphone built on a mainstream platform. Its initial launch was indeed supported by many important device makers, such as LG, HTC, Dell, Samsung, Asus and Sony Ericsson. However, the new Microsoft platform was presented to OEMs with a complete different approach than the Android one. First of all, it was offered through a licensee fee (Android was royalty-free). In addition to this, it required precise hardware specifics and its source code was closed, meaning that changes to the OS functionality and UI were not permitted. This strictly

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<sup>137</sup> Source: [www.microsoft.com](http://www.microsoft.com) (Microsoft Corporation, 2013)

reduced the personalization possibilities of device makers, which had the only chance to customize their devices through a limited set of applications pre-installed on the devices. Compared to Android, all these strict rules significantly reduced the possibilities for little OEMs to adopt the new platform and severely reduce the differentiation potential of the platform. On the other side, these specific decisions, based on a rigid control of the Windows Phones user experience, offered two main advantages for the OEMs: less effort in software development, and patent infringement indemnification (the license includes patent litigation protection by Microsoft).

- Developers: Microsoft started acting aggressively to attract developers to the platform. The company knew that it had to leverage on its preexistent established network of software development and partners to gain a significant foothold in the market. Windows Phone 7 allowed PC and Xbox developers to use the same tools, languages and API frameworks as on their respective when designing for Windows Phone 7. However, even if it facilitated developers' work, they still remained obliged to rewrite the smartphone applications codes from scratch. In October 2012, Microsoft launched the new version of its operating systems, Windows Phone 8. This new version was an essential boost for the development of the Windows Ecosystem because, other than many minor improvements, it permitted to obtain a total porting of PC applications to smartphones and tablets. Naturally, mobile developers currently programming for iOS and Android were skeptical at the beginning about the platform. Because of this, Windows actively tried to persuade iOS and Android developer of popular apps to release a Windows Phone version of them. In some cases, Microsoft decided to cover the development costs.

- Mobile operators: Windows Phone 7 was met with a positive reception from mobile operators. That was because operators saw the new operating system as an important source differentiation against the strengths of Apple brand and they expected Microsoft to bear much more promotional effort for the new platform than Google. At the initial launch, the platform was available from 30 mobile operators around the world.

- Users: Microsoft was initially unable to attract quickly the pre-existent desktop Windows users. Only with the late coming version of Windows Phone 8, it started to leverage on its pre-existent Windows ecosystem creating a real new platform experience. With Windows 8 in fact, the company was finally able to start convincing users to the powerful possibilities of the new Windows ecosystem. Windows Phone 8 in fact, put the Microsoft operating system as the natural destination for anyone who uses Office often. Today, in fact, it is the only mobile platform that runs a modern version of Microsoft's Office suite for free, giving the user the possibility to edit Word, Excel, PowerPoint and OneNote documents. In addition to this, the new SkyDrive application gives the user the opportunity to automatically backup pictures, text messages and contacts and synchronize music downloads and Office 2013 documents directly to a user's SkyDrive. These files can subsequently be opened on SkyDrive.com and on perfectly integrated Windows PC, thus recreating the unique experience that Apple generated for iPhone and Mac users. Microsoft's Xbox services are finally starting to show up across the company's devices. However, certainly the most important point of the new Windows platform architecture is the creation of an overall Microsoft account. As Google and Apple did, Windows gave the possibility to anyone who has ever used a Microsoft account to connect and maintain it on its device. In this way users can link their smartphone to their own Microsoft account and so being directly logged into services such as Skype, Outlook.com, Xbox, Gmail, Facebook, Twitter, Gmail and LinkedIn. With these advantages, Microsoft has created a mobile platform that can at least stand up to its rivals.

Summing up, the strategic approach applied by Microsoft has been focused on creating the virtuous cycle of the app store ecosystem following the Android and iOS example. This strategy has been pursued following a middle-of-the-road approach between the open source strategy applied by Google with Android and the integrated approach applied by Apple, and leveraging on its OS background and its pre-existent Windows ecosystem.

- Middle-of-the-road approach. We can consider the Microsoft entry strategy in the smartphone market as a middle-of-the-road approach between the Apple and the Google's ones. The company, in fact, followed an open platform approach similar to Android but, differently from it, it came with a licensee fee, with a closed source code and with specific hardware requirements for OEMs. These specific architectural decisions evidently did not permit the platform to have the initial astonishing impact of the Android platform. On the other side, these attributes gave the company the capacity to exercise a rigid control on the Windows Phones user experience and so, similar to Apple, guarantee a quality experience for every users. The company's trajectory of integration continued with the deal with Nokia in September 2013. As Microsoft itself states in its "strategic rationale" document on the deal with Nokia<sup>138</sup>, acquiring the Nokia's devices & services business, helped the company to highlight "high value experiences" on devices around its mobile operating software and to the creation of a "first-rate Microsoft phone experience" for users. Only through a direct control over both software and hardware, Windows could ensure those advantages and therefore guarantee less OS fragmentation, stabilize hardware specifications and, more in general, make sure that using a Microsoft Windows Phone mean exactly what Microsoft's software engineers intended.

- Leveraging on its OS background and its pre-existent ecosystem. With the introduction of Windows Phone 8, which came just at the end of 2012, Microsoft truly boost the development of the Windows Ecosystem. It involved, in fact, pre-existent PC software and Xbox developers thanks to a total and direct porting of PC applications to smartphones and tablets. Parallel to that, it involved final users thanks to the creation of a new Windows experience based on integrated powerful services (Office 2013, SkyDrive, Xbox services and Microsoft Account) and on a new powerful platform ecosystem that can, at least, stand up to its rivals.

