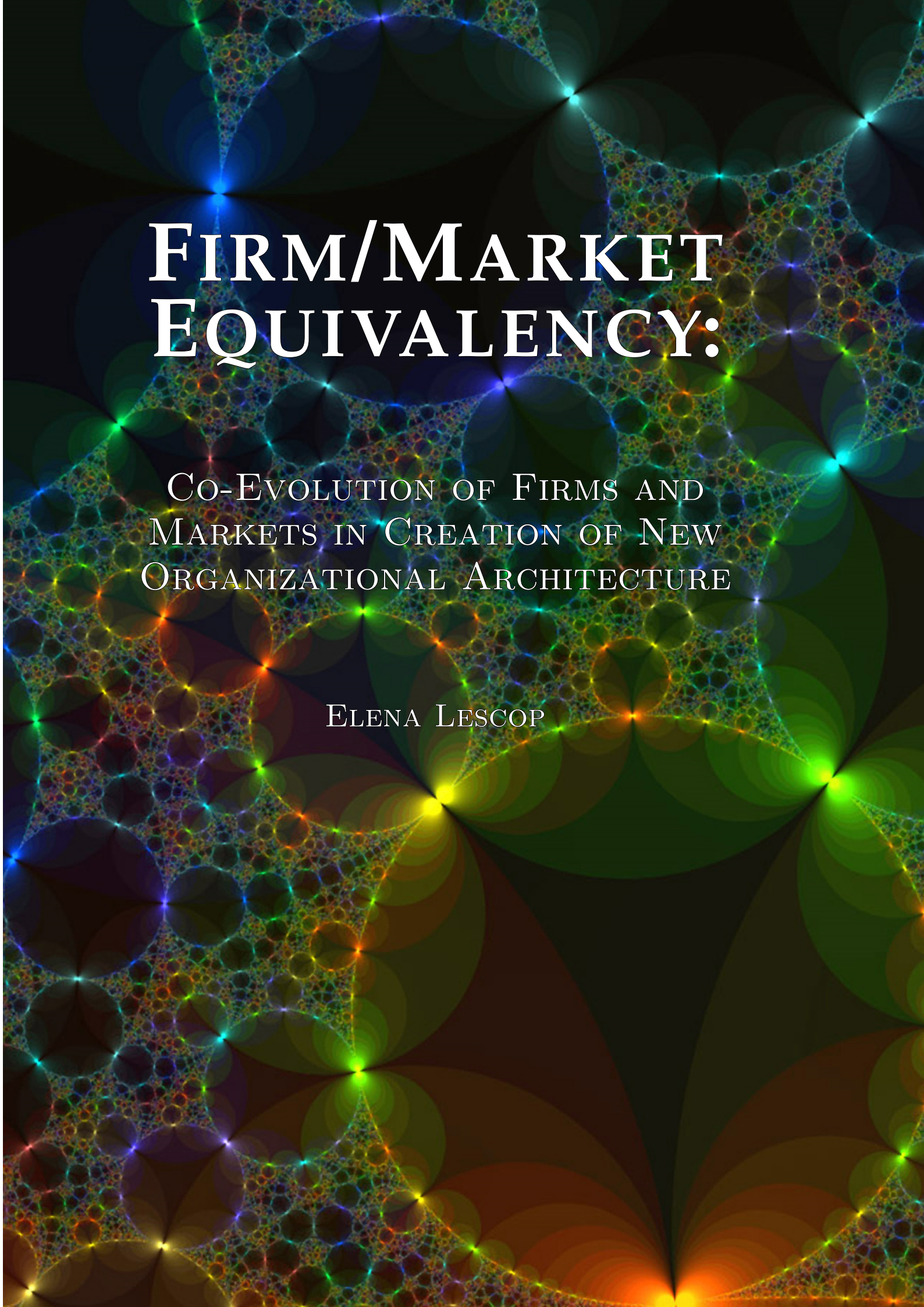


Firm/Market Equivalency:

Co-Evolution of Firms and Markets in Creation of New Organizational Architecture

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I would like to dedicate this thesis
to my loving husband Denis
and our firstborn, Avalon:
I would be lost without your energy,
positivity, stamina and love.
Denis, I kindly and sincerely thank you
for your far-reaching foresight, expert guidance,
endless endurance and generous encouragement.
Thank you for always being there
with me and for me.

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Abstract

The on-going process of evolution can be traced throughout the world around us. It is not limited to the objects of study of hard sciences. Methods, systems, mindsets - all undergo this process, and it also touches the ways the businesses are organized. This thesis, entitled *Firm/Market Equivalency: Co-Evolution of Firms and Markets in Creation of New Organizational Architecture*, aims to delineate these changes and outline their implications on organization of businesses and the industry structure as a whole. The particular attention is given to the market failures and market-creation strategies which, as a consequence, are often employed by today's firms, as well as how these strategies affect the shape and span of boundaries of the firms and markets. Comprehension of how the new forms of competition affect the market dynamics will help the regulators trace the early signs of anti-competitive behavior and prevent loss of welfare to society.



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Glossary

BDE business development ecosystem. 201

BE business ecosystem. 17, 35

CEMBUREAU European Cement Association. 11

GARA gross active user accounts. 72

GAU gross active users. 72

GMV gross merchandize volume. 71, 72

GRU gross registered users. 72

ICT information and communication technology. 195

IE innovation ecosystem. 17

netTPV net total payment volume. 72

OFT Office of Fair Trading. 186

OODA Observation, Orientation, Decision, Action. 213

OS operating system. 153

SDK software development kit. 109

SSNIP Small but Significant Non-Transitory Increase in Prices. 250

TPV total payment volume. 72

Introduction
Firms and Markets: Understanding New Forms of Competition



Blind Men and the Elephant

A Hindu Fable
by John Godfrey Saxe (1816 – 1887)

It was six men of Indostan
To learning much inclined,
Who went to see the Elephant
(Though all of them were blind),
That each by observation
Might satisfy his mind.

The First approached the Elephant,
And happening to fall
Against his broad and sturdy side,
At once began to bawl:
"God bless me!—but the Elephant
Is very like a wall!"

The Second, feeling of the tusk,
Cried: "Ho!—what have we here
So very round and smooth and sharp?
To me 'tis mighty clear
This wonder of an Elephant
Is very like a spear!"

The Third approached the animal,
And happening to take
The squirming trunk within his hands,
Thus boldly up and spake:
"I see," quoth he, "the Elephant
Is very like a snake!"

The Fourth reached out his eager hand,
And felt about the knee.
"What most this wondrous beast is like
Is mighty plain," quoth he;
"'Tis clear enough the Elephant
Is very like a tree!"

The Fifth, who chanced to touch the ear,
Said: ‘‘E’en the blindest man
Can tell what this resembles most;
Deny the fact who can,
This marvel of an Elephant
Is very like a fan!’’

The Sixth no sooner had begun
About the beast to grope,
Then, seizing on the swinging tail
That fell within his scope,
‘‘I see,’’ quoth he, ‘‘the Elephant
Is very like a rope!’’

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!

Moral:
So, oft in theologic wars
The disputants, I ween,
Rail on in utter ignorance
Of what each other mean,
And prate about an Elephant
Not one of them has seen!



Markets and firms evolve. The globalization of trade, the emergence of new fast-operating players, the acceleration of technological progress, the improvement of productivity, the Internet, the consumers' new behavior and attitudes, the exceptionally high speed of information flow from one point to another throughout the planet, the financial crises – all these are the phenomena that in no small degree have contributed to both: the fragility of the economic systems and the in-depth changes of competitive pressures.

In economic terms these phenomena have two visible effects: commoditization of markets and emergence of new competitive pressures. The first effect is attained due to presence of excess supply in certain industries such as personal computers, software, food, and clothing. This induces lower prices, lower profits and, as a result, commoditization of services and products. The concept of commoditization refers to a state of market where goods and services become simple commodities for the consumers: value becomes standardized and proprietary elements of products appear generic. With the commoditization in play the attempts to differentiate may fail even for well-established firms. Commoditization then forces firms to either dramatically decrease their costs or to race after launching new products on the markets. This entails either cost savings or value creation through innovation in the productive systems or in products and services, accordingly.

The second effect pertains to the emergence of the new forms of competitive pressures. Traditionally, a consumer was arbitrating between substitutable products and services that could meet his needs. Substitutability creates competitive pressure between firms selling substitutable products and services. Today, many products or services are complementary (computer, printer, Internet access, software, etc.). These complementarities spread out competitive pressures towards adjacent markets creating new rivalries between groups of products or services. Therefore, competitive pressure is not only about comparing substitutable products (e.g. Apple operating system versus Microsoft operating system) but also about comparing competing groups of complementary products (e.g. Apple compatible products versus Microsoft compatible products). Consumers are now evaluating the usage and value of a product or service not only in terms of its intrinsic value but also in terms of the

possibilities of combinations with other products or services. Firms therefore face a double pressure on their profitability: direct pressure that comes from competitors, and indirect pressure that is sourced from complementors who are eager to take a significant part of the value in exchange of the compatibility of their products or services. The competitive edge has changed: the competition is no longer solely among firms but also among groups or systems of firms offering complementary goods and services.

Firms can no longer operate alone – whether it is production, distribution or innovation. The most successful and outstanding firms are able to attract a large number of partners who help to improve their entire productive system. Some firms like Amazon, Apple, eBay, Google, Microsoft, Sony, Procter&Gamble, Toyota, weave complex networks of partners and collaborators around them. By doing so, these firms are even able to favorably alter the structure of their industries. The relation to others has changed and firms are using strategic systems to manage the tension between collaboration and competition. Various collaborative solutions have appeared: business ecosystems, clusters, living labs, crowd sourcing or the famous Connect+Develop of Procter&Gamble.

The evolution of the innovation network of Nokia depicted in figures 1 (NMT [1] and GSM era) and 2 (UMTS era) perfectly illustrates this point.

The trend is clear. The innovation network of Nokia had radically changed to support the new strategic vision of Nokia. Dittrich and Duysters (2007) observed that in the period between 1997 - 2002, 90% of the partners were new compared to the earlier period 1985 - 1996. New era of collaboration has been explored by Nokia through its innovation strategy (for instance, collaboration on secure payments on mobile phones); the number of non-equity agreements has grown from twenty to forty-two. The authors concluded:

> ‘‘The case of Nokia has illustrated the importance of strategic technology networks for strategic repositioning under conditions of change. Such interfirm networks seem to offer flexibility, speed, innovation, and the ability to adjust smoothly to changing market conditions and new strategic opportunities [. . .] The results show

[1] Nordic Mobile Telephone, a norm used in the mobile sector during the 1970s by the Nordic administration and rolled-out in Finland, Sweden, Norway and Denmark in 1981.

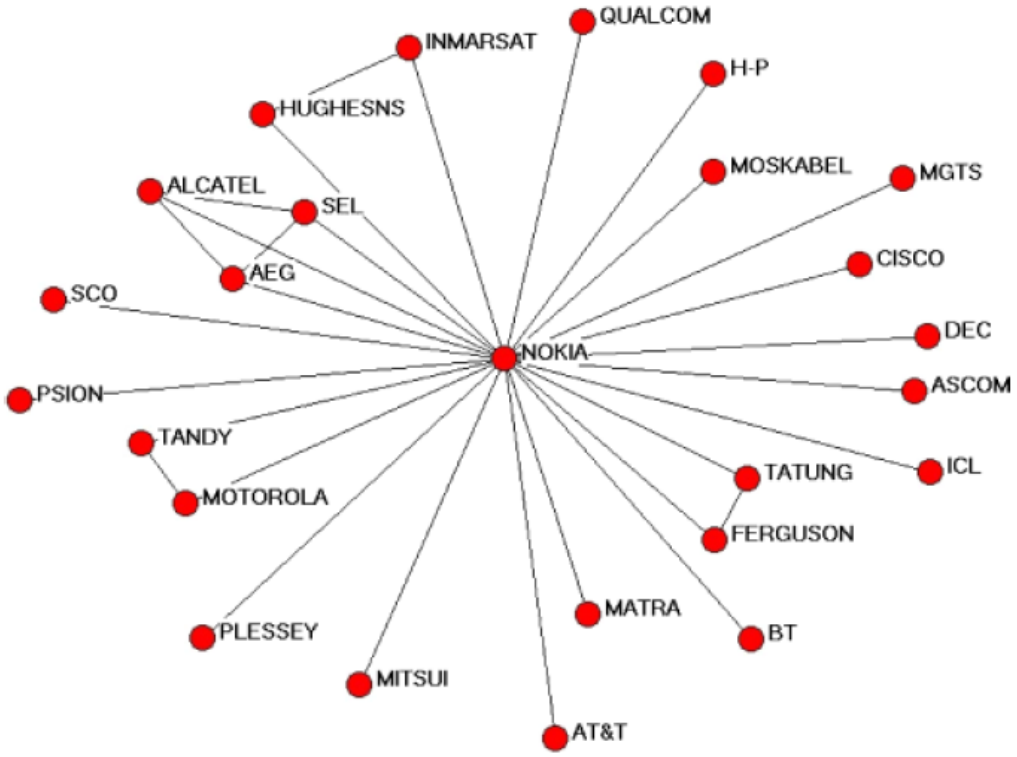


Figure 1: Nokia's Innovation Network in the NMT and GSM Trajectory. Source: MERIT-CATI (1985–1996)

> that Nokia has become a company embedded in both local and international innovation networks. The supplier network no longer consists of simple subcontracting or outsourcing relationships. The supplier–buyer relationship has been transformed to a networking relationship in which the boundaries between Nokia and its supplier have faded away.''

The competitive process has evolved. The competitive advantage is gained through the management and strategic use of third parties: consumers, users, providers, academics, customers, developers, and anyone able to improve the productive system. The boundaries of the firm are blurring. It has even become confusing to clearly define which role is performed by each of the economic players. The client is now seen as a potential partner carrying idea

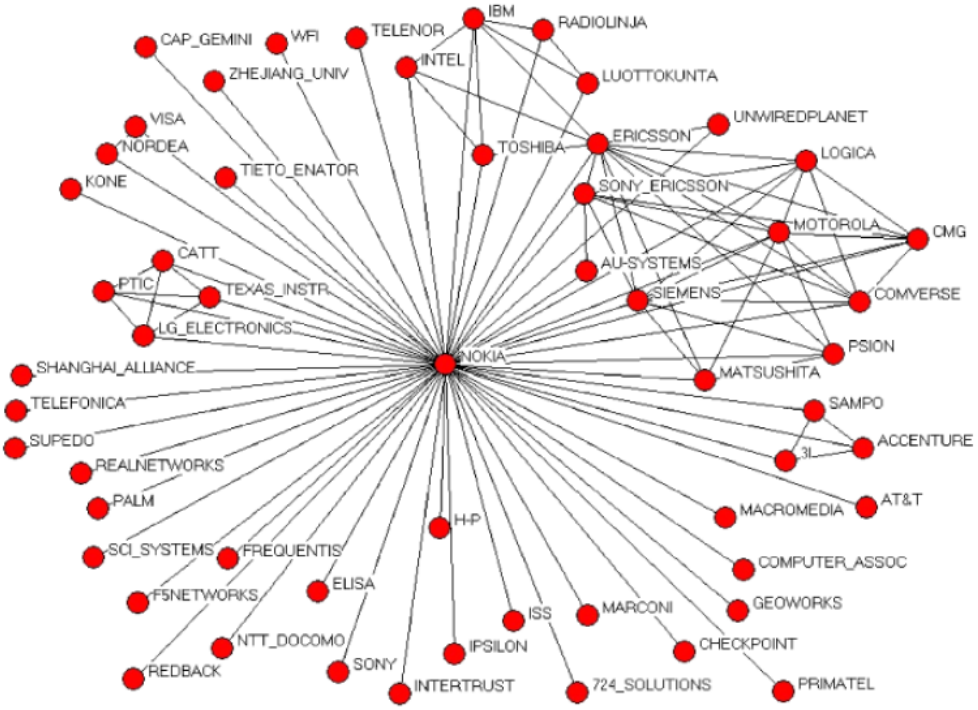


Figure 2: Nokia's Innovation Network in the UMTS Trajectory (1997–2002). Source: CGCP (1997–2002)

or innovation and whose audience can be monetized. Innovation has been democratized. As von Hippel (2005) argued:

> ''When I say that innovation is being democratized, I mean that users of products and services – both firms and individual consumers – are increasingly able to innovate for themselves. User-centered innovation processes offer great advantages over the manufacturer-centric innovation development systems that have been the mainstay of commerce for hundreds of years. Users that innovate can develop exactly what they want, rather than relying on manufacturers to act as their (often very imperfect) agents.''

This crowdsourcing aims at partially outsourcing the innovative process to a crowd of users; most of the time this crowd is assembled online. The term ''users'' here is taken in a broad sense: consumers, small firms, independent

developers, independent inventors, providers, complementors, competitors, etc. A firm is now better understood as a central node of a relational network.

The very notion of market becomes vague. The emergence, expansion and disappearance of markets is influenced tremendously by the strategic intent of firms and their networks: they are the strategic tools used by firms to acquire a competitive advantage. Today, the main function of the firms lies in their ability to support the markets they create. The question is: how do they create, support and control such markets?

The Context: a Collaborative Approach of the Productive Process and Innovation

The easiest and most effective way to remove any competitive pressure (and hence avoid commoditization) is to create new markets, to innovate. Given global hyper-competition and shorter product life cycles, innovation has become the leitmotif of modern firms in technology-related industries. Innovation has always been the central element of the competitive process: theoretically, it offers the easiest way to beat the competitors and to maintain high levels of profit margins.

Today innovation is understood in a broad sense. According to the Oslo Manual (2005), which is the most important source of guidelines for the collection and use of data on innovation activities, innovation is defined as follows:

> ''An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in-business practices, workplace organization or external relations.''