According to ABI Research<sup>139</sup>, in 2013, Microsoft's Windows Phone experienced a 104% growth on year basis, but it still owns only about 4% of market share. The Nokia's smartphones accounted for nearly 90% of the shipments. That is the clear

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<sup>138</sup> Source: [www.microsoft.com](http://www.microsoft.com) (Microsoft Corporation, 2013)

<sup>139</sup> Source: [www.abiresearch.com](http://www.abiresearch.com) (ABI Research, 2014)

evidence of the decisive role that Nokia is playing in Windows Phone growth. Recent rumors coming from some bloggers declare that Microsoft would be thinking about eliminating the cost of the license offering for free Windows Phone to its OEMs and that the company is planning to pay Samsung and other important device makers to promote the production of smartphones with Windows Phone. Even if, up to January 2014, they are just gossips, they are absolutely interesting for understanding the obsessive need for Microsoft to find the right way to emerge from the shadows of the strongly established duopoly of the smartphone industry. Windows Phone must demonstrate unique and powerful capabilities, quickly innovating and improving the state of the platform. Windows Phone, today, is surely the platform with the best chances to become the third app ecosystem behind Apple iOS and Google Android. The big question is, “how distant will the platform be from the two leaders?”.

#### 4.4 BLACKBERRY, THE CASE OF A FALLEN GIANT

##### *4.4.1 History Background*

BlackBerry Limited, formerly known as Research In Motion Limited (RIM)<sup>140</sup>, is a Canadian telecommunication and wireless equipment company founded in 1984 by Mike Lazaridis and Douglas Fregin. It is best known for its BlackBerry branded smartphones and tablets.

In 1999, the company launched its first product running the BlackBerry OS, the two-way pager BlackBerry 850. A second generation of devices have been introduced in 2002. They were smartphone provided with physical QWERTY keyboard and supported typical smartphone features, such as push email, text messaging and a basic internet browser.

Following versions added instant messaging functions and personal management tools, such as calendars and agendas. BlackBerry became strong in the enterprise

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<sup>140</sup> In order not be confusing, I will refer indistinctly to RIM or BlackBerry to identify the company. I will use the name “BlackBerry OS” to identify the operating system.



market but also within text-addicted users. Similar to Apple, BlackBerry historically followed an integrated approach for the production of its products, from the device manufacture to the development of the operating system and the embedded applications. In addition to this, BlackBerry owns messaging servers and operates the service infrastructure for its messaging and location-based services. BlackBerry OS runs exclusively on RIM's devices and it is not licensed to other OEMs.

Originally a leading innovative company of the smartphone market for business and government usage, the company has sharply declined in recent years due to the changed competition paradigm brought in the industry by the iPhone. The company's market share, that accounted for about 20% of world smartphone industry in 2009<sup>141</sup>, dropped to less than 2% in 2013<sup>142</sup>. On September 2013, the company signed a letter of intent to be acquired for 4.7 billion dollars. Most of Blackberry's remaining value is determined by its patent portfolio.

#### ***4.4.2 A Series of Unhappy Management Decisions***

This post-iPhone period was an era of strategic confusion for RIM.

Soon after the iPhone arrival, RIM had its important chance to contest the new rival. Because Apple signed an exclusive deal with the AT&T wireless company, Verizon Wireless, one of the biggest U.S. wireless players, asked RIM to develop "the iPhone killer". Verizon would have supported the new RIM's device, which should have been rigorously touchscreen, with a strong marketing campaign. RIM took the charge and started the development of the new BlackBerry storm. The result of this ambitious product was a total failure: the product hit the market months later than the settled date; the touchscreen was difficult and annoying to manipulate and far from competitive with the perfectly respondent iPhone's touchscreen; it relied on a single processor that made the product slow; many customers have been completely disappointed. Verizon Wireless soon abandoned the product and turned to the new Android operating system.

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<sup>141</sup> Source: (Wikimedia Commons, 2013), based on Gartner actuals

<sup>142</sup> Source: [www.gartner.com](http://www.gartner.com) (Gartner - Press Release, 2013)

In April 2010, RIM decided to acquire QNX Software System, an operating system developer company that, in the company expectation, would have provided the company with the needed software capabilities to compete in the new industry scenario. The QNX team's first assignment was to work on the operating system of the PlayBook, the new RIM's tablet in response of the successful iPad of Apple. Even in this case, the development of the product went through organizational and decisional problems that lead to terrible results. The product was marketed in April 2011 instead of in the fall of 2010. The Playbook lacked emails, contacts and apps and was essentially developed as an accessory product of a BlackBerry smartphone. It was a decisive flop and a turning point because it made publicly evident the declining stage of the Canadian company.

Even after its terrible year in 2011, RIM still had some valuable assets, such as the BBM, the BlackBerry Messenger. It was an app developed in 2005, and it was the first instant messaging service that used wireless connection to allow users to send free and reliable messages. It was one of the historical value added of the BlackBerry devices but had just one negative point: BBM only worked on BlackBerrys. When the Apple and Google's application platform took off, it was clear that other new instant messaging service would soon arise. That quickly induced part of the RIM's management to begin thinking of offering BBM to other mobile platforms. It was the right opportunity to make BBM the dominant chat messaging service of the smartphone industry thus creating a new interesting business for the BlackBerry brand. However, this portion of RIM's executives met resistance from the upper management, which was completely committed in the developing of the new version of the operating system, the BlackBerry 10. The new BBM business idea was quickly set aside.

At the beginning of 2012, during the development of the BlackBerry 10, RIM management was divided between those that wanted to produce only a touchscreen device, and those that wanted to produce also a keyboard phone version for BlackBerry die-hards. In the end, RIM's management agreed to release firstly the touchscreen version, the Z10, and then the keyboard version, the Q10. When the new Z10 was launched in January 2013, it received many positive important reviews even if many market observers largely agreed that the new

BlackBerry device was about two years late. As highlighted in an interesting report published on “The Globe and Mail”,<sup>143</sup> *“Once again, the market had shifted, and there was little demand for the Z10 in an era where sophisticated operating systems were commonplace and phones were getting cheaper.”* In a written response to questions about the success of the BlackBerry 10 introduction, the current BlackBerry’s CEO Mr. Heins called the launch *“a significant accomplishment and one that involved the reinvention of our company,”* even if he admitted *“it did not meet our expectations.”*

#### ***4.4.3 BlackBerry and The Innovator’s Dilemma***

Nowadays, the once giant of the smartphone business, BlackBerry Ltd., is on its knees and its future is seriously in doubt. The history of BlackBerry’s strategic movements highlighted above gives us a clear picture of the problems that incumbent firms face when a disruptive innovation changes the competitive paradigms of an industry.

Initially, BlackBerry’s co-chief executives, Mike Lazaridis and James Balsillie, did not take the iPhone seriously. An interesting article of “The Guardian”<sup>144</sup> highlights many of their most significant and explicative quotes:

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<sup>143</sup> Source: [www.theglobeandmail.com](http://www.theglobeandmail.com) (Silcoff, McNish , & Ladurantaye, 2013)

<sup>144</sup> Source: [www.theguardian.com](http://www.theguardian.com) (Arthur, 2012)

- Balsillie, February 2007: *"[Apple and the iPhone is] kind of one more entrant into an already very busy space with lots of choice for consumers ... But in terms of a sort of a sea-change for BlackBerry, I would think that's overstating it."*
- Balsillie, April 2007: *"Again, I have said this before and I will say it again; Apple has done the industry an enormous favour because they basically told the world to expect a media player [the iPod] as a software feature on a good smartphone."*
- Balsillie, November 2007: *"As nice as the Apple iPhone is, it poses a real challenge to its users. Try typing a web key on a touchscreen on an Apple iPhone, that's a real challenge. You cannot see what you type."*
- Lazaridis, May 2008 on mobile trends: *"The most exciting mobile trend is full Qwerty keyboards. I'm sorry, it really is. I'm not making this up."*
- Thorsten Heins, RIM's CEO from January 2012: *"At the very core of RIM – at its DNA – is the innovation. We always think ahead. We always think forward. We sometimes think the unthinkable."*

*Source: The Guardian*

The statements above are crucial for understanding the initial position of the two RIM's management towards the new Apple product. RIM's executives considered the iPhone as a toy, and assumed that corporations would never let their employees use them on the job. This concept let RIM's managers feel confident and sure about the company's core business. A famous BlackBerry marketing campaign was based on the sentence, "We need tools, not toys". While the iPhone was coming into the smartphone market, BlackBerry rested on its glories, sure that its targeted consumers would remain loyal and the iPhone would never break into the enterprise market. What the RIM's managers absolutely did not take in account was that the toy, soon, became an outperforming tool. It soon turned out that the iPhone touchscreen, coupled with a perfect integrated operating system and with the following introduction of the App Store, became, as I have deeply described in the second chapter, the *disruptive innovation* and the *compositio desiderata* of the smartphone industry.

RIM's greatest strength, its installed base and its enterprise-focus, became its greatest weakness.

One RIM's executive explicitly stated, *"The problem wasn't that we stopped listening to customers. We believed we knew better what customers needed long term than they did. Consumers would say, 'I want a faster browser.' We might say, 'You might think you want a faster browser, but you don't want to pay overage on your bill.' 'Well, I want a super big very responsive touchscreen.' 'Well, you might think you want that, but you don't want your phone to die at 2 p.m.' 'We would say, 'We know better, and they'll eventually figure it out.'"*

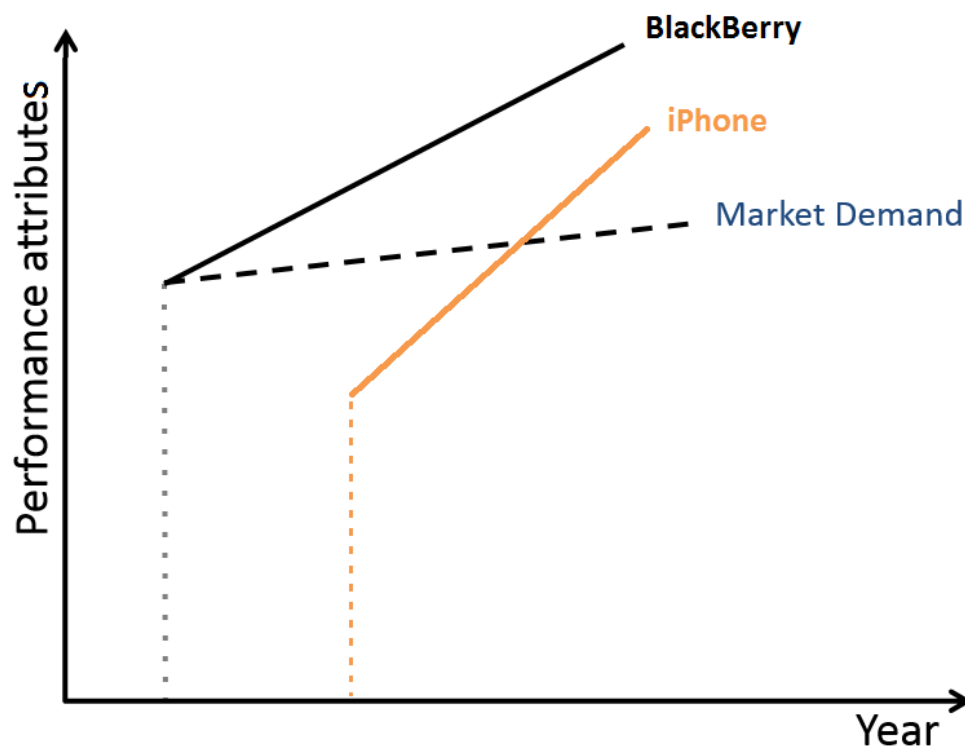
Another RIM executive in 2010 affirmed, *"Large corporate customers didn't want personal applications on corporate phones"*<sup>145</sup>.