This definition encloses a wide range of innovation from incremental to disruptive, and from technological to organizational (business model innovation). The key is that it must be something new or sufficiently improved. In this sense, innovation is central to corporate strategy for either big or small firms. The

ability to create new products or services faster than competitors, to anticipate consumption trends, future usage or to bring correctly these novelties to the markets are the essential elements of survival and competitiveness of firms. The growth and the survival of firms depend on an ongoing innovation a process, a flow of continuous development and adaptation of products and services. Maintaining and managing such a high level of innovation is obviously not straightforward: as a consequence, firms can no longer innovate alone.

In his book *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Chesbrough (2003) proposed a new approach to the innovation process: an open innovation model. Its key idea is simple: firms do not need to be at the locus where an innovation spawns in order to benefit from it. Instead, they need to gain access to the innovation: buy, acquire, hire, license, etc. As a corollary, firms can no longer rely solely on their own resources to implement an effective and efficient innovation strategy. Chesbrough argues (p. 43):

> ''This new approach is based on a different knowledge landscape, with a different logic about the sources and uses of ideas. Open Innovation means that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well. This approach places external ideas and external paths to markets on the same level as that reserved for internal ideas and path to market during the Closed Innovation era.''

Under this approach, firms have to seek in their environment resources (knowledge, expertise, partners, etc.) likely to be valued by them (Outside-In) and to better use their internal resources by seeking new opportunities (Inside-Out: e.g. avoiding dormant patents by a more aggressive use of property rights). Figure 3 illustrates these two branches of the open innovation model.

Opening and in a way externalizing the innovation process raises the following three questions.

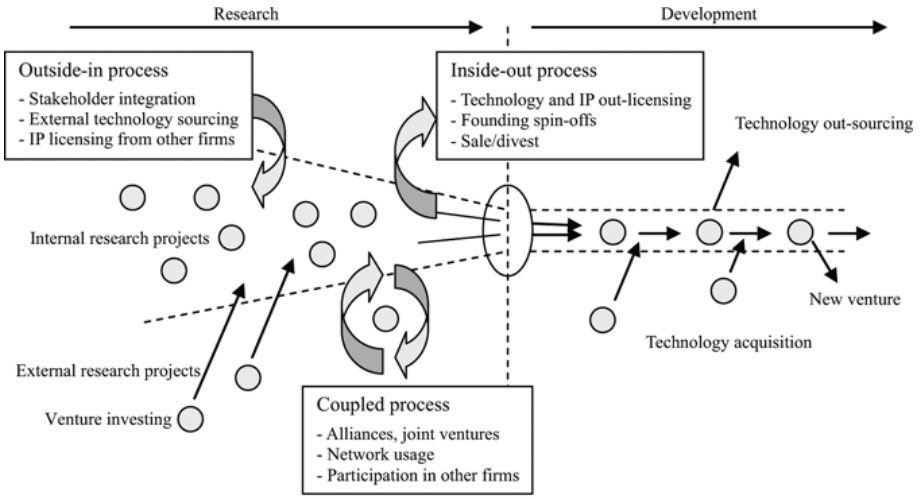


Figure 3: Outside-in and Inside-out Innovation Process. Source: Following Chesborough (2003); Gassmann and Enkel (2005)

What does *Opening* Mean?

Being open is not an alternative option of a binary option set: open or closed. Openness can rather be represented as a continuum, depending on the industry studied, the strategy used or the firm's culture. Openness is heavily contextual: it varies from industry to industry. One cannot compare openness in the ICT industry to openness in the cement industry. A study of OECD (2008) showed that some structural characteristics make industries more (+) or less (-) prone to open innovation: short technology life cycles (+) (ICT, electronics, telecommunications), long cycles of technology (-), knowledge intensity (+), technological intensity (+), the legal protection of innovation (+), path dependence implying that future innovation depends on previous innovations (-), tacit knowledge (-), explicit knowledge (+), mature industry (-). Clearly, open innovation is more likely in sectors with high capital intensity, high pace of innovation, growth and existing legal protection for innovation.

Openness does not mean open source (Pénin (2013)): it implies most of the time either property rights (patents) or contracts. Protection of properties, ideas, concepts or technologies gives more incentives to participate. It protects against free riding or betrayal by others. Even in mature industry with long cycles of technology, some forms of openness may occur, for instance, through

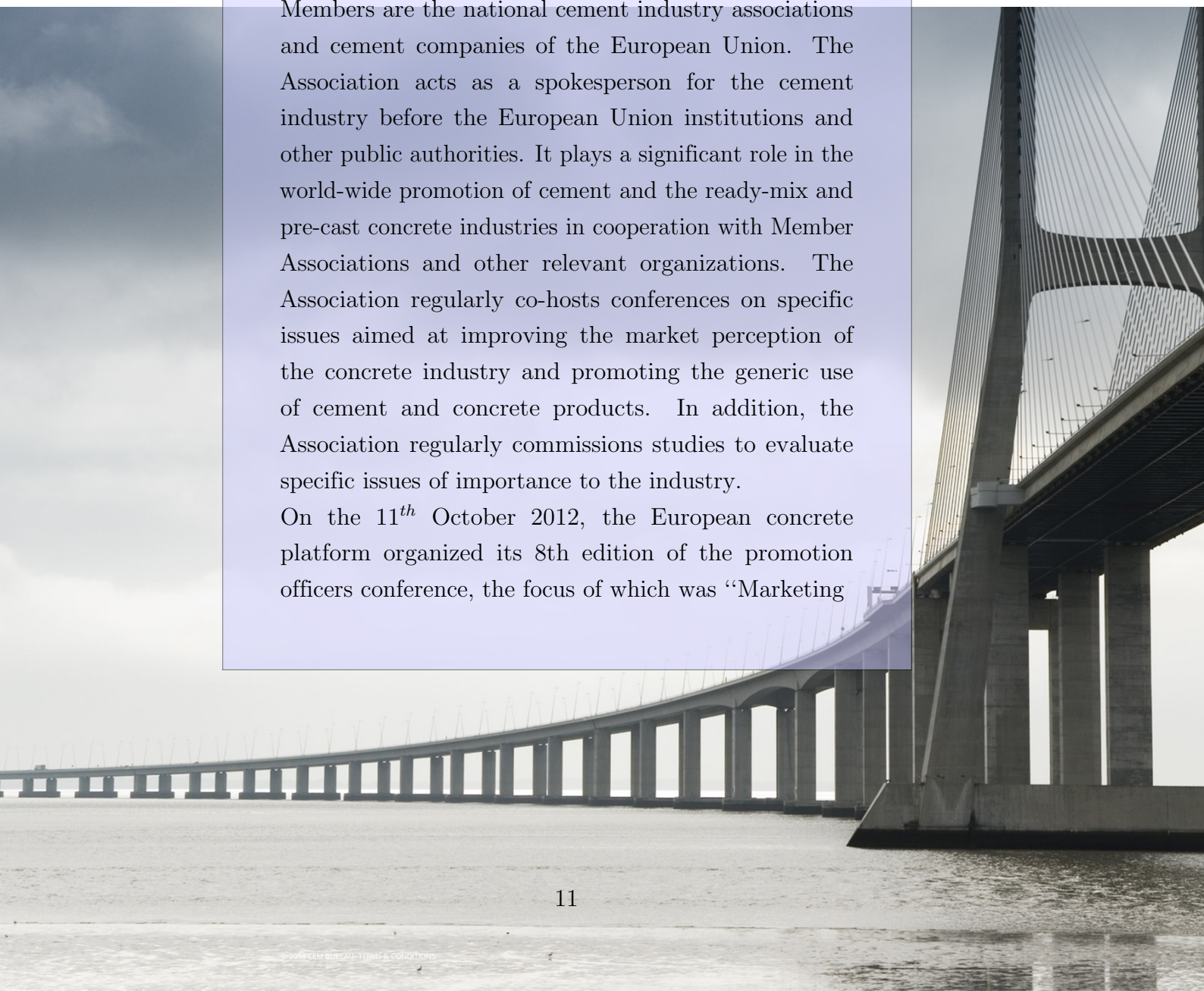
the organization of experts' conference, or through the creation of industry-related societies (see the insert entitled *''Mini-case: CEMBUREAU''*). In other words, what we may call openness in the cement industry may just be a routine in the software industry. Openness can only be defined according to its context.

MINI-CASE: CEMBUREAU

Extracts from the 2012 Activity Report

The European Cement Association (CEMBUREAU) is based in Brussels. CEMBUREAU is the representative organization of the cement industry in Europe. Members are the national cement industry associations and cement companies of the European Union. The Association acts as a spokesperson for the cement industry before the European Union institutions and other public authorities. It plays a significant role in the world-wide promotion of cement and the ready-mix and pre-cast concrete industries in cooperation with Member Associations and other relevant organizations. The Association regularly co-hosts conferences on specific issues aimed at improving the market perception of the concrete industry and promoting the generic use of cement and concrete products. In addition, the Association regularly commissions studies to evaluate specific issues of importance to the industry.

On the 11^{th} October 2012, the European concrete platform organized its 8th edition of the promotion officers conference, the focus of which was ''Marketing



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Concrete in a Changing World''. Held in Brussels, this event provided participants with the opportunity to reflect on current and future trends of concrete promotion. In addition, marketing strategies of other construction materials were also presented in order to fuel the debate. CEMBUREAU also supported the annual European Minerals Foundation Forum, which was held on November 28, 2012. This edition of the Forum ensured constructive dialogue between industry, policy makers and national land planners; the main focus of the discussion related to permitting processes and access to raw materials at Member State level.

What to Open?

Open innovation requires that each partner of the system shares, accesses the results of others, uses these results, improves them and eventually commercializes them. In this sense, the model appears very risky. However, revealing one's knowledge, skills or innovation does not mean giving it away for free or without control. It requires finding a compromise between openness and confidentiality, between what can be shared to improve the process and what needs to stay as the firm's secret. Only on very rare occasions do the firms open their core business or core competencies to their partners. Open innovation is most of the time a strategic tool of diversification used to improve the competences portfolio, to experiment novelties and to search for peripheral business opportunities.

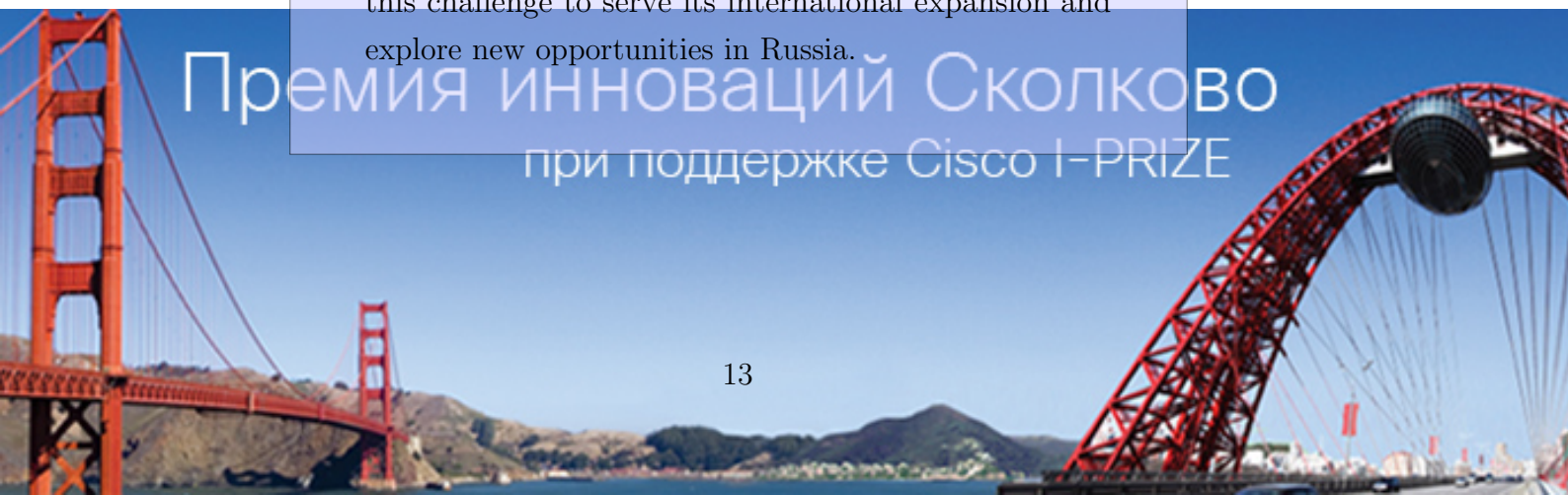
A corollary of ''what to open?'' is ''at which level to open''? Schematically, the innovation process shows three levels: ideation (finding an idea, a concept or a technology), development (transforming this idea, concept or technology into product or service) and commercialization (launching the product or the service on the market). The process can be opened at any level or any combination of

levels. The underlying principle is collective intelligence. Ideas, development or commercialization can be performed by partners, entrepreneurs, consumers, users or even competitors who are better equipped to perform these tasks.

Opening up of the ideation stage is well illustrated by initiatives like Innocentive, Connect+Develop or I-Prize of Cisco (see the insert entitled *''Mini-case: Cisco's I-Prize''* as an example.).

Mini-case: Cisco's I-Prize

Cisco idea looks like a worldwide challenge. Cisco launched the first I-Prize in 2007. I-Prize is a competition where entrepreneurs share and develop their ideas of business related to the future of work, the connected life, the new ways to learn or the future of entertainment. The aim of Cisco is to find the billion dollar ideas. The winners receive $250 000. In 2010, the competition gathered 2 900 participants from 156 countries around 824 ideas. The third I-Prize challenge in 2011 was targeted at Russia (Skolkovo Innovation Award, Powered by Cisco I-Prize) and gathered 10 000 Russian entrepreneurs around 2 381 ideas. The fourth and last challenge to date has also targeted Russia, but this time on specific projects: development and usage of smart grids and cloud technologies in energy saving, in healthcare or in education. Russia and the Skolkovo Technopolis seem like a field of ideas and development for Cisco: clearly, Cisco is using this challenge to serve its international expansion and explore new opportunities in Russia.



How to Open?

Dahlander and Gann (2010) proposed four different categories of openness (see table 1). Each category of openness suggests a particular strategy or actions.

	Inbound innovation	Outbound innovation
Pecuniary	Acquiring	Selling
Non-pecuniary	Sourcing	Revealing

Table 1: Structure of Different Forms of Openness. Source: Dahlander and Gann (2010).

Revealing and selling, generally referred to as outbound innovation, are the inside-out forms of open innovation.

Revealing refers to the act of unravelling the internal resources to the partners. This form of openness, however, bears no immediate financial returns. The collective invention of Allen (1983) illustrates the mutual revealing process. Firms in the English iron industry of the XIX^{th} century were regularly sharing through publications or discussions the performance and design of their blast furnaces. Neither patents, nor property rights were protecting these ideas: every firm was allowed to use this knowledge for its own cause. The way Wikipedia gathers and diffuses information and knowledge is another modern illustration of this revealing strategy. Revealing helps the firm gain legitimacy and reputation of collaboration in its external environment. It is a brick in the path towards extensive collaboration from external partners. Revealing may entail negative effects when it (indirectly) helps build competitive advantages for competitors.

Selling refers to the situation in which firms monetize on their ideas, innovations or technologies by either giving up the property rights (selling) or authorizing use of the proprietary content (licensing) in exchange for a fee. The essence of advantage of this form of openness is to monetize on the firm's innovations and patents that are otherwise dormant ''on the shelf''. The firm may benefit from simply selling or licensing out their patents. Alternatively, it can seek external partners with whom to carry out mutually beneficial endeavors, and that can put the shelved patents to good use. Such partners may

be better equipped or more efficient in implementing the firm's innovation through product development, service design or commercialization.

Inbound innovation such as sourcing and acquiring are the outside-in forms of open innovation.

Sourcing is diametrically opposed to revealing. Sourcing refers to a situation in which firms use external resources (suppliers, customers, competitors, consultants, universities, research organizations, clusters, etc.) for free. It corresponds to the exploration process: firms are scanning their environment in search of ideas, concepts, competences and knowledge that may be combined with their internal resources or engaged in their internal innovation process (e.g. Connect + Develop of Procter&Gamble).

Acquiring is the counterpart of selling. Firms buy external resources (pure acquisition, license-in, expertise) which are then inserted into their internal innovation process.

Each of these four forms of openness can be used alone or in combination.

How to open also depends on the time horizon and the strategic autonomy required by the firm, as well as the degree of familiarity with the targeted markets and the targeted technology (see table 2). Both: acquisition and licensing-in allow for a quicker entry into a new market and a faster access to using the new technology in comparison to the time frames associated with internal development. However, from the standpoint of autonomy, licensing is less favorable in comparison to autonomy achieved through internal development or acquisition.

MARKETS	TECHNOLOGY: **Core**	**Non-core**	**Unfamiliar**
Unfamiliar	Joint Venture Contract R&D	Venture Capital Internal Venture Fund	Spin-off Sell
Non-core	Joint Development Acquisition	Licensing Equity Stake	Venture Capital Internal Venture Fund
Core	Acquisition Internal Development	Internal Development License Acquisition	Joint Venture Contract R&D

Table 2: Open Innovation Modes: Technology and Markets. Source: OECD (2008).

Following its strategic intent, the shape of its environment, the dynamics of its industry, a firm will adopt one or several of the presented options to open up its innovation process and productive system. The firm will choose who to involve in the process, at which stage and in what capacity. Depending on its familiarity with markets and technologies, it will also choose a particular form of collaboration or interaction with its external environment.

Shen (2009), Research Fellow and Head of Palo Alto Nokia Research Center, explained:

> ''Making Symbian open is part of crowdsourcing approach in which instead of relying on finite number of people inside one company, it opens that up to the contributions of the greater community. We believe that is an effective way to accelerate the rate of innovation. But Symbian is only one of the primary systems that we have. The other one is Maemo, which is also open source. It's basically our version of the Linux OS. When it comes to OS or platforms, we are clearly moving towards the open source paradigm. The key underlying notion here is that the old walled garden approach – collecting all your IPRs, building these walls and leveraging the whole – is no longer the most effective paradigm for a number of reasons: 1) it is becoming very difficult for one company to hold all the necessary IPRs in order to create a walled garden that you can actually control; 2) innovation is happening at such a broad level that one company cannot possibly master it. Opening it up to allow a larger community to contribute is good for the entire industry, for the company that is thriving in the field.''