These last two sentences, which come from RIM's executives, are a perfect example of what Christensen pointed as one of the most crucial determinants for incumbents' failure after the coming of a disruptive innovation. Precisely, *"because these firms [well managed firms] listened to their customers, invested aggressively in the new technologies that would provide their customers more and better products of the sort they wanted, and because they carefully studied market trends and systematically allocated investment capital to innovations that promised the best returns, they lost their position of leadership."*<sup>146</sup> That is because, as I already depicted in the second chapter, technological improvements of the incumbents firms can progress faster than the market demand, thus "overshooting" the market. As it was the case, a disruptive technology (the iPhone) can enter the market offering a different package of performance attributes (usability trajectory). At the beginning it can underperform but, soon, it will intercept the market demand. At that point, for the incumbent leading firm, is often too late.

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<sup>145</sup> Source: [www.techland.time.com](http://www.techland.time.com) (McCracken, 2013)

<sup>146</sup> Christensen, C. (1997). *The Innovator's Dilemma*. Harvard Business School Press. Introduction. p.xv



#### 4.4.4 BlackBerry's High Adjustment Costs

The previous paragraph highlights the initial RIM's management underestimation of the disruptive power embedded in the new coming iPhone. We have also seen that, generally, when a disruptive innovation begins to attract the demand of the market, for incumbents firms it is often too late. At that point, in fact, the reasons that made difficult for incumbents to react adequately rely on what are called "adjustment costs". As we have already anticipated in the first paragraph of this chapter, mentioned, *"The arrival of the conpositio desiderata creates an exigent environment in which swift response is require. [...] Yet, despite the urgency, organizations remain subject to inertia, a force that makes it difficult to transform the organization, leading to increases in adjustment costs."*<sup>147</sup>

An important point of the theory, which could be perfectly linked with the BlackBerry case, is that *"The broader the knowledge embedded in the firm's*

<sup>147</sup> Argyres, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University. p. 16

*assets the lower will be the adjustment costs. [...] By contrast, firms whose embedded knowledge is more specialized will face higher adjustment costs as they reposition. The higher adjustment costs arise because acquiring new knowledge especially if some of it is tacit, is often subject to a number of failures in the strategic factors market". "Therefore, the more the repositioning requires knowledge that the firm does not possess, the greater are the adjustment costs."*<sup>148</sup>

There are three main determinant of a company's adjustment costs: (1) internal resources and capabilities, (2) internal organization structure and incentives, and (3) relationships with external parties such as suppliers, buyers, and regulators."

We can see that BlackBerry faced significant issues coming from all the three determinant highlighted above:

1. Internal resources and capabilities: When Apple came into the industry with its new software platform standards and new user interfaces. Android was able to follow the iPhone standards supported by the right kind of software and technology capabilities. At that time, RIM's technology was still based on an operating system built in the 1990s and on Java computer code. The absolute failure of the Canadian company to produce in 2007 "the iPhone Killer" is a clear evidence that RIM was not positioned for the future and that, in order to survive, the company would have to change its DNA.

2. Internal organization structure and incentives: One of the main ingredients for the initial historical growth of RIM was due to its particular organizational structure. The company, in fact, had two CEOs, Lazaridis and Balsillie, one looking on the product management and the supply chain, and the other looking after sales and finance. This peculiar kind of company structure worked very well at the initial stage of the company growth, but became much less efficient when RIM started to become big. Decisional and communicational problems arise, and they lead to one of the most important and determinant problems of all the last company's business failures: speed. Another problem related to the company's

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<sup>148</sup> Argyres, N., Bigelow, L., & Nickerson, J. A. (2011). *Dominant Design, Conpositio Desiderata, and The Follower's Dilemma*. Washington University. p. 17

internal organizational structure arised when the company acquire QNX Software. RIM's management, in fact, decided to isolate the QNX team in order to let them free to develop the new operating system without being influenced by the rest of the organization, and thus being more able to create an "out of the box" innovation. It is, actually, one of the suggestions that Christensen and Raynord propose in their book "The Innovator's Solution". Unfortunately, this organizational decision created tension and morale problems, and employees out of the team started to be worried about their future. As Silcoff, Mcnish and Ladurantaye report in their work<sup>149</sup>, *"To me, the most logical thing would have been to integrate the operating system organizations into one," said one senior executive who was caught up in the fray. "Then you'd have a whole team, not 150 people sitting around saying, 'I don't know what I'm going to do next,' and another 150 people saying 'I'm over my head'"*.