Business Ecosystems and Platforms as a Managerial Answer to this Imperative of Collaboration

In order for collaboration and interactions to take place, a designated space needs to be defined and created. The opening up of the innovation process involves creation of a system the core function of which is to facilitate exchanges and interactions. Business ecosystems (BEs) and innovation ecosystems (IEs) have largely been used by managers to meet this requirement. Schematically, they are represented by a community of economic actors (customers, complementors, R&D labs, etc.) gathered around a leading company (figure 4).

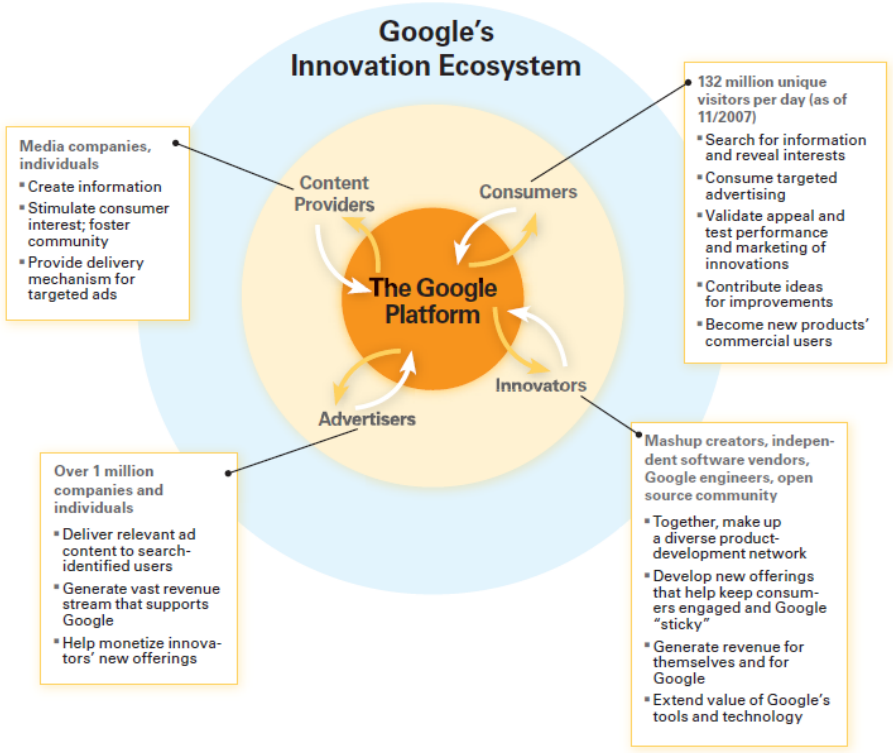


Figure 4: Google's Innovation Ecosystem. Source: Iyer and Davenport (2008)

A leading company has two roles:

- As a member of the ecosystem, it shares and provides resources and value to the whole ecosystem;
- As a coordinator, it provides the building blocks needed to operate the system (knowledge, financial resources, customer bases, reputation, etc.) and ensures the efficiency of exchanges and interactions.

The function of coordination is central to the ecosystem's health. The leader adopts the position of an intermediary to facilitate and regulate interactions that take place within the system. This intermediary function is implemented by means of a platform. A platform is understood as a medium that facilitates interactions (or transactions) among several groups of economic agents served by it. For Chesbrough (2011):

> ''The advantage of platforms is that a network of small firms remains entrepreneurial and creative and can make quick decisions, while profiting from leverage of the tangible and intangible assets of the large firm. A second advantage is that they sometimes discover exciting opportunities that the large company did not know about.''

There are several ways in which the platform can manifest itself: physical (conferences, common lab), virtual/technical (Google, Amazon), permanent or non-permanent (challenges, ideas of entrepreneurs competition). As coordinator, the platform owner gains a detailed understanding of their system through the controlled flow of information and knowledge. The platform can be seen as a tool of automation of interactions.

Platform-based innovation ecosystems follow the logic of an incubator:

- Open and non-discriminatory partnership: anyone can enter the system. The platform acts as a repository of codified knowledge and resources (e.g. software development kits) that are open to all participants;
- Open innovation system: this ensures value creation;

- Controlled/regulated system of open innovation (IP management): this ensures value capture;
- Interoperability: every partner should ''speak'' the same language. Interoperability is in ICT-related system a prerequisite for open innovation and it guaranties a rapid dissemination of information. It ensures an efficient and reciprocal exchange/sharing of data, information and knowledge between partners;
- Knowledge and information sharing within the ecosystem;
- Logic of control of the interfaces with the external environment (consumers): most of the time, the contact with the final users or the main actors go through the platform owner (e.g. Apple iTunes);
- Exploration logic: the system allows the platform owner to track value and to be aware of value migrations.

The Google model (see table 3) is a textbook case of innovation ecosystems centered on internet-based operating platform, composed of proprietary infrastructure, hardware, operating systems and a database. This platform operates as a modular, flexible hub where partners can share and create new applications relying on Google resources.

The business philosophy of Google is to provide products and services that make the Internet a more useful and enjoyable experience for their users, and enhance the way people access information. Obviously, innovation is of tremendous importance to Google. Since its early beginning it has adopted a user-centric approach placing customer satisfaction as a top priority.

Google has a strong internal culture for open innovation: innovation is spread across all Google departments and business units. All employees are engaged in the innovation process. They are expected to spend some of their work time (up to 20%) on an innovative or creative project of their choice: this is how Gmail, Google News and AdSense were created. Google tries to maintain a start-up spirit by promoting professional exchanges, interactions and discussions between employees as well as by minimizing the corporate hierarchy. This culture is surely the main element of Google innovation strategy.

Inside-Out	Outside-In
• Interoperability • Openness: open API, open-source platform • Technology licensing-out	• Connect and Develop: academic world, SMEs, partnerships and alliances • Connect and Buy: corporate venture capital, acquisitions, investments
INTERNAL CULTURE OF OPEN INNOVATION	

Table 3: Innovation at Google: Explore, Exploit, Conquer

The inside-out strategy is composed of three elements: interoperability, openness, and technology licensing. Google creates and participates in the standardization and normalization groups to foster deep collaboration in the system. For instance, in 2007 Google created the Open Handset Alliance: a consortium of 47 members (among which: NTT Docomo, T-Mobile, China Mobile, Telecom Italia, eBay, Intel, Nvidia, Qualcomm, HTC, LG, Motorola, Samsung). The consortium aimed to develop an open standard for mobile devices operating system, better known as Android. Members of the alliance are not allowed in principle to produce devices that are incompatible with the Android system. Google ensures openness of its system through open API (Application Programming Interface) and open-source platform. API specifies how the components of software interact with each other. API eases the work of programming and the interactions between developers. Most of the Google's applications have API (e.g. Google Search, Google Maps, Google Earth, Picasa, AdWords, AdSense, etc.). Lastly, Google uses licensing to share some of its technologies with the third parties.

Google's outside-in approach is built around the following two elements: Connect and Develop and Connect and Buy. The former one is now a classic. Google tries to drain ideas and concepts from its environment by maintaining

strong relations with the key actors: users (Google Ideas), leading academic institutions to pursue research of common interest and to ensure rapid patenting, when necessary (Google Scholarships, Google Research Awards, Google as an institutional partner of research foundations, Google Faculty Summit, Visiting Faculty Program), developers (Android Developer Challenge), joint research with industrial partners (for instance: IBM, certain universities on cloud computing, NASA), strategic alliances (with mobile operators, software and media companies on cloud computing, on advertising services, to develop mobile devices). The latter, Connect and Buy, relies on corporate venture capital, equity investments and acquisitions. Corporate venture capital is dedicated to start-ups regardless of sector (Google Ventures). Google invests time, money and resources to find creative and innovative entrepreneurs who in the future may offer significant financial returns. Also, Google has quite an aggressive policy for investments and acquisitions. Between 2001 and March 2014, Google has bought 146 firms, the largest acquisition being Motorola Mobility for $12,5 billion in 2011[1]. These companies were either integrated or used by Google departments or divisions.

Google innovation strategy shows the high complexity of such system. From the managerial point of view, open innovation has many implications. It is essentially based on the intelligent opening of competences, ideas, knowledge, patents and corporate resources. This opening requires that the firm develops new capabilities: management of external flows of knowledge, ideas and skills (Knowledge Manager), control the use of its intellectual property (Intellectual Property Attorney), and shift of the R&D towards a focus on development and exploration. Firms must also be able to foster collaboration both internally and externally. Open innovation can create internal tensions: employees may resist the new culture of openness. Open innovation requires management of the internal and external relational network: a necessary condition of success is the ability to attract a third party to share skills and risks as well as to accelerate the pace of innovation.

Creating a platform to support a collaborative process of innovation raises

[1]Source: Wikipedia consulted on April 2014, ''List of Mergers and Acquisitions by Google''.

many issues. Apart from being able to attract other players, the platform owner must ensure an in-depth governance of the system to prevent any dysfunction that may jeopardize the flow of interactions, information, knowledge or innovations. Some players might be tempted to develop strategies to slow or even block the development of other players. Moreover, the platform owner should prevent any uncontrolled fleeing out of the system: such outflows imply destruction of value inside the system. Interoperability and property rights can play a crucial role.

Beyond Innovation

These managerial trends go far beyond the scope of innovation and influence business practices in general. Firms use platform strategy to implement new forms of business models focusing on intermediation, partnership and openness. These strategies incorporate partners' networks as a key element of business model (Osterwalder and Pigneur (2009)). Platform or ecosystem strategy can foster the growth of a firm and leverage the transformation of a business model.

Amazon is the world's largest online retailer. It has been created by Jeff Bezos in 1994. Figure 5 from Isckia and Lescop (2009) describes Amazon's three main stages of the growth.

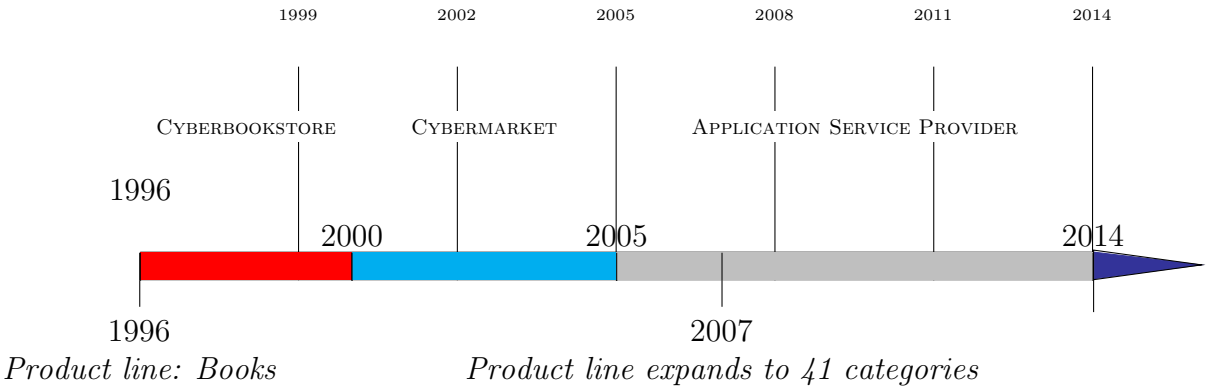


Figure 5: Evolution of the Amazon Business Model. Adapted from Isckia and Lescop (2009)

Stage one corresponds to online retailing (Cyber Bookstore). Amazon

started its business in USA in 1994. It was offering competitive prices on millions of book titles, great customer experience using innovative tools such as one-click shopping, high level customer relationship management and fast delivery. Amazon was operating a long tail strategy: offering the best sellers at the best price as well as the less flashy titles. Thanks to a smart system of online recommendations and customer book ratings, not only people were able to discover new titles, they also discovered their own demand in a way. Very quickly the sales of Amazon skyrocketed. After a couple of months of operation, Amazon was making $20 000 per week. By the end of 1997 Amazon had reached its one-millionth unique customer count. The following year they began to grow the product line to expand the offer to such merchandise as CDs and videos. The product line expansion continues to this day. In 1999 Amazon injected nearly $1 billion into its online platform and underlying infrastructure to maintain the high quality and the fluidity of the website.

Stage two, the cyber market, began in 1996, when Amazon launched its Amazon Associates Program. The underlying idea of this program was to generate more traffic to the Amazon Website. The partners were able to add links for products on Amazon to their own website; they could create an individual business page, referred to as aStore, displaying the Amazon products they were selling. Partners could also include Amazon products on their own site as well as let Amazon suggest links in their blogs. In return partners were receiving commissions for clicks and purchases. Other programs followed: merchants@ and Amazon Marketplace, allowing other businesses to fully integrate their Web sites into Amazon's site and to use Amazon payment infrastructure. In 2001, Jeff Bezos explained his strategy on a ''napkin diagram'' (figure 6).

In 2001 and 2002, Amazon engaged itself in a cost killing effort. In 2003 this effort and the use of the platform strategy contributed to the first positive annual profit ($35,3 million on revenues of $5,26 billion). In 2004 profit soared to $588,5 million.

Stage three, application service provider, was launched in 2002, when Amazon created the Amazon Web Services (AWS). In 2008 more than 300 000 independent developers were using these services to develop notably the

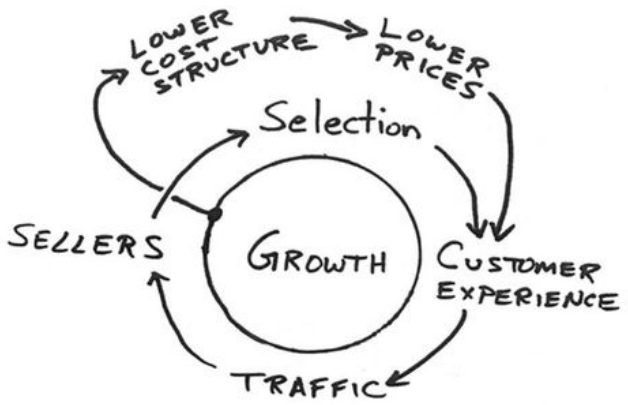


Figure 6: Bezos Napkin Diagram. Source: Jeff Bezos, September 2001.

e-business solution. Amazon became more than an application service provider: it became an incubator for e-business. This activity brings innovation to the Amazon website.

To summarize the above, in 1994 Amazon created a proprietary platform to launch its online retail store. The online store grew by means of successive addition of new products as Amazon was developing economies of scale. After two years of development, Amazon began to open its platform to partners. Amazon implemented economies of scope by allowing partners to use its platforms for their own business. These partners came to be known as affiliated merchants. This strategy was bringing together customers and merchants on the Amazon website. From 1994 to 2002 Amazon developed a business ecosystem around its platform relying mostly on its attractiveness and reputation as a successful online retailer. After 2002 Amazon opened its knowledge, know how, part of its technology and other resources to create a real innovation ecosystem around its platform. ePost and Lawson used the same strategy to transform and expand their businesses (see the following inserts entitled *''Business Transformation through Platform Strategy: Case of ePost''* and *''Business Transformation through Platform Strategy: Case of Lawson''*).

Business Transformation through Platform Strategy: Case of ePost.



In 1996 the Canadian Post created ePost, an electronic postal service. In the early 1990s the Canadian Post realized that the emergence of Internet was creating a threat for its business model. As any other Post, the mail activity was heavily relying on big billers. At the time, people were receiving and paying bills by mail. The correspondence containing bills and bill payments represented nearly 85% of all the mail activity. The Canadian Post executives projected that in the near future thanks to the Internet and the roll-out of higher quality telecommunications networks in Canada the bills will be diffused and paid electronically. The dramatic drop in volume of paper bills and paper bill payments would undeniably reduce Post's income and derail the equilibrium of its current model. The Post's executives anticipated this trend and responded by creating a platform, called ePost, which allowed users to receive, view, pay, manage and store their paperless utility bills (phone, electricity, cable, water, etc.), tax bills and bank statements. The Canadian Post positioned itself as an aggregator of bills. The system embarked on its platform several distinct categories of partners: consumers/citizens, public utilities, telecom operators, banks. Each of these groups of participants has its own interest in using the platform: consumers get a clearer statements faster as well as the platform makes it easier to make bill payments (and no more penalty charges for

missing payments due to bills lost in the mail!), utility companies reduce their production costs (the price per bill sent through the platform is largely below the cost of delivering a paper statement) and cut down on the number of unpaid bills, while the banks save on the processing costs for issuing payments. The system works well thanks to the good reputation of the Canadian Post as a trusted third party. Today ePost serves 7,5 million subscribers among 13,3 million households and over 100 billers.

Business Transformation through Platform Strategy: Case of Lawson.



Since 1974 Lawson operated a chain of Lawson konbini, a Japanese convenience store franchise chain. Konbini operate 24/7, distributing consumer products such as food, drinks, press, etc. Prior to the year 2000 the competition between konbini firms was very basic. The Japanese law impedes firms to enlarge the surface area of their shops such that in downtown areas of Japanese

cities no large supermarkets can be built, therefore preventing competition on the number of products. Hence, firms resorted to the geographical competition, where the competition was then relying on the store density – the number of contact points with customers. Konbini were located near metro stations and along the path of the main pedestrian traffic throughout Japanese towns. At a point in time it became difficult to find space with such criteria for new store locations. In the year 2000 Lawson decided to break the rules of the competitive game by rethinking its business model. Lawson understood that its main competitive advantage was ubiquity. Lawson then decided to use its dense networks of stores to create partnerships that would improve the customer experience. The first complementary service introduced was bill payments. In general, Japanese people prefer to pay by cash most of the time. Lawson got in touch with the big billers and proposed to collect the bill payments on the billers' behalf throughout the network of their stores and then transform the cash into electronic money, which would then conveniently be wired to the biller. Tokyo Electric Power Company, TEPCO, and Tokyo Gas were the first to accept this deal. Shortly, many other billers followed. Also, Lawson invested in its customer relationship management. Its network of partners extends to include parcel companies (Yamato Transport Co.), ski rentals (Yamato), catering, etc. The system is beneficial both for the partners, who gain access to a huge network of contact points with customers, and for Lawson, who is able to attract more customers to its stores. As of 2013, Lawson operates 11384 stores, is visited by nearly 9 million customers per day, and is one of the top performing convenience stores in Japan, second only to 7-Eleven.