### 3. Relationships with external parties such as suppliers buyers, and regulators:

The initial approach of BlackBerry at the App Ecosystem was exactly the opposite of the Google's one. RIM's management, in fact, strongly underestimated the applications' future industry impact. In November 2010, Balsillie stated, *"There may be 300,000 apps for the iPhone and iPad, but the only app you really need is the browser. You don't need an app for the web ... You don't need to go through some kind of SDK ... You can use your web tools ... And you can publish your apps to the BlackBerry without writing any native code."*<sup>150</sup> The result of this was that when BlackBerry started to create its own app ecosystem it was late and, in addition to this, the company was not able to convince developers to write apps for its platform. Apple's iOS and Google's Android systems were much easier for outside software developers to use then the BlackBerry's technically complicated apps based on Java-based system. Blackberry's apps, on the other side, looked "uglier" than those of the two rivals. In addition, RIM exercised a tight control over developers in writing BlackBerry's apps without giving the same motivational inputs that Apple provide to developers to balance position. The

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<sup>149</sup> Source: [www.theglobeandmail.com](http://www.theglobeandmail.com) (Silcoff, Mcnish , & Ladurantaye, 2013)

<sup>150</sup> Source: [www.theguardian.com](http://www.theguardian.com) (Arthur, 2012)



company was also slow in providing services to help developers with the right tools, such as a way to transfer applications they had written for the old BlackBerry system to the new versions. Developers, in fact, would have to rewrite their apps for the new system if they wanted to remain part of the BlackBerry world. As a result, many popular apps initially decided to bypass BlackBerry. As of May 2013, BlackBerry World reached over 120,000 apps, against the over one million of iOS and Android apps.

At the end of the story, we can see BlackBerry as the vivid example of how one's core competence can be both a blessing and a curse as disruptive technologies introduce a change. It is the typical case depicted by Christensen in its "Innovator's Dilemma", in which a big and leading company of an industry, because it stays too close to their main customers, remains blinded on the new paradigms that are coming into the industry.

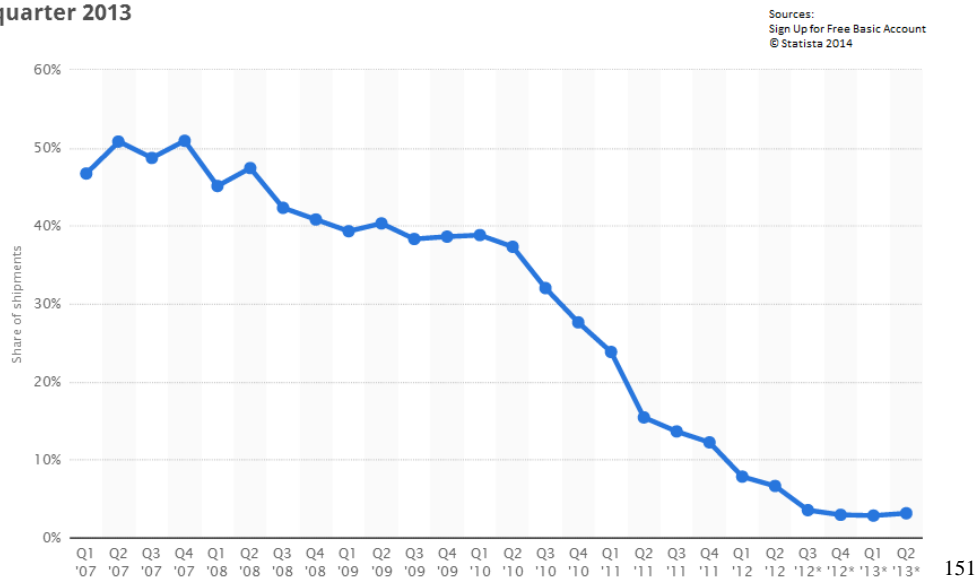
It is also a vivid example of how adjustment costs can be high for incumbents firms when a *conpositio desiderata* comes into the market, especially when the firm has a very specialized and focus vocation.

## 4.5 NOKIA

### ***4.5.1 History Background***

Nokia Corporation is a Finnish communication and information technology multinational corporation. Nokia was the world's largest vendor of mobile phones from 1998 to 2012. Nokia reached its dominant position in the mobile phone industry relying on its vertical integrated manufacturing capabilities and strong relationships with network carriers. However, in the last five years its market share steadily declined from a peak around 55% of the handsets to less than 30% in 2010. According to Gartner, in 2007 Nokia's Symbian OS accounted for more than 65% of all smartphone, against the 6,5% of iOS. Nowadays, as I have depicted already in the first chapter, the situation is dramatic.

**Global market share held by Nokia smartphones from 1st quarter 2007 to 2nd quarter 2013**



In February 2011, Nokia announced an important strategic partnership with Microsoft, which led to the replacement of Symbian with Microsoft's Windows Phone operating system in all Nokia smartphones. According to Gartner,<sup>152</sup> Nokia's position in the smartphone market by vendor in the first quarter of 2013 dropped to "No. 10".

In September 2013, Microsoft announced its plan to purchase Nokia's mobile phone business unit.

#### ***4.5.2 The Story of Symbian***

Because of its dominant position in the mobile phone manufacturing market, Nokia was perfectly conscious of the convergence of the Internet and mobile phones. That is why in 1998, together with other handset manufactures, such as Ericsson, Motorola and Psion, it started to develop a new operating system specific for smartphone, the Symbian OS. Since its initial development, the new operating systems was conceived to be freely licensed to several handset makers,

<sup>151</sup> Image Source: [www.statista.com](http://www.statista.com) (Statista Inc., 2013)

<sup>152</sup> Source: [www.gartner.com](http://www.gartner.com) (Gartner Press Release, 2013)

with the strategic intention to create a collective standard that could protect partner companies from a possible domination of other operating software producers. At that time, the biggest threat came from the Microsoft mobile OS. Once Symbian started to be marketed, Nokia immediately accounted for more than 80% of Symbian's device shipments and the majority of all smartphone sales until 2008.