These examples show that platform or ecosystem strategy can be used beyond the innovation context. Amazon, Lawson, ePost and many other companies developed such strategy to revamp their business model and their view of the markets. Identifying the right partners and choosing the correct strategic leverage are the essential elements needed to create attractiveness of the system. Amazon, Lawson and ePost were able to anticipate some trends and beat their competitors by correctly identifying:

- The fundamental functions they each performed for their current customers (customer experience for Amazon, ubiquity for Lawson, third party of trust for the Canadian Post) and building the platform strategy around these key functions;

- The groups of partners who would be willing to interact with their current customers; in the meanwhile these firms were gaining profits and increasing the value of the platform.

These firms created indirect positive externalities between their current customers and potential partners, which gave rise to the economies of scale and scope. This has overwhelmed the functioning and the frontiers of markets, and created strategic spaces free of competitors. These firms have transcended their business boundaries and changed the boundaries and routines of their industries.

Platform owners have two strategic levers of development: depth and breadth (Evans et al. (2006)). To enhance the depth of the platform means to create new features, functionalities, services or products that will improve the membership experience for the existing platform members, be they customers or partners. To achieve this, the current member's needs need to be saturated by creating some switching costs on partners. This relies on creation of secondary functions; for Amazon, an example of secondary functions are one-click payments and customer recommendations, while for ePost it is storage of paperless bills. These secondary functions are meant to reinforce the value of the primary function of the platform; books sales for Amazon and bills payments for ePost. Depth is improving the experience effect (customer

experience on Amazon), the learning effect (members get better acquainted with the functionalities of the platform) as well as the long tail effect (Amazon recommendations system helps members discover their own demand). Depth intensifies loyalty and the link between the platform and its partners. In this sense, the platform reinforces its strategic position by closing any strategic spaces that an entrant may target. The creation of new secondary functions can be ensured by the innovation side of the platform: functionalities created by partners in the innovation ecosystem of the firm can be standardized on the platform and proposed to all members. A feedback loop can emerge: the way partners use the new functionalities may lead to generation of new ideas. A positive indirect externality exists between the business side and the innovation/incubator side of the platform (see figure 7). A good functioning of the business ecosystem entails a good functioning of the innovation ecosystem, which in return has a positive effect on the business ecosystem, and so on.

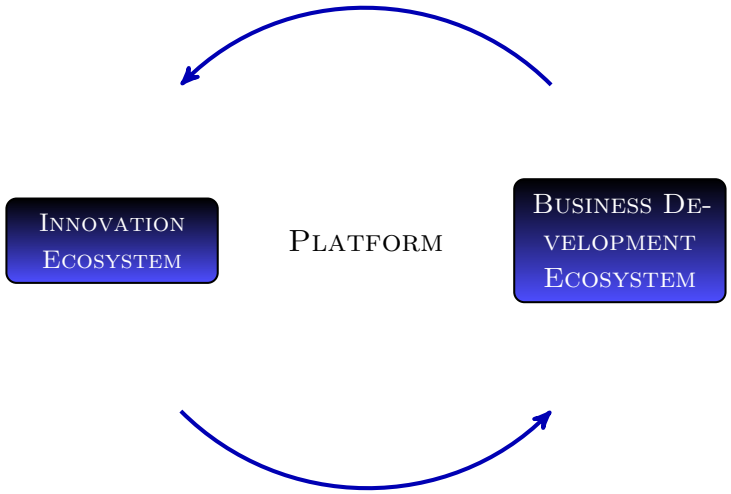


Figure 7: Feedback Effect

This feedback effect, however, can go both ways: it can be either positive or negative. A dysfunction of the business ecosystem can in turn create a dysfunction in the innovation ecosystem and make the whole system collapse. The insert entitled *"The Video Game Market Crash of 1983"* illustrates this.

The Video Game Market Crash of 1983

Following five years of astonishing growth between 1978 and 1983, the video game industry crashed. The industry's revenue peaked in 1983 at $3,2 billion. Two years later, revenues were down to a mere $100 million. Several companies, including the fast-growing Atari, went bankrupt or abandoned the market. How did this happen?

Experts bring several reasons for the crash. However, we can point out the main causes: the influx of rival consoles and the saturation of the market with hundreds of rush-produced low quality games. This induced the loss of consumers' trust and assisted the reputation of the game console manufacturers to plunge. Before 1983 the market housed numerous console manufacturers. Each manufacturer had its own game catalogue and some of them were showing independent developers'



library. During the same period the first home computers appeared (Apple II, Commodore PET, ATARI 400 and 800). By 1982 the home computer sales have rapidly increased (the Commodore VIC-20 was sold at $199, while Atari 2600 console was sold at $125). Home computers were equipped with more memory, and better graphic and sound cards than consoles. Hence, the personal computers were able to run more sophisticated games, as well as allowed a semi-professional use (word processing, home accounting). Commodore played with this specificity and targeted the game player market segment. The market entered a fierce price war that expanded to the console markets. At the same time developers reacted to the refusal of game console manufacturers like Atari and Mattel to recognize their work (their value) by allowing the developers' names to appear in game's credits as well as to pay royalties based on the game sales. Atari and the other console manufacturers ignored dissatisfaction of their innovation partners in their ecosystem. Instead, they focused all their efforts on the war with computer manufacturers. Atari's programmers left Atari in 1979 and created Activision.

With the third party game developers in play, the game console manufacturers began to lose control on the quality of games compatible with their consoles. Atari tried to prevent Activision from selling Atari console compatible games by challenging them in court. As a consequence, in 1982 the court legitimized third party game developments. Numerous startups and other companies entered the console game market. Numerous games were rushed to be released in time for Christmas of 1982. The market got quickly saturated as it was

flooded by low quality games. Stores ran out of space to display all these games. The consumers were unable to choose as they had no reference point to evaluate the quality of these games before buying. Games kept sitting on the shelves and publishers had no cash to refund stores for the surplus. Facing the problem of storage of a large number of games, the stores decided to sell all the games at a large discount. The most recent titles, regardless of their quality, were sold along with the old ones via discount bins at $5 per title instead of their recommended retail price of $35. The market for lemons unravelled: consumers were unable to discern good games from bad ones that were rush-produced. Reputation of both: games and consoles for which these games were written plummeted, crashing as the result the entire industry.

The game console market reincarnated six years later, in 1989. The rebirth took place thanks to Nintendo, who imposed strict regulation on third-party developers by introducing the "Seal of Quality": Nintendo's new system for ensuring high quality of games.

The breadth consists of adding new groups of partners to the platform (e.g. ePost adding new billers). This strategy provides new sources of value by creating new indirect positive externalities with existing group of partners. Breadth may create new forms of competition between firms, which were not competing before: Google vs. Microsoft, Apple vs. Nokia, Orange vs. Canal+. It often leads firms to the unfamiliar strategic areas with totally different routines and competitive process. Platforms that seek to expand in this fashion face critical problems with resources (financial, human resource, skills, competencies, etc.) that limit their ability to integrate new groups of

partners and features. To overcome such problems, platform owners often use partnerships or strategic alliances with established firms in the market as the first step to expansion (Google and HTC, NTT DoCoMo and Japan Rail for mobile payments). Strategies of expansion through platforms lead to radical changes in the market structure and throughout the entire industries: this mechanism is one of the drivers of digital convergence. As a consequence, the most threatening forms of competition do not come from the market (face-to-face competition); instead they are the result of side competition: the intrusion of dominant or powerful firms from adjacent markets (e.g. Apple, Microsoft and Google expansion in the mobile market, Microsoft's entry into the game console market, etc.).

Breadth and depth can be hard to distinguish. They often go hand in hand: a new group of partners (breadth) can enter a platform with a complementary product or service for existing partners (depth). In this case, depth is not created by existing partner or by the platform owner; it is created by the new member (e.g. new affiliated merchants proposing a new line of products to Amazon's platform).

Defining Platform and Business Ecosystem: a Strand of Literature Between Economic Sciences and Management Sciences

The concept of platform has been defined, discussed and refined many times in the literature. This literature is recent, flourishing and quickly growing. In April 2014, a search query of the term ''platform'' in the Business Source Complete database, limited to peer-reviewed academic journals in the disciplines of economics and management, returned the following results: 1728 articles in management and 790 articles in economics. Out of these 2518 articles 84% were published during the last decade (2004 – 2014) and 28% (or over 700 titles!) were published within the last two years. The citations in this section are purely illustrative and were selected because they represent a unified view. We do not intend to produce here a thorough review of the concept. Instead

we try to highlight the diverse and sometimes confusing definitions used in the literature.

Scholars acknowledge that the concept in question is interpreted differently in at least three strands of the literature (see Gawer (2009) and Baldwin and Woodard (2009)): product development, design and operations; technology strategy; industrial economics.

The researchers of the first stream use the term ''platform'' in the context of product development and planning. For Wheelwright and Clark (1992)):

> ''Companies target new platforms to meet the needs of a core group of customers but design them for easy modification into derivatives [cost-reduced version of existing products, add-ons, enhancement of existing production process] through the addition, substitution, or removal of features. Well-designed platforms also provide a smooth migration path between generations so neither the customer nor the distribution channel is disrupted.''

These product platforms are purely internal: they involve one firm, namely the platform owner. Their main goal is to increase the efficiency of the firm productive system, to lower costs, to improve agility in the design of new products, to create and reuse modular components, etc. Product platforms have been mainly studied in manufacturing industries. The concept has been later extended to firm interactions in the context of a supply chain. Gawer (2009) indicates:

> ''A supply chain platform is a set of subsystems and interfaces that forms a common structure from which a stream of derivative products can be efficiently developed and produced by partners along a supply chain.''

The only difference between the supply chain platform and the product platform is the introduction of interfirm relationships in the process of product design. Aerospace and automotive industries were often taken as examples in this part of the academic literature (see, for instance, Zirpoli and Caputo (2002) or Brusoni (2005)).

The second stream emerged in the late 1990s in the context of a technological boom. In their paper Bresnahan and Greenstein (1999) examine evolution of the computer industry market structure over the thirty year span. The authors highlight the existence of technological competition between computer platforms and not between firms. They state:

> ''Equilibrium in each segment of the computer industry obeys its own logic of concentration and persistence, determined by buyer/seller interactions, not technology alone. Interactions between buyers and sellers are organized around computer platforms, such as the IBM System/360 or the Apple Macintosh. Platforms share interchangeable components, so many sellers and buyers can share the benefits of the same technical advance. Interchangeable components also permit buyers to use the same platform over time, avoiding losses on long-lived software or training investments. The sharing is a social scale economy: accordingly, there tend to be few platforms in any segment. Long-lived investments also lead to platform persistence, whether for cost-minimizing coordination-failure, or strategic reasons.''

Directly in line with Bresnahan and Greenstein's (1999) definition, Gawer (2009) defines a platform as a building block, which can be a product, a technology or a service that acts as a foundation upon which other firms can develop complementary products, technologies and/or services (see also Cusumano and Gawer (2002); West (2003)). Through their platforms firms try to create and capture value from external complementors. Complementors play the game since they benefit from the installed base and the resources of the platform.

Following the work of Moore (1993, 1997), the management literature also refers to another close concept to depict this phenomenon: business ecosystems (BEs). Moore (1996) explains that a BE is:

> ''An economic community supported by a foundation of interacting organizations and individuals - the organisms of the business

> world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they co-evolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments and to find mutually supportive roles.''

Later, Moore (2006) defines business ecosystems as intentional communities of economic actors whose individual business activities share in some large measure the fate of the whole community. The definition appears broad enough to cover a wide range of different economic situations. Nevertheless, it points out two major issues: interactive dependence of the basic elements of an ecosystem and interaction with the environment. The two levels of interaction are necessary to ensure that the community acts as a whole organization. In each business ecosystems there are feedback effects. Every action or interaction has an effect on each element as well as on the whole entity. This implies that both behavior and evolution of any element vary according to the influence of the ecosystem. Hence, business ecosystems are characterized by a large number of loosely interconnected participants who depend on each other for their mutual benefit and survival.

Iansiti and Levien (2004) integrate and reconcile these two conceptions:

> ''Platforms serve as an embodiment of functionality that forms the foundation of the ecosystem, packaged and presented to members of the ecosystem through a common set of interfaces. Ecosystem members then leverage these interfaces as a kind of toolkit for building their own products and think of them as starting point for their own value creation. The platform is the ''package'' through which keystones (the focal firm) share value with their ecosystems.''

Similarly, Evans et al. (2006) state:

> ''Those software platforms are at the heart of ''economies'' or ''ecosystems'' that consist of mutually dependent communities of businesses and consumers that have a symbiotic relationship with the platform [...] At a business level, these software platforms permit the formation of ecosystems that create value through the symbiotic relationship between diverse communities.''

Iansiti and Levien (2004) show the crucial role of a central firm in the survival and dynamics of a business ecosystem, as played through the central firm's platform. This central firm can affect the overall system in two ways: as a member of the business ecosystem, and hence exerting some competitive pressure onto other members of the ecosystem, and as an intelligent biotope providing the other participants with elementary building blocks, such as competences, knowledge, information, database, etc., in order to sustain their economic activity. The regulatory power of the system relies on the latter role: as an intermediary, the central firm regulates and controls its business ecosystem, and proposes a vision of the market. A central firm, being a technical owner and creator of a platform, compiles an interactive space, akin to a game field, equipped to host a full range of economic players. The access to the game field can be either discriminatory or non-discriminatory depending on the central firm's strategy.

Gawer (2009) recognizes that:

> ''Iansiti and Levien (2004) call a ''keystone firm'' the equivalent of what Cusumano and Gawer (2002, 2008) call a platform leader, that is a firm that drives industry-wide innovation for an evolving system of separately developed components.''

The third stream of literature studying platforms is industrial economics. William Baxter (1983) was the first known academic to highlight the concept without formally naming it in the context of the bank interchange fee. The literature refers to that kind of functional compilation as multi-sided markets (Armstrong (2006); Rochet and Tirole (2003, 2006); Weyl (2010)). Rysman (2009) explains:

> ''Broadly speaking, a two-sided market is one in which 1) two sets of agents interact through an intermediary or platform, and 2) the decisions of each set of agents affects the outcomes of the other set of agents, typically through an externality.''

The terminological cross-reference is inherently confusing since all markets in their essence can be seen as multi-sided. Rysman (2009) argued that the existence of a multi-sided market is tied more to the company's strategic intent than to the market's intrinsic structure.

The literature on two- or multi-sided markets is focused on the strategy of the market intermediary when there is interdependence and externality between the sets of agents served by the intermediary. This definition is very wide and involves many economic situations that range from real estate agents to App stores. The literature on two-sided markets finds its roots in two other strands of economic literature: networks effect (see Shapiro and Varian (1999)) and match-making games (see Caillaud and Jullien (2003)). Scholars have largely studied very particular kinds of markets: payment systems and interchange fees, newspapers, media, shopping malls, dating services and operating systems.

In this context pricing has received considerable attention. The main result can be stated as follows: the price on one side of the market depends both on the demand on this side and the cost of serving it, and on how participation on this side affects participation and profit on the other side. In the extreme case, the absence of demand on one side jeopardizes the demand on the other side: if there is no seller willing to sell through a real estate agent, then no buyer will demand the services of a real estate agent. This raises the famous chicken and egg problem underlying any match-making context or intermediary situation. In a sense, the optimal pricing is optimally balancing the demand between two groups of agents. These theoretical works also demonstrate that optimal prices are generally lower than costs. Therefore, to ensure the optimization of profits of the platform owner (intermediary), one side of the market can be sponsored by the other depending on the strength and direction of externalities. In a real estate market where houses are a rare product, a real estate agent would tend to bill the buyer rather than the seller in order to attract sellers. Another important result is that if the economic agents cannot reach an efficient

outcome through bargaining (failure of the Coase theorem) and if there exist other market failures (e.g. usage or membership externalities between agents), then the price structure is not neutral. The price structure and not the price level will influence profits of the intermediary: for an estate agent, profits will be different whether only the sellers are billed rather than the buyers, whether both the sellers and the buyers are billed, or whether only the buyers are billed rather than the sellers. In this literature, openness of the intermediary is also considered through the number of sides to serve, the opportunity of being compatible or not with competing platforms and through vertical or horizontal integration.

Economic literature focuses on the platform's main function as an intermediary. By doing so, the concept loses part of its essence and its explanatory power and concentrates mainly on what kind of pricing structure may encourage distinct groups of agents to access and exchange through a platform. Although the results give a lot of insights, it is not easy to translate these insights into managerial or policy recommendations. Very little attention has been given to the dynamics of the emergence of platforms.

The definition used in economic theory has been recently refined and reconciled with the management streams of the literature. Evans and Schmalensee (2007b) introduce the concept of economic catalyst:

> ''Economic catalyst is an entity that as (a) two or more groups of customers; (b) who need each other in some way; (c) who can't capture the value from their mutual attraction on their own; and (d) rely on the catalyst to facilitate value-creating reactions between them. For profit-business, joint ventures, cooperatives, standard-setting bodies, and governments operate catalysts.
>
> In the economy, a catalytic reaction is the process by which value is created by facilitating the interactions between two or more mutually interdependent groups of customers.''

In this definition, the way platforms are built or designed is not central: the attention is focused on the role played by the catalyst. Hence, this definition is functional. It encompasses a wide array of economic situations. Platforms and

business ecosystems can be seen as catalysts: they promote and accelerate an economic reaction (interactions) between groups of agents, creating catalytic reaction that will improve the value for all.

Following the work initiated in Evans et al. (2006) and Evans and Schmalensee (2007b), Hagiu (2009) proposes the following definition:

> ''A platform provides a support that facilitates interactions (or transactions) among the two or more constituents (sides) that it serves, such that members of one side are more likely to get on board the platform when more members of another side do so''.

Later, Hagiu refined this definition (Hagiu and Wright (2011)):

> ''Multi-sided platform (MSP): an organization that creates value primarily by enabling direct interactions between two (or more) distinct types of affiliated customers''.

Mere presence of indirect network externalities is not a sufficient condition for the existence of a multi-sided platform. This statement can be clarified by means of a simple example: the supermarket. In a supermarket, consumers are valuing the presence of multiple suppliers (brands). A first indirect externality emerges: the more brands are present in a supermarket, the more there are consumers. Moreover, brands are willing to propose their products to a supermarket that has a significant flow of visitors. Hence, the second indirect externality emerges: the more customers are in a supermarket, the more brands there are. A supermarket is a merchant that buys from suppliers and then resells the merchandize to consumers; it is not a platform. This example shows that indirect network externality is not a sufficient condition for the existence of a multi-sided platform. Moreover, even if most platforms exhibit significant cross-group network effects, the existence of such effect is not necessary for the emergence of a platform.

The definition of the concept is still evolving. By integrating the notion of business ecosystems, platforms and, sometimes, multi-sided markets, researchers have caused a semantic shift in the original definition of Wheelwright and

Clark (1992), making it more complex and unnecessarily confusing. The term platform seems to refer either to a technological platform composed of modules (operational definition), to the intermediary function of the firm (functional definition), or to the whole system of interactions and exchanges, driven by the creation of such platforms (ecosystem-based view of the firm). The definition of the concept appears heavily contextual depending on the market studied and on the strands of disciplines involved: it embeds various economic and technological situations.

The Thesis

The research context is important. In their work researchers are influenced by their educational background, their discipline, their experiences, their knowledge, their epistemological posture and their methodology. The choice of a particular level or scale of observation (industry, market, firm, technology, function) of a phenomenon relies on all of these characteristics. It involves an element of arbitrariness and discretion that can lead to an elephant syndrome. The different views of the platform are not incorrect; they simply embody different facets of the same phenomenon.

Our thesis follows the strands of literature presented above in line with the work of Evans et al. (2006) and Hagiu (2009).

Research Questions and the Research Object

Our research focuses on the phenomena of open innovation and ‘‘platformatization’’ of the markets and industries. Our main research question is:
How firms and markets have recently co-evolved to create new organizational architecture?

This main question raises a series of sub-questions:

- Can we define and describe such firms?
- How and why firms assume the function of the market?
- What are the main characteristics of such firm architecture?

- What are the roles played by the leader and by the other partners?
- What are the dynamics of this kind of system?
- How does it affect the competitive process?

The research question is broad as it addresses an array of economic situations. Keeping such breadth makes the research object vague and somewhat confusing. Hence, we voluntarily narrow down the context of our work.

There exist two main contexts of emergence of platforms: matchmaking and audience building (Evans et al. (2006); Evans and Schmalensee (2007b)). Matchmaking context emerges when two or more groups of agents are not able to interact on their own or through the existing organization of the market. A platform owner then tries to address this problem by creating a system designed to facilitate interactions between such groups of agents. This system mimics the way a market functions. Interactions between the groups of agents are beneficial for all of the participants. As a result, a match-making platform creates a reciprocal positive effect between the groups of agents. In case of a match-making platform such as eBay, the sellers are better off by selling through the eBay platform since their products can reach a large number of potential buyers; buyers are better off by shopping on eBay since they have a larger choice, buy at a better price, and do so within a secure transaction system.

The audience building context emerges when a group of agents is looking for the audience of another group, while the latter group may not be willing to volunteer its attention. In this context, a platform owner creates a system aimed to attract the eyeballs of one group of agents, which is then ‘‘sold’’ in form of attention of the audience to another group of agents. A typical case is free TV: the TV acts as a platform that proposes some content free of charge, which in turn attracts an audience. It then ‘‘delivers’’ this audience to an advertising company. In return, the revenue earned from advertising allows the TV to make profits and buy new content for its audience. The platform is then creating a junction between existing markets. This junction creates a positive effect for one group of agents (advertisers benefit from attention of

the audience) and a negative effect on the other group (audience may feel that advertisements are intrusive).

Table 4 offers some examples of these two contexts (adapted from De Vogeleer and Lescop (2011)):

Examples	Context:		Groups of Agents
	Match Making	Audience	
	Objective:		
	Facilitate Interactions, Transactions and Exchanges	Attract Eyeballs	
Application Stores	✓		Consumers Developers
eBay	✓		Buyers Sellers
Financial Markets	✓		Firms Investors
Free Press, Free TV, Free Radio		✓	Users Advertisers
Google Search Engine		✓	Users Advertisers
Meetic	✓		Women Men
Operating Systems	✓		Consumers Developers
Incubators	✓		Start ups Investors Consumers

Table 4: Platform Polarity. Adapted from De Vogeleer and Lescop (2011)

These two contexts imply different objectives for the platform leader, different functions on a particular market and, as a consequence, different firm architecture. Our work focuses on the question of how in certain circumstances firms replace markets. Hence, our main field of investigation is the match-making context. Our objects of research are firms as platform owners as well as firms as players on the platform within this context.

Methodology

Our thesis lies at the boundary of economic sciences and management sciences. We do not intend to develop mathematical models as it may appear usual in economics. Our readings of the literature have convinced us that more exploratory work needs to be done to better clarify the phenomena. Our intent is to integrate in our approach the concepts that come from economics and management sciences with the proposed new ways to apprehend the phenomena of platformatization of markets. Our view of research is quite pragmatic: the methods should match the questions and the purpose of research. Hence the different parts of our work (dealing with a particular sub-question of research) may not follow the same methodology. Our research is inductive in the sense that we try to infer new knowledge from our observations, but also abductive since our work contains some back and forth shuttling between empirical observations and theories in order to refine theories and found better explanations.

Figure 8 offers a schematic view of our method.

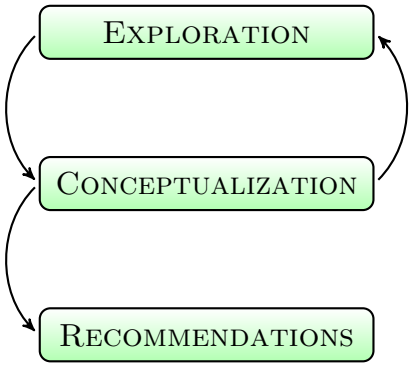


Figure 8: Exploration - Conceptualization - Recommendations Method

Design of the Thesis

The Ph.D. thesis is divided into five chapters. Even though there is a logical link among them, the chapters have been constructed in such a way that they can be read independently.

Chapter 1, entitled *Firms or Markets?*, explores the numerous branches of the theory of the firm literature and confronts it to the phenomenon of platformatization of markets through the study of the eBay case. Following the detailed analysis of the case study, this chapter concludes that the concept of firm has undergone metamorphosis and has been redefined beyond the traditional and contemporary definitions of the firm. Hence, the chapter introduces the concept of firm/market equivalency. This concept is thoroughly explained and discussed in the chapters that follow.

Chapter 2, entitled *Firm/Market Equivalency* explains the role of firms that choose to position themselves as intermediaries and take charge over platform construction, operation, and support. These firms then draw to themselves a multitude of partners who form what the management literature calls BE around the platform operator. In the literature, such firms are referred to as *central firms*, *keystones* (Iansiti and Levien (2004)), *catalysts* (Evans and Schmalensee (2007b)), or simply *platforms*. Following the review of the literature relevant to this issue, we then explain our choice of terminology and embark on a thesis-long quest to learn the answer to the question of how firms and markets co-evolve in creation of new organizational architecture.

Chapter 3, entitled *Firms-Satellites in Firm/Market Equivalency: an Unexpected Source of Competitive Pressure*, discusses a different take on the platform creation strategy. Whereas in chapter 2 we focused on the types of firms that create and support the platforms, in the third chapter we take a closer look at other constituents of platforms: the small players. In the literature these small players are often referred to as ‘‘niche players’’ (Iansiti and Levien (2004)). In text we address these players as

"firms-satellites" due to their tendency to gravitate towards creators and operators of platforms. We study the role of these firms-satellites in the platform-based ecosystems and identify that some of firms-satellites may potentially bear threats to the platform owners. We then discuss the issues of clustering and multi-homing as well as how these issues affect platform owners, their systems and whether or not these behaviors are a source of competitive pressure.

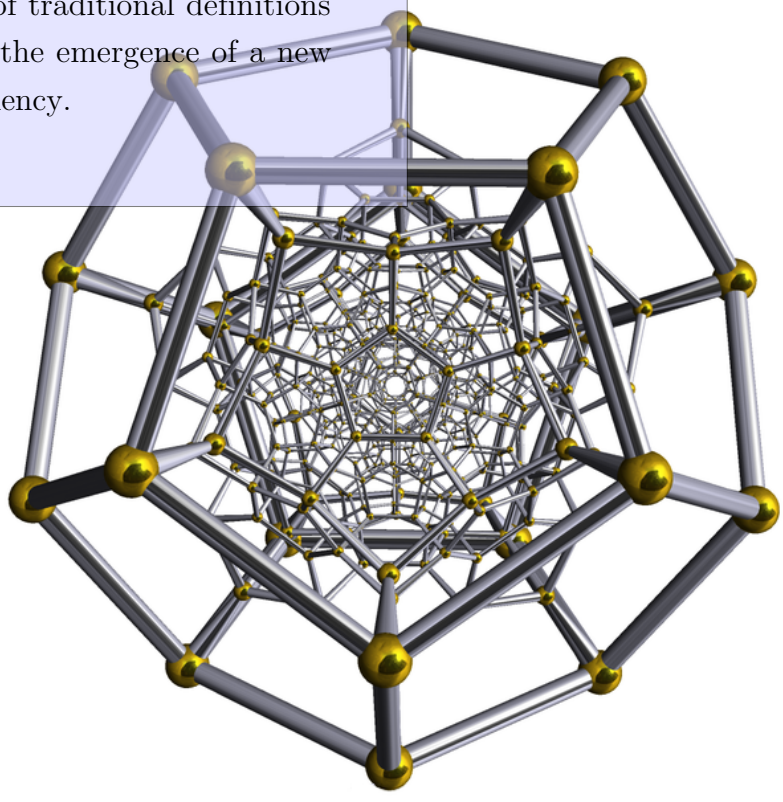
Chapter 4, entitled *Evolutionary Process of Firm/Market Equivalency*, discusses the dynamics of firm/market equivalency. Ideally, firm/market equivalency has two dimensions: innovation and business development. In this model, the platform is a central socio-technical artefact that supports openness strategies in both dimensions. It facilitates sharing and exchanges among participants. Such systems are not static. They co-evolve with their constituents: the participants and the platform owner. This chapter explores the dynamics involved in firm/market equivalency models. For each stage of development (birth, expansion, leadership, renewal), we study the architecture of the platform, the behaviour of participants and the strategic response of the platform owner.

Conclusions: Antitrust Issues. We conclude the thesis with the discussion of antitrust issues pertaining to firm/market equivalency: i.e. the issues that do – or may – arise as the result of employment of market creation and support strategies. We also draw potential ways to refine our approach and discuss further research.

Chapter 1

Firms or Markets?

In this chapter we explore the theoretical underpinnings of what is understood by the terms *firm* and *market*. We also discuss the theory of the boundaries that outline and segregate these two entities; in particular, we examine how does the theory of the firm view the subject of boundaries between firms and markets to understand what it is that defines them. In an attempt to illustrate the theoretical findings with a case study of a modern firm, we uncover an organizational shift that reassigns functions of markets and firms, and, as a result, distorts the outlines of traditional definitions of boundaries, hence marking the emergence of a new paradigm: firm/market equivalency.



Markets have evolved. From the fora of the antiquity to today's virtual marketplaces throughout the Internet, economic history shows that markets are constructed, transformed and are evolving through the movement of resources, knowledge, technologies and innovations. These movements are created by entrepreneurs and firms. One of the essential functions of today's companies lies in their capacity to create markets: this function ensures the adaptability of the system and its survival, as well as the optimal use of scarce resources. It also allows the emergence of innovations, technological breakthroughs and new forms of development of our society.

Firms have evolved. They now use strategic partnerships and third-party players to enhance their competitive and economic power. The firm is no longer this simplistic black box as described by the neoclassical economic theory. Today it is a complex nexus of interactions and relationships. The firm acts as a facilitator and a regulator of the overall system, providing bare necessities for collaboration, and it does so with a strategic intent. In this sense, firms can model their environment and their market to their liking. They can influence the rules of the competitive game within an industry in order to improve the market conditions and architecture. Not only do the firms create markets, they now also support them.

The evolution of firms and markets raises the question of how to distinguish the former from the latter and where lie the boundaries between them.

The question of definition of the boundaries of the firm has been tackled by the economic literature pertaining to the subject of theory of the firm since the dawn of the literature concerning this topic in the first half of the twentieth century. Historically the notion of the firm as we refer to it today was hindered by its sole function as a supplier of goods since the late 1500s - early 1600s. Nevertheless the definition of the firms' boundaries has since been undergoing an evolutionary process. At present, the role of the firm is no longer thought of as limited solely to the function of supply of a sole good as it used to be the case historically. Instead, the firm of today is a dynamic, continuously evolving system, which actively participates in global markets. Today's leading firms are innovators, pioneers, platform leaders, creators of business ecosystems and markets, they are socially responsible and accountable,

yet still are profit-seeking. The shape of their corresponding boundaries varies, and this variation is contingent on a number of factors, which are imposed by both: from within the firm and by the environment to which the firm is subjected. The boundaries too are evolving to reflect the changes in the functions and responsibilities of the firm; their evolution is also in part due to advancing economic and managerial theory as can be observed in the academic literature and as a result changing views on the subject matter.

The objective of this chapter is to confront the literature to the contemporary forms of firms as described in the introduction and to discuss the difference between firms and markets. The discussion relies on a comprehensive literature overview pertaining to the subject of defining the firm's boundaries as well as the corresponding evolution of this definition. Hence, in discussion of the literature we omit those theoretical details which deviate from the subject matter as specified above. Complementary to this objective, the methodology is restricted to discussion of theory by addressing it through analysis of the economic and management strands of literature on this subject.

The chapter considers the firm as the primary unit of analysis. It uses the top down approach to the issue and commences by identifying the influential theories of the firm and the nested definitions of *what a firm is* within these theories. We concisely summarize the influential theories of the firm and extract the underlying stated, implied, or inferred definitions, which we then sort and group. In the second part markets are defined. The chapter progresses to further discuss the firms' boundaries and to trace their evolution throughout the economic history. In the process we observe the evolution of the firm's boundaries as seen from the point of view of the academia. Moreover, we identify the factors that play a role in defining the shape and the span of the firms' boundaries.

Following the review of the literature on the subject of theory of the firm we present a case study of a contemporary firm. The firm chosen is a prominent example of modern firms that engage a platform-based strategy. The case study addresses relevant aspects of the firm's behavior towards issues of profitability and capitalization, viability and survival, contractual relationships and governance, resources and capabilities, as well as frictions-

filled environment. We conclude the chapter by cross-examining the firm presented in the case study against the definitions of the firm as per the academic literature and propose an alternative way of viewing contemporary firms such as the one studied.

I The Firm in the Academic Literature

To date, there are four distinct influential theories of the firm, each with its own strengths and weaknesses. These theories cradle the definitions of the firm as an entity, viewed from the academia's perspective from the point of view of a firm and the firm's corresponding view of itself, which spawn their key differences. The most recent summaries of the influential theories of the firm have been done by Gibbons (2005) and Kantarelis (2007). However, there is somewhat of a misalignment regarding the method of formalization of the influential theories. Figure 1.1 presents the different branches of the theory of the firm literature.

The Theories of the Firm

In the late 1960s Machlup (1967) divided the theories of the firm into three categories: marginalist, behavioural, and managerial; his article is a great analytical snapshot of the hitherto developed theories of the firm, in an effort to defend the positions of the neoclassical theory. Foss (2000) presents a position of viewing theories of firms as either one of two camps: complete contract theories (i.e.: principal-agent, nexus of contracts) and incomplete contract theories (i.e.: asset specificity, property rights). Gibbons (2005) outlines the following four theories: rent-seeking (Williamson (1971)), property-rights (Demsetz (1967)), incentive-system theory (Holmstrom and Milgrom (1991)), and adaptation (Simon (1951)). Kantarelis (2007) in his recent book puts forward another classification of the theories of the firm: neoclassical theory, transactions cost theory (Coase (1937)), principal-agent theory (Cyert and March (1963)), and evolutionary theory (Alchian (1950)). One can argue that the classes of these theories are interrelated, and the roots of some of the theories can be traced to

Figure 1.1: Theories of the Firm

earlier dates. For instance, the adaptation theory is a ramification of the evolutionary theory, while incentive-system theory clearly takes its roots in the principal-agent theory; as well as rent-seeking theory builds on the evolutionary theory and is in concurrence with the adaptation theory.

Also, as per Gibbons (2005),

> ''The emphasis on the boss's authority places the adaptation theory together with the rent-seeking theory in making control the central issue in the theory (whereas the incentive-system theory ignores control in favour of incentives and the property-rights theory blends the two).''

Let's consider these theories and some of their ramifications logically.