Nokia, as the de facto regulator of Symbian, pursued an “academic” platform strategy, promoting the platform through collaborative development. Nokia stimulated the adoption of Symbian working together with application developers, handset manufacturers, and mobile operator in order to foster innovations for the advantages of the whole Symbian platform. Even if Nokia had the largest stake in the Symbian coalition, the other partners fully play their role in its evolution. However, this truly open platform strategy did not help Nokia to lose market share after the entrance of the iOS and Android. The coming of the iPhone in 2007, with its incredible new multi-touch user interface and all the related “usability innovations”, changed the attribute of the standard “smartphone operating system”. Nokia simply did not have the right software DNA to replicate quickly to a similar combination of elements. This lack of competence became even clearer after the introduction of the App Store in 2008, which introduced a new system for programming, searching and downloading apps that was absolutely difficult to imitate rapidly and adequately for a firm that did not have the specific required know-how. In early 2011, Nokia's CEO officially declared that the Symbian OS had become obsolete compared to Android and iOS, and thus Nokia opted to abandon the Symbian operating system to rely on Microsoft's Windows Phone OS. By setting aside a legacy operating system in favor of a new application platform technology, hoped to catch up with its competitors' much younger operating systems. This was a major turning point for Nokia because it confined the Finnish company to compete, from that moment on, only on the handset-manufacturing field. Unfortunately for Nokia, the powerful expansion of the Android OS transformed the manufacturing sector of the smartphone industry into an almost zero-profit market for all modular handset makers (with just one exception – Samsung – as I will demonstrate in the following paragraph). In

September 2013, Microsoft announced its acquisition plan for the Nokia's mobile phone business unit. The transaction will soon close the important mobile phone chapter of the Nokia's old history.

#### ***4.5.3 Overview of Nokia's Experience***

The history of Nokia's software efforts that I have illustrated above, offers us two important learnings.

The first one is that, for building an effective application platform, a solid "software DNA" is required. All the new players and now leaders of the industry (Apple, Google and Microsoft) comes from the same US environment pregnant of the right software and Internet know-how.

The second important evidence is that network effects could be far stronger than supply chain efficiencies. It permitted, in fact, Apple first and Google after, to challenge and win over Nokia's internal smartphone platforms.

### **4.6 SAMSUNG**

#### ***4.6.1 History Background***

Samsung is a South Korean multinational conglomerate company. Samsung was founded in 1938 as a trading company and it grew diversifying into several different sectors. In the 1960s, the company entered the electronics industry. Since 1990s, Samsung have risen as an international corporation with globalized activities. It is today the second largest producer of memory chips after Intel.<sup>153</sup>

Since 2005, Samsung has become the world's largest manufacturer of liquid-crystal display panels.

Samsung started to focus on the mobile phone industry at the end of 1990 and today it is one of the company's most profitable business.

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<sup>153</sup> Source: [www.isuppli.com](http://www.isuppli.com) (Ford, 2013)

The company produced also its own mobile application platform, the Bada operating system, which was launched at the end of 2009. It was a mobile application platform for mid to low-end touch-screen smartphones. Bada was utilized more as a strategic mean to increase Samsung's bargaining power in the negotiations with companies such as Google or Microsoft. At the beginning of 2013, Samsung announced it would stop developing Bada.

In 2010, Samsung announced its first flagship Android phone. The same year it entered the tablet market.

Today, Samsung is the leading smartphone handset makers with more than 32% of the market share.<sup>154</sup> What is interesting to point here is that, nowadays, the smartphone handset market is a "zero-profits" market for almost all current modular device maker companies. Samsung is the only exception.

In the next two paragraph I will show, following an interesting paper of Max Nisen<sup>155</sup>, that Samsung was able to remain the sole profitable device maker of the industry because it pursuits a "fast follower" strategy relying on powerful resources and on the right organizational structure.

#### ***4.6.2 The "Fast Follower" Strategy***

First of all, *"Samsung is better than anybody else at learning from its competitors"*<sup>156</sup>. Barry Jaruzelski, co-author of the "Global Innovation 1000", depicted Samsung as the perfect example of what he called "market reader". *"It is sort of the classic fast follower," explains "It doesn't mean they ignore their customers, but they're very attuned to what competitors are doing and what other people are bringing to market first and observing what seems to be gaining traction, then very rapidly coming up with their own version of that innovation."*<sup>157</sup>

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<sup>154</sup> Source: [www.gartner.com](http://www.gartner.com) (Gartner - Press Release, 2013)

<sup>155</sup> Source: [www.businessinsider.com](http://www.businessinsider.com) (Nisen, How IBM Crushed Everyone Else In Patents For The 20th Straight Year, 2013)

<sup>156</sup> Source: [www.strategy-business.com](http://www.strategy-business.com) (Jaruzelski, Loehr, & Holman, 2012)

<sup>157</sup> Source: [www.strategy-business.com](http://www.strategy-business.com) (Jaruzelski, Loehr, & Holman, 2012)

The company tries and produces very quickly, releasing a wide variety of devices. It sees the response of the market, supporting successes and eliminating failures. IT combines market research with fast execution.

Despite its reputation, the company is able to create a lot of innovation of its own. According to Business Insider<sup>158</sup>, Samsung was second only to IBM in the number of U.S. patents filed in 2012.

Contrary to Apple, which relies only on fewer models perfectly cured and designs, Samsung tries everything, and fast. As the Samsung' Chairman DJ Lee admitted, "We watch the market, and we immediately respond".

The Note was a perfect example of this approach. The unexpected market success of this new product called "phablet" (a combination of a smartphone and a tablet) came exactly from a market research that was immediately pivoted on the market. In addition to this, Samsung spends in R&D more than any other competitor in the industry. When Samsung wants to get behind something, it does so with significant weight. However, what is evident up to this point is that being a "fast follower" requires the right resources and the right organizational structure.