The neoclassical theory stems from the works of Smith and further developed by others (Malthus, Ricardo, Bentham, Mill, Marshall, Keynes, Pigou). Neoclassical theory treats the firm as a rational profit-maximizing producer that operates under assumption of perfect competition. As Penrose (1995) puts it, the neoclassical theory does not treat the firm as organization; instead the theory operates on notions of the theory of supply rather than on the notions pertaining to what we now understand to be the firm. Neoclassical theory is not hindered by asymmetric information and the agency problem; neither does it concern itself with transaction costs, nor any evolutionary considerations (Kantarelis (2007)). These theoretical omissions gave rise to the development of the following theories of the firm, which are well-summarized in the works of Gibbons (2005) and Kantarelis (2007); the following theory ''family tree'' is restructured to reflect classifications of both Gibbons and Kantarelis, with a few additions.

The transaction cost theory, devised by Coase (1937) circa 1932, building on the teachings of Knight (1921), approaches the comprehension of *why do the firms exist* from the perspective of internal (or intrafirm) versus external (or interfirm) transaction costs, where the presence of the latter draws the distinct boundaries between the firm and the market. Coase (1988), attributes the further expansion of the theory to Williamson in his publications of *Corporate Control and Business Behavior* (Williamson (1970)) and *Market and Hierarchies*

(Williamson (1975)) during the 1970s.

To quote Mahnke (2001),

> ''The modern transaction cost theory is premised on the idea that transaction attributes determine comparative advantages of intra-firm vs. inter-firm resource allocation.''

The property-rights theory builds on Coase's *problem of social cost* (Coase (1960)). The theory was introduced by Demsetz (1967) and further developed by Alchian and Demsetz (1973). The theory focuses on concepts of control and incentives (Gibbons (2005)) and emphasizes the three distinct types of property ownership and resulting ability of owners to selectively grant access to property. This thus renders the distinct view where the firms are owners of specific property when the benefits of internalizing externalities exceed the costs. The modern theory of property rights explains the concept of boundaries of the firm through optimal allocation of residual decision rights to physical assets (Mahnke (2001)).

Other managerial theories contain an array of interrelated theories which include Baumol's *Economic Dynamics* (Baumol (1951)), as well as his further publications (Baumol (1959), Baumol (1962)) outlining the *sales maximization model*. Cyert and March (1963) are responsible for introduction of the principal-agent theory, which was later built-on by Holmstrom and Milgrom (1991) in their incentive-system theory, focusing on incentives and incentive-conflicts rather than control. Further contributions are attributed to Marris (1964) for his *growth maximization hypothesis*, Williamson (1966), as well as to Jensen and Meckling (1976) for their work on network theory, also known as *contract nexus* theory, and Grossman and Hart (1986) for their work on incomplete contract approach.

The evolutionary theory, pioneered by Alchian (1950), is concerned with firms' production capabilities, control over unique resources, and, as a consequence, possession of competitive advantages. In the words of Nelson and Winter (1982):

> ''The point emphasized by evolutionary theory is that a firm with an established routine possesses resources on which it can draw very

> helpfully in the difficult task of attempting to apply that routine on a larger scale.''

Evolutionary theory focuses on knowledge, processes of learning and capability development as well as, unlike the other theories of the firm, it accents the importance of switching costs given the change in governance (Mahnke (2001)). Evolutionary theory has received much support in the academic literature, yielding the following views.

The behavioural theory, also known as theory of administrative behaviour, had originated with Simon's work (Simon (1951)) where he introduced two key concepts: *bounded rationality* and *satisficing*. The theory was further developed by Cyert and March (Cyert and March (1963), Augier and March (2008)), who stated in particular that:

> ''Decisions are intendedly rational but bounded by human and institutional limitations, that organizations accumulate and use slack, that attention is a scarce resource, that firms satisfice with respect to aspiration levels, that firms adjust expectations and aspirations over time in response to experience.''

The subset of behavioural theory, the adaptation theory, was developed by Williamson (1985), although devised in his earlier work (Williamson (1971)). Both of Williamson's rent-seeking theory and adaptation theory (Williamson (1971)) focus on control.

The resource-based view introduced by Penrose (1959) (also in Penrose (1995)) and further built-on by others (Wernerfelt (1984); Badaracco Jr. (1991); Grant (1991)) focuses on strategic resources at a firm's disposal and the role of such resources in firm's attainment of competitive advantage. The resource-based view influenced the formation of the following three views, which further articulate the resource-based approach and focus on non-tangible resources such as competences (Winter (1988), Dosi and Winter (2000)), capabilities (Chandler (1992b), Amit and Schoemaker (1993)), and knowledge (Grant (1996)).

The theories and their interrelation are important in understanding the guiding forces in the origin of the definitions of the firm as such. These theories

isolate factors, which are deemed relevant to defining firms. The theories are not scrutinized further since the aim of the chapter is to describe the features that distinguish firms from markets in an effort to trace the evolution of the firms' boundaries. Hence, further dissection of the theories would be redundant in the context of this work. Instead, we shall proceed to identification of stated, implied and inferred definitions of the firm that can be found in the relevant literature.

What is a Firm?

Defining a firm is a necessary pre-requisite to coming up with the definition of the firm's boundaries. The definition of the firm, as one may expect, is multi-faceted, yielding a number of views that are vastly contingent on the author's perspective. The corresponding boundaries hence are derived from the given definition of the firm. The definitions of the firm range from the ones that are concerned with a single perspective to definitions that encompass several correlated or concurrent yet independent factors.

1. Chandler stated that most economists would agree that a firm is first and foremost a legal entity (Chandler (1992a,b)).

2. Penrose (1959) defined a firm as a *''collection of productive resources the disposal of which between different users and over time is determined by administrative decision''* (Penrose (1995)). Chandler (1992a) agreed that the firm is also an administrative entity in his definition of the firm. Similarly, Richardson (1998) defined a firm as an institutional device that organizes, consciously plans, and directs.

3. Jensen and Meckling (1976) define the firm not only as a legal entity but also an entity bearing a contract component. In their words (Jensen and Meckling (1976)):

   > ''A firm is simply one form of legal fiction which serves as a nexus for contracting relationships and which is also characterized by divisible residual claims on the assets and cash

flows of the organization which can generally be sold without permission of the other contracting individuals.''

4. The contract definition of the firm states that *''the word firm is merely descriptive, a collective noun denoting a particular cluster of otherwise ordinary contractual relationships''* (Masten (1988)).

5. Coase defined the firm as a transaction cost-minimizing employer aiming to maximize profits (Coase (1937), Winter (1988)). In Coase's words, a firm *''consists of the system of relationships which comes into existence when the direction of resources is dependent on an entrepreneur''.* (Coase (1937)).

6. From the point of view of neoclassical economics a firm is considered to be a rational profit-maximizing producer within a frictionless environment; however in neoclassical economics the firm is not treated as an organization (Penrose (1995)).

7. In the evolutionary view the firm is an intendedly rational profit-seeking decision-maker, aiming to increase scale by means of utilization of strategic resources in an environment of uncertainty (Alchian (1950); Simon (1951); Williamson (1985); Winter (1988)). The behavioral theory of the firm states that *''firms can be seen as coalitions of individuals and groups with conflicting goals''* (March and Simon (1958); Cyert and March (1963)), or in other words, as Augier and March state it in their recent article, *''a firm is an adaptive political coalition, a coalition between different individuals and groups of individuals in the firm, each having different goals and hence possibly in conflict''* (Augier and March (2008)). Competence-based view (Winter (1988); Dosi and Winter (2000)) shares the view of the firm from the evolutionary perspective and stresses the role of competences that a firm has in the firm's ability to grow. In the capabilities view the firm is defined as a *bundle of capabilities* (Chandler (1992b); Foss (1996)). Dosi and Marengo (2000) extend the capabilities-based argument to define the firm as a knowledge-generator, diffuser and implementer. In their words, they also characterize a firm *''as complex*

multi-dimensional bundle(s) of routines, decision rules, procedures and incentive schemes whose interplay can be hardly assumed to be perfectly known also to those who manage the very same organization'' (Dosi and Marengo (2000)).

8. There is a number of other definitions that are summarized by Machlup (1967), Cohen (1979), and others. Cohen states that *''[...]''firm'' is a word which we use to distinguish those organizations which sell goods or services in exchange for what we judge to be an accurate approximation of their actual worth to the purchaser''* (Cohen (1979)). Machlup (1967) goes to the great extent in order to overview the pre-1967 definitions of the firm as seen by ten out of twenty-one theories of the firm.

The literature presents us with sets of traits that the firm is ought to have. They are summarised in the table 1.1.

Entity	Legal Administrative Institutional device Coalition of individuals	Organizer Planner Director Employer Seller Scale maximizer Profit maximizer Profit seeker Transaction cost minimizer Strategic resource utilizer	Function
Collection	Contractual relationships Productive resources Capabilities Routines Decision rules Procedures Incentive schemes	Rational Uncertain Frictionless Conflicting goals	Environment

Table 1.1: Traits Possessed by Firms as per Definitions of the Firm in Academic Literature.

II The Market

As one becomes acquainted with the literature on the theory of the firm, one raises a question: *what is a market?*

Sissors (1966) states:

> ''[Market] is many things related to selling products which meet consumers' needs and wants.''

Following the interpretation of Rosenbaum (2000), markets can be defined from three perspectives: observational, functional and structural.

The first perspective focuses the empirical interpretation of what a market is. Several of these definitions interpret market as a physical location. For Cournot (1897) market is a

> ''[...] region in which buyers and sellers are in such frequent intercourse with each other that the prices of the same goods tend to equality easily and quickly''.

Other definitions are more conceptual and focus on the observable phenomenon of exchanges, that characterizes the market. Jevons (1871) explained that market is *''any body of persons who are in intimate business relations and carry on extensive transactions in any commodities''*. The term *market* then refers to the constituents of comparable or substitutable mutually beneficial exchanges. In other words, a specific good or service and its substitutes would attract a specific set of buyers and sellers, whereas a good or service that is complementary to the forth said good or service would not necessarily attract the same set of market participants. This hence implies that the specific good or service and its substitute are in the same market, while the specific good or service and its complement are not necessarily in the same market.

The second perspective refers to functional definitions that rely on what market does, rather than on what market really is. Markets are viewed as an allocation mechanism, which helps to determine and set prices. In the general equilibrium theory, market is the intersection of supply and demand curves. As such, its fundamental functions are allocation of products and pricing. Hayek

(1945) improved the definition by bringing the idea that markets also aggregate and disseminate knowledge and information.

The third perspective regroups structural definitions, paying attention to the underlying structure of markets. The definition of Hodgson (1988) is the most representative. He understands markets as:

> ''a set of social institutions in which a large number of commodity exchanges of a specific type regularly take place and to some extent are facilitated and structured by those institutions. Exchange involves contractual agreements and the exchange of property rights, and the market consists in part of mechanisms to structure, organize, and legitimate these activities''.

For the purpose of this chapter, we will adopt a mix of these perspectives. Let us assume that the definition of market is tangible and attainable, and is formulated as follows: market is a medium that facilitates interactions between two or more groups of participants who share a mutual interest in order to allow for the mutually beneficial transactions or exchanges to take place.

Three conditions characterize the emergence of a market:

1. Presence of two or more types of economic agents;
2. Need, ability and willingness for these agents to interact;
3. Mutual profitability of such interactions.

In this context, a market addresses the mutual need of different types of agents to interact by implementing:

1. Mechanisms to allocate interaction elements as well as negotiation rules;
2. Mechanisms that enforce the terms of exchange;
3. Provision of the necessary information for the exhanges to be completed, and a system of comparison and valorisation of the exchanges (such as, for instance, price or ranking).

In addition, as pointed out by Roth (2008):

''To work well, marketplaces have to:

1. Provide thickness, that is, they need to attract a large enough proportion of the potential participants in the market;
2. Overcome the congestion that thickness can bring, by making it possible to consider enough alternative transactions to arrive at good ones; and
3. Make it safe and sufficiently simple to participate in the market, as opposed to transacting outside of the market or having to engage in costly and risky strategic behavior.''

Above we discussed the conditions for the market to carry out its activities. Conventionally, markets are thought of being composed of two types of participants: providers of goods and services and consumers. An integral part of the interaction between these types of participants is that the resulting transaction is mutually beneficial. In addition, for these participants to be able to meet, a place for execution of transaction, either physical or virtual, has to be defined, and both types of participants must agree on the medium of exchange with which to carry out the transaction. Some questions arise: How is it that a market forms? Who is responsible for market creation? Who is ensuring the provision of either physical or virtual space in which to host the market participants? Moreover, why would anyone be interested in creating a market?

III Firms versus Markets

Once firms and markets are defined or better characterized, we have to turn to the question of the frontier between them. Penrose states that the *''boundary of the firm is what distinguishes it from the market and therefore must ''exist''[...]''* (Penrose (1995)). Richardson (1972) notes that *''firm networking blurs the boundaries of the firms''*: obviously, the same is true for ecosystemic forms of firms. Teece (1982) (also in Helfat and Teece (1987)) states that the boundaries of the firm are a *''diverse array of means by which rent-streams*

are protected and transactions organized in relation to productive knowledge of diverse types''. Winter (1988) summarizes that the boundaries of the firm are *''different modes of governance of transactions''* (Winter (1988)). In conventional sense boundaries are viewed as a buffer (Potts (2001)) or bridge (Araujo et al. (2003)) between the firm and the market. In their study, Araujo et al. (2003) approach the problem of boundaries from the indirect capabilities perspective, emphasizing the problem of identification of the vertical boundaries alone. As per Barney (1999), while the *''firm capabilities do not play a significant role in traditional transaction cost analyses of boundaries[...]* (Barney (1999)) *[...]conditions under which capabilities are costly to gain access to through hierarchical governance thus becomes an important determinant of a firm's boundary choices''* (Barney (1999)), or as Araujo et al. (2003) put it, *''the capabilities view of the firm suggests that the boundaries of the firm are determined by relative costs of developing ancillary capabilities as opposed to accessing them through the markets''* (Araujo et al. (2003)). Araujo et al. (2003) conclude that the *''decision of where to draw the boundaries of a firm can be seen as a matter of establishing, maintaining, developing or terminating connections amongst clusters of capabilities''* (Araujo et al. (2003)). Parmigiani and Mitchell (2009) consider firm's boundaries from knowledge and production perspectives; in particular, focusing on the effect of knowledge boundaries on production.

To date, the literature provides neither a precise definition nor a method of determination of the boundaries of the firms. However, one way to apprehended boundaries is through understanding the factors that affect them and their significance.

The Boundaries of the Firm

Tracing of evolution of the firms' boundaries does not really begin with the neoclassical theory since at the time the theory was not at all concerned with defining the firm as a worthwhile entity. Firm's boundaries also were not a subject of any particular concern and hence are by large invisible in the early neoclassical literature. The implied boundaries however can be traced around

the activity of the supplier entity, which we can assume to be a neoclassical equivalent of the modern day firm. The question of the firms' boundaries arises with the work of Knight (1921), who uses the term to pose as a barrier force in the process of identification of the range of influence of market forces. Knight's ideas are further developed by Coase (1937) and formalized in the transaction cost theory. A firm exists because, in terms of transaction costs, it is less expensive to perform some transactions inside the firm compared to the cost of performing the same transactions outside the firm. Coase sets out the boundaries of the firm by separating the firm from its market, where the transaction costs are significant, whereas within the boundaries of the firm they are insignificant or even non-existent.

Alchian's inferred evolutionary outline of firms' boundaries (Alchian (1950)) encompasses the managerial scope of firm's reach, where the managerial control has specific traits of being both rational and profit-seeking, subject to availability of strategic resources in an otherwise uncertain environment.

In March and Simon's view (March and Simon (1958)) firm boundaries lie at the reach of the coalitions of individuals and groups, differentiated from each other by conflicting goals.

Penrose's view (Penrose (1959)) suggests that the boundaries of the firm are outlining its appropriated resources, the disposition of which is bound by the administrative decision.

Jensen and Meckling (1976) extend the boundary of the firm beyond its legal scope to include the scope of the contract component, such that the firm's range of influence is extended by the scope of its contracts, both within and outside the firm's legal boundaries.

Masten's definition (Masten (1988)) dismisses the legal boundary beyond the cluster of contractual relationships that the firm creates and hence depicts a firm's boundary as a conglomeration of unilaterally overlapping contracts with what is supposed to be the *firm* in the centre of this economic unevenly-petalled daisy wheel.

In his competence-based view Winter (1988) does not expand the definition of the firm beyond the view of the evolutionary perspective in such a way as to re-define the firm's boundaries beyond the notion of nodes of transactions

governance.

The Chandler's definition (Chandler (1992a)) of a firm as a legal and managerial entity, however, yields well-defined boundaries that are drawn at the edge of legal scope of action of any given firm as well as at the edge of the scope of managerial authority. Although one could infer from this definition that the firm's boundaries are determined by the sum of legally-defined contractual relationships, the definition does not explicitly state it.

Richardson's management-flavoured definition of the firm (Richardson (1998)) sketches the firm's boundary to include the actions of the management personnel who are acting on behalf of, or as he puts it, within the same *institutional device*.

Mahnke (2001) summarises that modern property rights theory explains firm boundaries by the optimal allocation of residual decision rights to physical assets, while the modern transaction cost theory is premised on the idea that transaction attributes determine comparative advantages of intra-firm vs. inter-firm resource allocation.

More recently the boundaries are viewed as buffer or bridge (Potts (2001), Araujo et al. (2003)) between the firm and the market. To quote Araujo et al. (2003)[1]:

> ''The more firms rely on complex interfirm relationship to access complementary capabilities, the more the boundary of the firm will have to expand, to incorporate indirect capabilities mutually specialised to relevant partners. Conversely, the more firms rely on markets to access dissimilar but complementary capabilities, the more the boundaries can contract and the less specialized the range of indirect capabilities the firm needs to retain. [...] Boundaries provide buffering as well as bridging functions for a firm. On one hand, boundaries provide a space for the development of stable clusters of connection amongst capabilities within the firms - the buffering function [...]. On the other hand, boundaries provide a

[1]The capabilities necessary to undertake productive activities are direct or core capabilities. The capabilities necessary to interact with the environment (customers, suppliers or other external actors) are called indirect or ancillary capabilities.

bridge to access capabilities outside the control of the firm.''