#### ***4.6.3 Samsung's Organizational Structure***

Samsung is much more than a simple smartphone-maker. It is a multinational conglomerate corporation and, above all, is one of the world's largest producers of memory chips. It also produces many of the most important smartphone components. All of this gives the company a substantial advantage in terms of costs and flexibility.

*"There was this orthodoxy 10 years ago that vertical integration was passé," says Tero Kuittinen, an analyst at Alekstra, a mobile-phone consultancy. "Then it turned out that the only two companies that took it seriously [Samsung and Apple] took over the whole handset industry." "Having that early-stage insight into the*

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<sup>158</sup> Source: [www.businessinsider.com](http://www.businessinsider.com) (Nisen, How IBM Crushed Everyone Else In Patents For The 20th Straight Year, 2013)

*supply chain has been one of the key factors to give them an edge,” says Neil Mawston of Strategy Analytics. “They can see three years ahead.””<sup>159</sup>*

Samsung’s position as supplier of key smartphone component, in fact, gives the company a way to understand how its main competitors are moving. If a device maker client asks Samsung a specific kind of hardware feature, it gives Samsung a high valuable information. *“Having a road map of, say, Apple and knowing what competitors are doing is pretty useful,” says Bernstein’s Newman. “It’s not copying, and it’s not illegal. You just know that in 2013, Apple’s going to need a quad-core processor.”<sup>160</sup>* This Samsung’s attitude leads the company to face many litigations on patent infringements. However, as it was for the case of the patent infringement battle against Apple, the pecuniary fines and the negative effects on reputation that the company is likely to face through these litigations are often a small price to pay compared to what the company achieves following this peculiar strategy.

Another key advantage that comes from the company’s global nature is the huge advantage in distribution.

A last important ingredient of Samsung organizational structure relies on its company’s culture, strongly characterized by the strong hierarchical and rigid approach typical of Korean companies. Even if it can create flexibility problems, in Samsung history it has always been one of its main successful ingredients. *““Samsung’s like clockwork,” says Mark Newman, an analyst at Sanford C. Bernstein (AB) who worked at Samsung from 2004 to 2010, for a time in its business strategy department. “You have to fall in line. If you don’t, the peer pressure’s unbearable. If you can’t follow a specific directive, you can’t stay at the firm.””<sup>161</sup>*

#### **4.6.4 Overview of Samsung’s Experience**

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<sup>159</sup> Source: [www.businessinsider.com](http://www.businessinsider.com) (Nisen, 2013)

<sup>160</sup> Source: [www.businessinsider.com](http://www.businessinsider.com) (Nisen, 2013)

<sup>161</sup> Source: [www.businessinsider.com](http://www.businessinsider.com) (Nisen, 2013)

As highlighted by the valid research made by VisionMobile ltd. in July 2013<sup>162</sup>, and as I partially mentioned at the beginning of the paragraph, the smartphone handset market is not a source of valuable profits for almost all current modular device maker companies. That is because “*Competition among OEMs in the Android camp is intense: all major Android vendors are pushing “hero devices”, i.e. cutting-edge smartphones, in the hope that they will be able to capitalise on features, brand recognition and retail relationships to increase their market share.*”<sup>163</sup> The only exception to this negative scenario is Samsung that, as I highlighted above, has been able to pursue a successful “fast follower” strategy thanks to its powerful organizational structure”. Samsung has been the sole case in the whole mobile industry scenario that was able not to be overwhelmed by the disruptive power of the new platform ecosystem. On the contrary, it was able to look at the changes that occurred in the industry, align the company’s strategy to them and, relying on its unique resources and capabilities, gain a substantial portion of the new market.

#### 4.7 COMPETITION OUTLOOK

In this last chapter, we have seen that the different strategies and business models used by the industry players reflected their diverse historical core competencies and backgrounds. Each of the described firms had to focus on their core competencies in order to find the best strategy to react to the changed competitive paradigm. Google and Windows entered the market leveraging on their know-how coming from the PC and the internet world. BlackBerry and Nokia tried with all their efforts to switch from its previous mobile phone and PDA experiences, no longer sufficient to maintain them competitive in the new scenario. The handset maker Samsung built its “fast follower” strategy upon a powerful and unique organizational structure.

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<sup>162</sup> VisionMobile ltd. (2013). *Developer Economics Q3 2013*.

<sup>163</sup> VisionMobile ltd. (2013). *Developer Economics Q3 2013 p. 15*



The mobile market will continue to evolve in the coming years. IOS and Android, with their self-reinforcing network effects, will continue to lead in a foreseeable future. Windows Phone, strengthened by Nokia's device business, is the most likely to rank third in the platform game, and its distance from the two leaders will depend on the company's ability to reinforce its ecosystem. Both the platform landscape and the handset market are going to become more complex in the close future, as a result of smartphone and tablet hardware commoditization and of market dynamics evolution. Emerging countries, with their diverse customer needs and different country structures (i.e. banking system, mobile operators efficiencies, legal frameworks), are becoming the next crucial mobile battlefields, which could lead to new outcomes in the industry and to major changes of the global competition landscape.

## CHAPTER 5 – CONCLUSIONS

The objective of my work is to give an empirical demonstration of the disruptive impact that can generate from a virtuous connection between strategy and innovation. The subject of the study is the revolution that occurred in the mobile phone industry after the entrance of the iPhone in the market in 2007. I have showed that Apple was able to link the innovation embedded in its product to an innovative strategy that, based on a novel business model, had such a “*disruptive*” impact that changed the paradigms of an entire industry.