As per Augier and March's definition (Augier and March (2008)), the emphasis on coalitions of individuals and groups within a firm does not clarify the definition of the firm, leaving their take on the firm's boundaries unclear. However, given their definition, one could infer that the firm's boundaries are coinciding with the definitions that were formulated earlier, which pertain to the legal and managerial scope of the firm as a separate entity.

Knowledge perspective (Parmigiani and Mitchell (2009)), which is at disposition of a given firm, is another way to draw the firm's boundaries, since the range of influence of availability of knowledge has a distinct effect on within-firm production and hence may play a role in determining the boundaries. Firms to which the specialized array of knowledge is accessible tend to be innovative and capable of optimizing their production.

Factors Affecting Boundaries

There are a number of factors that affect the shape of the firm's boundaries. These factors can be subdivided into the following four categories: a) environmental frictions, b) customer attitudes, c) firm behavior and adaptations as well as d) resource properties. Figure 1.2 presents these factors.

Environmental frictions include factors such as asymmetric information, transaction costs, menu costs, government actions and involvement as well as barriers to entry that affect openness. These factors are well-elaborated on in the economic literature; positive changes in the magnitude of each of these factors produces adverse effects on the scope of the firms' boundaries. For instance, a rise in costs of carrying out transactions forces the firms to be more self-sufficient, discouraging interactions with the other firms in the market, while the decline in the magnitude or, better yet, elimination of this form of friction enables the firm to seek productive interactions outside its former boundaries, which may put a positive pressure on the scope of the boundaries to expand.

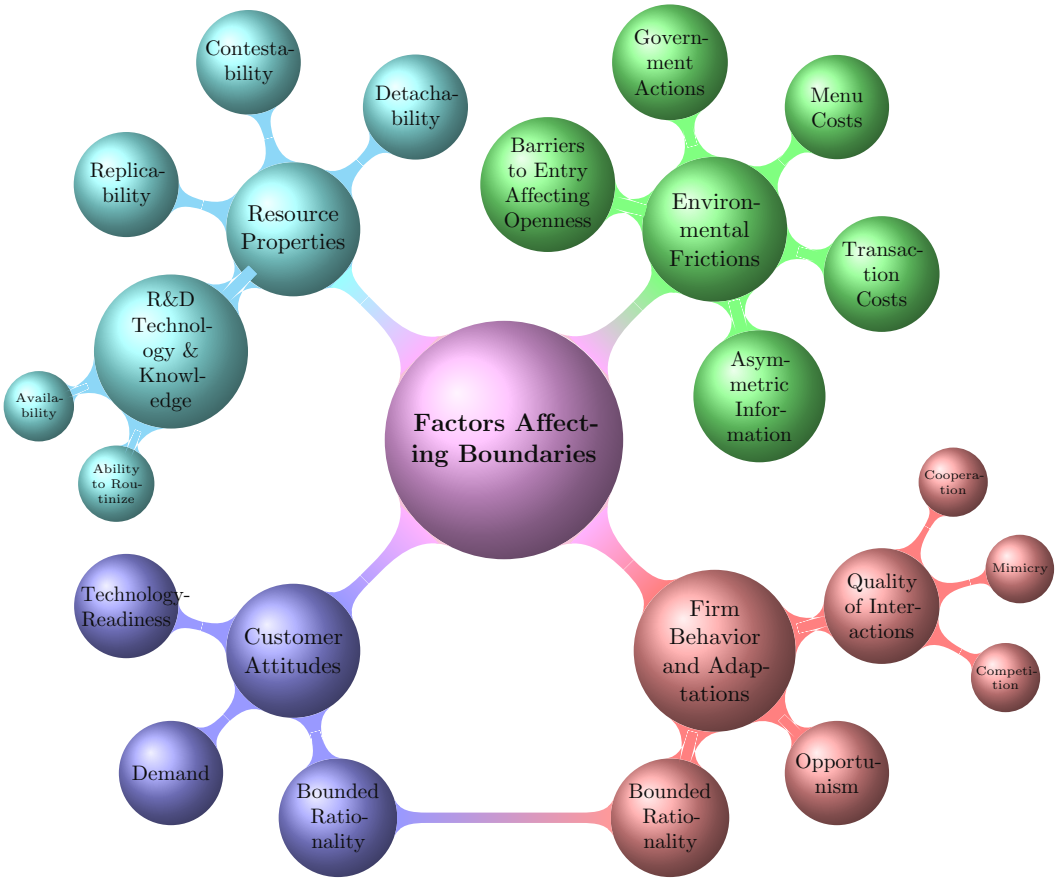


Figure 1.2: Factors Affecting Boundaries

Customer attitudes include demand, technology readiness and bounded rationality. As historically evident, the technologically un-ready customers may cause even a great product to fail at market creation or market entry, causing the firm's boundaries to retract. Bounded rationality is a vice that affects both the firms and the consumers. Active presence of this factor inevitably leads to market inefficiencies.

Firm behaviour can be expressed through opportunism as one extreme, well-known examples of which are rent-seeking and hold-up problems. Alternatively, it can assume a range of manifestations of the quality of interactions such as competition, parasitism and mimicry with co-opetition and cooperation on the other extreme. The latter of these interactions are the pre-requisites of and may lead to formation of business networks and business ecosystems.

Firms' adaptation can involve mimicry and parasitism, which are the forms of survival strategies that are aimed to benefit only the mimic or parasite. Later in text (see chapter 2) we summarise these strategies as a form of inter-firm interactions with asymmetric effect. Moreover, just as consumers, the firms are subjected to bounded rationality.

Resources and their accessibility to the firm can also affect the shape and scope of the firm's boundaries. In particular, the resource-bound factors such as resource detachability, contestability and replicability play a role in the question of definition. A particular role is attributed to R&D as a resource (Pisano (1990)). The availability of the technology and knowledge resource is insufficient to affect the boundary alone, since the matter lies in the firm's ability to adapt as well as routinize the said resource for it to have any notable effect on the shape and span of the firm's boundaries.

All of the above factors play a role in altering the shape and span of the boundaries. Understanding the restrictions that these factors impose and harnessing their power yields an opportunity for unhindered span of business activity, appeal to wider audience, and improved viability of business entity.

As we observed throughout this chapter, the scholarly focus on the theory of the firm overtime yields the evolving definition of the firm and with it the implied or inferred evolving definition of the firm's boundaries. The boundaries are fuzzy regardless of the scale of organization of business entities due to observer's inability to determine all of the relevant components that define the firm's boundary. A firm's boundary can be clearly seen only when analysed from a specific perspective, be it legal, managerial, resource-focused, or etc. In reality, boundaries are a function of convolution of interdependent parameters, where each of which needs to be considered in an effort to construct the complete depiction of the appearance of a given boundary. Aside from its chief function of separating the business entity from the market through a variety of means such as transaction costs, available competences, capabilities and resources, as well as scope of legal and managerial reach, the boundary can also be viewed as a buffer or a bridge between the firm and the market.

IV Case Study: eBay

As seen in the introduction of this thesis, over the last several decades the literature has been observing the emergence of the new forms of competition, open innovation and platform strategies. Firms have been expanding their functions past the scope of the traditional well-accepted definitions. There has been an observable trend of firms to assume new forms of inter-firm interactions in order to attain competitive edge or simply to remain competitive and ensure their own survival. Considering the issue of modern industrial organization, the firms can now be observed to organize themselves into complex interactive cooperative structures that operate in cohort with each other.



Employment of a platform strategy presupposes the presence of a larger player firm that is interested in mediation of exchange between various sides of the market, and a rather large number of smaller-scale participants. Presence of the smaller players is ensured by perceived mutual benefit from participation. In such a system, small players are not necessarily bound to the larger player by any legal obligation such as a contract; in cases where there is some sort of contract involved, it is generally a guideline of conduct, restricting foul behavior towards other members of the ecosystem as well as customers. Absence of contracts typically enables small players to multi-home freely and to leave the platform without penalty should they perceive to acquire no further benefit from participation. A platform-based business ecosystem is a non-explicit-contract-based cooperative conglomeration of firms; it is a business entity that is composed of legally-independent entities, which are not bound by contracts, but rather enabled by a platform creator to generate input, in a form of products and/or services, in order to achieve a common goal in exchange for benefit such as profit and/or visibility or fame. It is generally perceived that the members of the business ecosystem are to a certain extent mutually dependent (Moore (1993)). The extent of their mutual dependence is limited due to the business ecosystem's reliance on the existence and viability of the platform. Other factors include productive participation of individual members and favourable market conditions. It is not, per se, of importance that any particular individual member, with exception of the platform provider, continues to contribute, since in this dynamic ecosystem the vacated place will be taken by another comparably capable self-identified member.

To address the issue of emergence of the modern means of industrial organization, we will present a case study of a contemporary firm, eBay, that qualifies as fitting the definition of a business ecosystem that employs a pure platform strategy. The motivation behind the examination of this firm is to help determine how do the definitions of the firm and its boundaries as seen in economic and management theory fit to this modern species of firms. Following the presentation of the case study in question we will proceed with the cross-examination of the case study against the theory of the firm discussed earlier in this chapter. In particular, we will examine how does the firm discussed in

the case study fit the definitions of the firm and the boundaries of the firm. Our aim is to illustrate whether or not the existing theory of the firm can be applied to describe such form of firms.

Method

To answer our research question, we make use of the single case study methodology as described by (Yin, 1994). We will confront our empirical findings to the theoretical framework developed above. The data was collected mainly from the activity reports and eBay's public domain.

The essential sales data was harvested from the eBay's public domain by the means of a software program code-named *the eBay Crawler*. The crawler was programmed in a shell-scripting language to browse through eBay's feedback pages serially. The number of products and the value of the goods for the selected companies were logged to a file. Also, static information about the companies was collected and saved[1]. The web pages visited were limited to the ones containing the information for the predefined time frame. At the time of this study, eBay has put forward categorization to be able to segregate brands from other merchants and deliver to buyers the ability to search for a specific brand, if they so chose. Several brands pioneered the new found categories. The companies that were chosen for this study were all of the ones that were, at the time of the study, categorized by eBay into one of the categories studied: total of twenty eight brands and five non-branded merchants.

The program collected data for the period beginning July 1^{st}, 2010 ending July 1^{st}, 2011. For ease of collection and analysis, we focus our attention to companies listed in the following categories prior to July 1^{st}, 2011: *eBay Pulse's Top Five non-Branded Merchants*, *Brand Outlet*, *Buy Direct*, and *Branded Stores*. The data encompassed the following parameters: brand name, eBay-ID, eBay member since, location, feedback score, total amount of feedback, amount of feedback for the last one, six, and twelve months, number of items listed for sale on July 1^{st}, 2011, sales volume for the period of one year starting July 1^{st}, 2010, and number of items sold. In total the crawler took about nine hours

[1] e.g.: the eBay-ID, the eBay account creation date, the total number of listed items, etc.

to complete the harvesting of the data. Following the data collection, the derivative data was produced offline. The derivative data includes but is not limited to the monthly, quarterly, semi-annual, and annual *sales volume* as well as *number of items sold* and *average number of items sold*.

On eBay

eBay is an online platform founded in 1995 with the aim to connect individual buyers and sellers interested in mutually beneficial exchange of secondary market goods. Overtime the platform evolved into a facilitator of exchange of non-secondary market goods, allowing the entry of small and medium-sized businesses. Today, with over 128 million registered users[1] in its marketplaces business segment, the platform is encouraging the entry of large enterprises (brands) by enabling the platform-wide brand advertisement, as well as by segregating brand-specific categories to create brand visibility and accessibility for buyers. eBay can be considered to be employing a pure platform strategy, i.e. its sole focus is on mediation of interactions between the buyers and sellers in its marketplace. eBay's recent acquisition, GSI Commerce Inc.[2], has yielded ownership of a branded store, FogDog, which is now a niche player on eBay. This, however, did not alter the focus of eBay with respect to the platform operation and intermediation strategy.

Since its launch, eBay has been committed to development of its business ecosystem. It was pursuing a strategy aimed at attracting registered users who in turn will be active on the platform and interested in assuming one of the sides of the market as either buyers or sellers, or - both. In order to propel the growth of number of registered user accounts, eBay has set the platform access fee of zero for all registered users. It has also worked out per-transaction pricing to be able to capitalize on the successful transactions that take place. Moreover, the listings that were exposed to potential buyers for a limited time were subject to a listing charge, with extra fees due for additional features such as ability to add extra images of the product for sale or

[1] As per eBay's 2013 Annual Report.
[2] eBay acquired GSI Commerce, Inc. in June of 2011.

add an eBay designed listing html frame. eBay's ecosystem has been developing steadily in terms of both the rapidly growing number of user accounts as well as increasing gross merchandize volume (GMV). In addition to ensuring free access to its platform, eBay has identified the importance of making sure that the transactions between registered users are secure. It introduced the user ranking system where the buyers would write concise evaluations of the sellers whom they have dealt with, while the sellers would write their evaluations to characterize buyers they have done business with. The buyers would be expected to rate the seller's accuracy of information in the listing vs the product received, speed of shipping, comment on whether the cost charged for shipping was reasonable, as well as evaluate quality of seller's communication with the buyer. Similarly, the sellers would rate the buyers they have dealt with. These evaluations, also referred to as feedback, are computed to produce a score that signals to potential transaction participants whether or not to deal with the particular registered user. The users who fail to comply with the rules of conduct, i.e. the users that receive a score lower than a threshold set by the platform owner, are relieved from their platform membership. The expelled member can choose to return to the platform under a different user name; they would, however, need to start building their reputation within the eBay community from scratch.

To further improve the security of transactions eBay recognized the need for a payment system, better yet if the payment system was their own. The payment system was expected to process payments for the online transaction by accepting a variety of payment methods, in different currencies, yet not expose the users' banking information, as well as be able to handle disputes between buyers and sellers, shall they arise. With increasing volume of payments as the result of its auctions, eBay first acquired Billpoint in 1999 and in 2002 another online payment system, PayPal. Following the acquisition, eBay Inc. has made PayPal its official payment system, expanded its business into the payments sector and widened its customer base. Table 1.2 summarizes the eBay and PayPal data pertaining to the growth in the number of gross registered users (GRU), gross active users (GAU), GMV[1], gross active user accounts (GARA),

[1]Total GMV: Total value, including vehicles, of all successfully closed items between

total payment volume (TPV), and net total payment volume (netTPV)[1]. The data is sourced from the eBay Inc. annual reports for the years 1996 - 2013 and 2001 - 2002 PayPal SEK filings, 10-K and 10-Q.

Year	eBay			PayPal		
	GRU	GAU	GMV	GARA	TPV	netTPV
1996	41		$7 200			
1997	341		$95 000			
1998	2 181		$745 000			
1999	10 006		$2 805 000			
2000	22 472		$5 422 000	5 500	$1 261 500	
2001	42 400	17 800	$9 319 000	12 800	$3 520 000	
2002	61 700	27 700	$14 868 000	23 000	$5 213 700	
2003	94 900	41 200	$23 800 000	13 200	$12 226 000	
2004	135 500	56 100	$34 200 000	20 200	$18 915 000	
2005	181 000	71 800	$44 299 000	41 300	$27 485 000	$26 066 000
2006	222 000	81 800	$52 474 000	49 400		$35 800 000
2007		83 200	$59 353 000	57 300		$47 470 000
2008		87 700	$59 650 000	70 400		$60 146 000
2009		90 100	$57 206 000	81 000		$71 607 000
2010		94 500	$61 819 000	94 400		$91 956 000
2011		100 400	$68 633 000	106 000		$118 758 000
2012		112 000	$75 376 000	122 000		$144 937 000
2013		128 000	$83 330 000	143 000		$179 663 000

Table 1.2: eBay and PayPal user counts & gross merchandise (GMV) and net total payment volumes (netTPV), respectively: 1996-2013 (all figures are in thousands; GMV, TPV, and netTPV are in US $)

In an effort to improve its platform's appeal to large enterprises, in the second quarter of 2011 eBay has launched brand-promoting categories on some of its domains of the marketplaces business segment. The launch began with

users on eBay Marketplaces trading platforms during the period, regardless of whether the buyer and seller actually consummated the transaction.

[1] netTPV: Total dollar volume of payments, net of payment reversals, successfully completed through our Payments network or on Bill Me Later accounts during the period, excluding PayPal's payment gateway business.

the opening of a *Brand Outlet* category on the eBay's .ca domain in mid-April 2011. The *Buy Direct* category on the .com domain followed, and in mid-June was replaced by the *Branded Stores* category on the same domain. This latter category contained far more brands than its predecessor. As per eBay, the purpose of introducing this categorization was to *help buyers find brands selling directly on eBay*[1]. Should this categorization had been launched successfully, the eBay platform would have become more attractive to well-known companies who in turn would commence their business activity through the eBay platform. Granted, most brands have the eCommerce outlets of their own, however it is likely that having access to the official branded stores through a single platform would also attract - and/or retain - users on the buyer side. This could potentially result in enlargement of the eBay GMV and further growth of the business, as well as present an opportunity for participating brands to enhance their online visibility and, perhaps, sales volumes.

In this case study we focused on the three pioneer categories listed above. We studied all of the brands that participated within these pioneer categories between the launch of categorization in mid-April, 2011 and July 1^{st}, 2011. All data collected is up to July 1^{st}, 2011; all dollar figures are in US dollars, as per corresponding annual reports.