In order to so, I have presented and described the various innovations that the iPhone brought into industry.

Following the famous theories of the Harvard Professor Clayton Christensen, stated in its famous work “The Innovator’s Dilemma”, I have demonstrated that Apple, innovating following the “*usability trajectory*” in both the hardware, the operating system and the creation of the App Store, gave birth to the iPhone, a *disruptive innovation* able to narrow the boundaries between product innovation and strategy innovation.

According to Argyres, Bigelow and Nickerson’ theories, I also demonstrated that the iPhone became the “*conpositio desiderata*” of the smartphone industry, able to create new standards for hardware design, software capabilities and business models. To do so, I illustrated that the iPhone’s “*usability innovations*” perfectly met the principal “latent” need of the smartphone and non-smartphone users at that time: the true usability of all the features of a smartphone. Smartphones, in fact, were already in the market in 2007, but people did not recognize the potentials of the product until the iPhone opened up their eyes. As Steve Jobs stated in an interview in 1985<sup>164</sup>, “*A lot of times, people don't know what they want until you show it to them.*”

In the third chapter, I have stressed the attention to the App Store, that I depicted as the bridge that Apple created to connect its innovative product to its innovative

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<sup>164</sup> Steve Jobs. (1985). Extract from the interview *Playboy Interview With Steve Jobs*. Retrieved from <http://www.scribd.com/doc/43945579/Playboy-Interview-With-Steve-Jobs>

strategy. The birth of the App Store, in fact, is the crucial momentum in which Apple created the other fundamental part of its disruptive innovation, a new business model that marked the birth of the Application Ecosystem. This is absolutely in line with the concept that pushed Raynor and Christensen to replace the term *disruptive technology* with *disruptive innovation* in their work “*The Innovator’s Solution*”<sup>165</sup>. They recognized that few technologies are intrinsically disruptive or sustaining in character while, indeed, it is the *business model* that the technology enables that creates the disruptive impact.

Following the framework drawn by an interesting work of Michael Seminer<sup>166</sup>, we have seen that Apple introduced a “*platform-based open innovation business model*”, able to bridge the gap between outside value creation and value capture. It is based on building an ecosystem of interdependent actors and control the bottlenecks of the new architecture. This new business model enabled Apple to reach what Professor Michael G. Jacobides calls “*architectural advantage*”,<sup>167</sup> which is “*the ability to control an industry without even owning it*”. It introduced, in the mobile phone industry, a new way of thinking about competition: firms do not only compete in a sector anymore, they compete to shape the structure of the sector.

I have also depicted the Apple case as a master example of “*how to build a platform leadership*” following the framework that Cusumano and Gawer described in their 2002’s works<sup>168 169</sup>. I demonstrated that Apple followed the authors’ suggestions in an extremely concrete and impeccable way.

IOS was so successful in setting a benchmark that all new platforms that came after the original iPhone attempt to copy Apple’s application platform recipe. We have seen that someone have succeeded, some other not.

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<sup>165</sup> Christensen, C. (2003). *The Innovator’s Solution: Creating and Sustaining Successful Growth*. Harvard Business Press.

<sup>166</sup> Seminer, M. (2009). *Platform-based Open Innovation Business Models: Bridging the gap between value creation and value capture*. MSc Dissertation Series.

<sup>167</sup> Jacobides, M. G. (2008). *Creating and Capturing Value: From Innovation to Architectural Advantage*. LBS Business Insight.

<sup>168</sup> Cusumano, M. A., & Gawer, A. (2002). *The Elements of Platform Leadership*. MIT Sloan Management Review

<sup>169</sup> Cusumano, M. A., & Gawer, A. (2002). *Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*. Harvard Business School Press.

I have illustrated, following Argyres, Bigelow and Nickerson, that when a “*conpositio desiderata*” shakes an industry, a “*follower’s dilemma*” arises for the other competitors. Following this theory, I have shown that the different strategies pursued by the different actors and the related results reflected their own core competencies and historical backgrounds. Google and Windows entered the market leveraging on their know-how coming from the PC and the internet world. BlackBerry and Nokia struggled to switch from its previous mobile phone and PDA experiences, no longer sufficient to maintain them competitive in the new scenario. The handset maker Samsung built its “fast follower” strategy upon a powerful and unique organizational structure.

The ultimate evidence that arises from this work is that today’s entrepreneurs should completely fuse strategy and innovative mentality to create a truly “*disruptive*” innovative product.

There must be innovation in strategy, as well as strategy in innovation.

The specific case of the “*platform-based open innovation business model*” that Apple introduced in the smartphone industry, demonstrates that today more than ever companies cannot rely entirely on their own research to create and deliver value for costumers. Those developments require firms to allow a more fluid interaction between external and internal innovations activities letting ideas, people and resources flow in, around and out the organization. In line with this, business models need to be re-evaluated, reconsidering not only the way to address customer needs, but also new ways to capture value from new products and services.

In this new business context, a company should “*insights on the advantages of modular design, the importance of architectural innovation, and the need to exercise a form of control over complementary products, services and components, while reaping the benefits from a strategy aimed at fostering network effects*”<sup>170</sup>.

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<sup>170</sup> Ballon, P. (2009). *Control and Value in Mobile Communications: A Political Economy of the Reconfiguration of Business Models in the European Mobile Industry*. PhD thesis. p.112

Successful companies have understood that the greatest part of value redistribution in today's economy comes from re-defining sectors and find innovative business models that change the way the value is created and captured. Corporations cannot rely on the creative genius of a solitary inventor anymore. Today, innovation requires new ways of managing and orchestrating the value that a company creates: it is a new way of thinking about strategy.

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