Prior to the launch of categorization eBay acquired an online Germany-based platform, *Brands for Friends*, in the first quarter of 2011. This platform caters deals on branded items to its $3,5$ million members, who are located in Germany, Austria, UK, and Japan. *Brands for Friends* connects the buyers directly with the listings of 600+ brands. Also, in the first quarter of 2011 eBay announced its intent to purchase GSI Commerce, Inc., and completed its acquisition in June 2011. GSI Commerce, Inc. was an eCommerce company specialized in provision of marketing solutions for retailer's ecommerce storefront, specifically targeting brands that were interested on opening a storefront on eBay. GSI Commerce is of particular interest due to its narrow specialization fit to encouraging brand entrance into the eBay ecosystem, as well as its ownership of brands such as *FogDog* who were already participating as niche players on eBay. By the end of the 2011 fiscal year, the acquisition of GSI Commerce, currently referred

[1]As per http://brandoutlet.ebay.ca/, last accessed on August 1, 2011.

to as *eBay Enterprise*[1], contributed $590 million or 5% to eBay's total net revenue. In following years this contribution grew to $1,083 billion in 2012 and $1,112 billion in 2013[2] and represents 7,7% and 6,9% of eBay's total net revenue, respectively.

The brands that were subjected to this study were selected based on eBay's categorization of certain branded niche players. In the second quarter of 2011 eBay segregated certain brands into categories, motivating such action by stating that the aim is to facilitate customer's direct access to the branded stores that are present on eBay. For comparison purposes, we also selected top five eBay merchants who were not segregated as brands. The selection was aided by eBay's own statistic, publicly accessible via eBay called *eBay Pulse*[3]. These *Top Five* merchants include *Buy's Internet Superstore*, *Grand Eagle Retail*, *eCom Electronics*, *Powell's Bookstore*, and *Plc Centre Supply Industrial*. In addition to our non-branded merchant selection, there are three pioneer brand categories. Shortly after their launch, the three above-mentioned branded categories converged to two: *Brand Outlet* for the .ca domain, and *Branded Stores* for the .com domain of eBay.

The *Branded Stores* category includes eighteen members, which are as follows: *Black&Decker*, *DeWALT*, *Porter Cable*[4], *Creative Technology Ltd.*, *The Timberland Company*, *Dell Inc.*, *KitchenAid*[5], *Jockey International*, *Toys "Я" Us*, *Babies "Я" Us*[6], *Drugstore.com Inc.*, *The Lenox Corp.*, *Barnes& Noble*, *FogDog Sports*[7], *MacMall*[8], *Skullcandy Inc.*, *Brookstone Company*, and *eBags Inc.*. Another category was formerly referred to as *Buy Direct*; we only list the companies unique to this category in order to avoid duplication, and they are

[1]Following its acquisition by eBay, GSI Commerce Inc. was assimilated as a division of eBay and renamed *eBay Enterprise* in June 2013.

[2]As per eBay's 2013 Annual Report.

[3]eBay Pulse is the customer aid, last accessed on 29/06/2011 via http://pulse.ebay.com. The top five merchants were ranked based on the number of active listings.

[4]Porter Cable, DeWALT and Black&Decker brands are owned by *Stanley Black&Decker, Inc.*

[5]*KitchenAid* is owned by the *Whirlpool Corp.*

[6]Both Toys "Я" Us and Babies "Я" Us are owned by *Toys "Я" Us, Inc.*

[7]Owned by GSI Commerce Inc. from 2000 to 2011; owned by eBay Inc. since June 20, 2011.

[8]*MacMall* is owned by *PC Mall Inc.*

as follows: *Brooks Brothers*, *Calvin Klein*, *Tommy Hilfiger*[1], *Custo Barcelona*, and *William Rast*. The last category is unique to the .ca domain and is entitled the *Brand Outlet*; this category includes *Danier Leather Inc.*, *Dyson*, *Gemstone King*, *Henry's*, and *Moneysworth&Best*[2]. *Skullcandy Inc.* is also listed in the latter category, but shares the eBay-ID across .ca and .com domains, so we will consider only one instance of it. There are instances when a single company owns several brands; these relationships are outlined in the table 1.8[3]. Since the 1^{st} of July 2011 a number changes took place: categories were renamed (e.g. Brand Outlet is now Brand Vault), more brands began to participate, categories are now subdivided into subcategories for easier search etc.; however, these changes are beyond the scope of this case study.

Observations

The launch of the *Brand Outlet* and the *Branded Stores* categories enabled visibility of online presence of the branded stores. Now brands have the choice to advertise their eBay presence via *Buy Direct* advertisement banners, which appear atop the search results when customer makes a brand-specific search. Prior to appearance of the above-mentioned brand-centred categories, the customers were either unaware of the presence of branded stores due to their absence from or previously low profiles on eBay, or had to manually seek, by trial and error, the branded stores in order to buy direct. With this emerging categorization within eBay customers can access the branded stores directly.

How does this brand appearance and assertion affect the overall balance of the eBay ecosystem? Let's consider the average transaction volumes, per annum, for different types of users. There are three types of users: buyers, merchants, and users who are both buyers and merchants. The figures regarding the proportion of each user type are unknown, so we rely on the published GAU figures for analysis. The figure 1.3 depicts the merchandise volume per active user and net total payment volume per active user for $1996 - 2013$ (eBay) and $2000 - 2013$ (PayPal).

[1]Both the Calvin Klein and the Tommy Hilfiger brands are owned by the *PVH Corp.*
[2]Owned by *M&B Acquisition Inc.*
[3]This table can be found in the Annex section of this chapter.

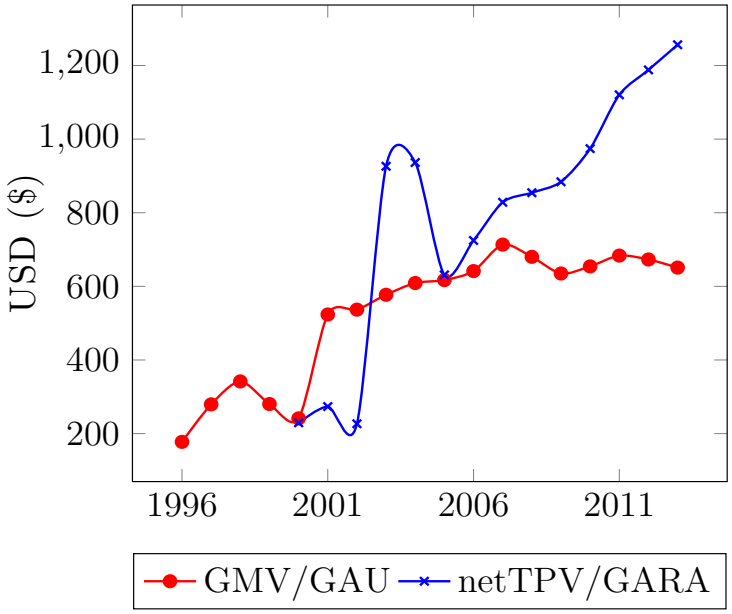


Figure 1.3: Average US$ per [Active] Registered User in eBay Merchandise Sales Volume (GMV) and PayPal Net Total Payment Volume (netTPV)

The deviation from the trend, i.e. the "dip" in $1998 - 2000$ (eBay) is attributed to the difference in parameter measured: prior to 2001 eBay measured GRU instead of GAU. Similarly, the "dip" in $1999 - 2002$ (PayPal) is due to the method of measurement of the users parameter: registered users were measured instead of active users. The "spike" of $2002 - 2004$ (PayPal) is due to the fact that prior to 2005 the measurement of the TPV parameter was taken into account instead of the netTPV. The netTPV measurement is net of payment reversals, as well as other factors[1]. In 2010, the average annual active user's transaction volume was $\$654,17$(eBay) and $\$974,11$(PayPal). For comparison, in the same year the average per user sales volume in the *Top Five* non-branded merchants category was $\$9\,927\,570,79$, while the average per user sales volume for merchants in the *branded* category was $\$1\,574\,736,24$. It is interesting to note that the annualized 2010 sales figures for *Top Five* non-brands and

[1]In addition, the spike is attributed to eBay acquisition of PayPal in October 2002. eBay made PayPal the official payment system, resulting in payments completed by $7,9$ million users in the three months following the acquisition, compared to payments completed by about 8 million active users during the entire fiscal year prior to acquisition.

the twenty-eight *branded* stores were comparable: the former's cumulative sales were \$49 637 853, 96 and the latter's were \$44 092 614, 60. Compared to eBay's 2010 GMV of \$61, 819 billion, the *Top Five* non-branded merchants' footprint represents 0, 0803%, while *branded* stores' footprint cumulatively makes up for around 0, 0713% of total eBay merchandise volume. In other words, 0, 0000349% of eBay users, namely merchants, are responsible for the 0, 1516% of the eBay's GMV. This represents an average of 0, 00459457% contributions to GMV across the thirty-three merchants studied compared to the significantly smaller eBay-wide user average[1] of 0, 00000106% contributions to GMV.

The data collected can be summarized as follows.

1. 89, 3% of the brands are US-based, while the 10, 7% are Canada-based.

2. Brand entry onto the eBay platform is uncorrelated with the date of the company's founding.

3. Half the brands joined eBay in 2010; thirteen joined prior to 2010, and one joined in 2011.

4. One non-branded merchant that made the *Top Five* list by July 1, 2011 joined eBay in 2010; the other four joined eBay prior to 2010.

5. Feedback score represents the trustworthiness of the merchant as evaluated by its eBay customers. The average feedback score for brands is 99, 41%, with scores ranging from 97, 5% to 100%. The average feedback score for *Top Five* non-brands is 99, 5%, with scores ranging from 99, 4% to 99, 6%.

6. The amount of feedback is correlated with the number of items sold; in 2010, on average, each of the branded stores sold 14 940 items, while, on average, each of the *Top Five* non-branded merchants sold nearly tenfold of 145 121 items. The corresponding average per-item prices are \$115, 18 for brands and \$68, 40 for non-brands.

[1]This average excludes contributions to GMV by the thirty-three merchants.

Table 1.8[1] summarizes the key data on the *Top Five* merchants and the above-mentioned brands, sorted by category. The table also summarizes the ownership of brands, both in terms of whether the enterprise is privately- or publicly-held, and in terms of relationship to parent companies which own the said brands.

Out of twenty-four companies (or twenty-eight brands) that were studied, $91,7\%$ operate their own eCommerce website outside eBay, while 25% exercise a purely online distribution approach and do not have any means of retail via physical locations. Table 1.3 summarizes the brand attitude towards operating retail locations vs focusing solely on eCommerce as its sole distribution channel.

It is important to understand what motivated the brands to ensure presence on eBay. As the figures in tables 1.4 and 1.5 suggest, the brands do not so much focus on their eBay stores as a revenue stream; instead, they seem to view it as a channel for increased visibility and accessibility to its online customers, as well as the platform for delivery of targeted advertisement to a select group of eBay users. The above is supported by data collected, which clearly indicates that eBay-sourced portion of the brand's revenue is on average less than $0,1564\%$ of their annual total sales revenue. The tables 1.4 and 1.5 summarize the data on eBay portion of the annual total revenue (2010) of the twenty-eight brands of public and private companies in question. These twenty-eight brands are owned by twenty-four companies, evenly distributed between publicly- and privately-held. Of the fifteen brands of public companies considered only one brand's eBay portion of revenue breaks the 1% barrier. Due to lack of annual total revenue data for most of the brands of private companies, we are unable to estimate the eBay portion of the private brands' revenue, however, partial data that is available is comparable with that of brands of public companies.

Interpretations

Among other advanced search categories on eBay there is a category of particular interest as it allows to search items listed by a particular seller; this however

[1]This table can be found in the Annex section of this chapter.

Company	eCommerce		Physical Retail	
	eBay Store	eCommerce Site	Authorized Retailer	Own Stores
Stanley Black&Decker, Inc.	✓	✓	✓	×
Creative Technology Ltd.	✓	✓	✓	×
The Timberland Company	✓	✓	✓	✓
Dell, Inc.	✓	✓	✓	×
Whirlpool Corp.	✓	✓	✓	×
Jockey International	✓	✓	✓	✓
Toys "Я" US, Inc.	✓	✓	×	✓
Drugstore, Inc.	✓	✓	×	×
The Lenox Corp.	✓	✓	✓	✓
Barnes&Noble, Inc.	✓	✓	×	✓
Fogdog Sports	✓	✓	×	×
PC Mall, Inc.	✓	✓	×	×
Skullcandy, Inc.	✓	✓	✓	×
Brookstone Company	✓	✓	×	×
eBags, Inc.	✓	✓	×	×
Brooks Brothers	✓	✓	×	✓
PVH Corp.	✓	✓	✓	✓
Custo Barcelona	✓	✓	✓	✓
William Rast	✓	✓	✓	✓
Danier Leather	✓	×	×	✓
Dyson	✓	✓	✓	×
Gemstone King	✓	✓	×	×
Henry's	✓	✓	×	✓
M&B Acquisition, Inc.	✓	×	✓	✓

Table 1.3: Brands' Attitude Towards Direct and Retail Distribution Channels

requires that the customer knows the exact user ID of the seller in question. When eBay search results are displayed they can be sorted as per customer's demand in the following fashion: best match, time (ending soonest, newly listed), price (highest first), price + shipping (highest-lowest, or lowest-highest), or distance (nearest first). There is no sorting with respect to brand name (if search is general, e.g.: *electric drill*), or with respect to merchant that carries the searched item. Hence brands, unless searched for specifically or accessed

Brand	Sales on eBay	Total Revenue	eBay Portion
Danier Leather	$2 039 754, 06	$164 217 000, 00	1,2421%
MacMall	$9 698 350, 96	$1 368 314 000, 00	0,7088%
Fogdog	$1 710 580, 94	$1 357 994 000, 00	0,1260%
Drugstore	$458 352, 76	$456 500 000, 00	0,1004%
Barnes&Noble	$3 342 655, 40	$5 810 564 000, 00	0,0575%
Black&Decker	$2 754 055, 28	$8 410 000 000, 00	0,0327%
Calvin Klein	$254 669, 20	$933 504 000, 00	0,0273%
Timberland	$223 389, 54	$1 429 484 000, 00	0,0156%
Brookstone	$56 352, 60	$468 191 000, 00	0,0120%
Dell	$4 907 130, 40	$61 494 000 000, 00	0,0080%
Creative	$16 910, 36	$275 000 000, 00	0,0061%
Porter Cable	$358 564, 04	$8 410 000 000, 00	0,0043%
DeWALT	$196 797, 68	$8 410 000 000, 00	0,0023%
Tommy Hilfiger	$31 625, 72	$1 949 230 000, 00	0,0016%
KitchenAid	$261 203, 58	$18 366 000 000, 00	0,0014%

Table 1.4: eBay Portion of Annual Total Revenue (2010) of the Brands of Public Companies. All figures are per annum. Sorted by significance of eBay potion of annual revenue. Revenue figures are in US dollars.

via one of the brand-dedicated categories, are not emphasised in the search results.

Based on the data collected, it is clear that the revenues collected by the branded stores via sales on eBay are insignificant, compared to the brand's total revenues for the year reported, as well as compared to the brand's revenues from its own eCommerce activity outside eBay. Out of all the brands considered, only six of them report contribution from eCommerce activity to their revenue in their annual reports. None of the companies report the

Brand	Sales on eBay	Total Revenue	eBay Portion
Henry's	$4 814 449,22	NK	NK
eBags	$3 144 791,62	NK	NK
Skullcandy	$2 039 754,06	$160 600 000,00	1,2701%
Toys "Я" Us	1 063 716,48	$13 860 000 000,00	0,0077%
Brooks Brothers	$660 875,50	NK	NK
Jockey	$468 556,38	NK	NK
Babies "Я" Us	$199 990,36	$13 860 000 000,00	0,0014%
Dyson	$186 924,94	NK	NK
Lenox	$130 015,70	NK	NK
Gemstone King	$55 121,90	NK	NK
William Rast	$53 573,64	NK	NK
Custo Barcelona	$14 718,20	NK	NK
Moneysworth&Best	$187,22	NK	NK

Table 1.5: eBay Portion of Annual Total Revenue (2010) of the Brands of Private Companies. Annual total revenue figures are not available for most of the above-noted private brands. All figures are per annum. Revenue figures are in US dollars.

revenue data attributed to the revenue sourced from eBay operations, implying insignificance of eBay portion of revenue compared to total revenue. Tables 1.4 and 1.5 summarise this data. Table 1.6 summarizes the available data pertaining to the eBay portion of revenue of the brands in question compared to the brands' revenue from their eCommerce activity. The question arises as to the brands' motivations that encourage participation on the eBay platform.

One of the motivations is that the brands take advantage of the opportunity to advertise on eBay. The ads of the brands that choose to be advertised appear atop of the search results when customer searches for a particular brand. The ads are segregated from the listings and are non-specific; instead they point the potential brand-seeking customer to the eBay store of the brand in

Brand	Sales on eBay	Total Revenue (eCommerce)	eBay Portion
MacMall	\$9 698 350, 96	\$1 368 314 000, 00	0, 7088%
Barnes&Noble	\$3 342 655, 40	\$572 763 000, 00	0, 5836%
Drugstore	\$458 352, 76	\$456 500 000, 00	0, 1004%
Brookstone	\$56 352, 60	\$98 311 000, 00	0, 0573%
Toys "Я" Us	\$1 063 716, 48	\$782 000 000, 00	0, 1360%
Babies "Я" Us	\$199 990, 36	\$782 000 000, 00	0, 0256%

Table 1.6: eBay Portion of Annual Total Revenue from eCommerce (2010) of the Brands of Public and Private Companies, where available. All figures are per annum. Revenue figures are in US dollars.

question. A similar strategy cannot be employed by non-brands, giving the brands a clear advantage.

In addition to the opportunity to advertise, the brands may consider other factors that motivate their participation on the eBay platform. Possible reasons for brand participation are to ensure brand's visibility on eBay, as well as to provide the customers with accessibility and convenience of shopping from the brand store via eBay platform. Brands may also view participation on the eBay platform as potential source of revenue through direct sales.

It is common knowledge that the eBay users are generally expecting to get a good deal on their purchase when they shop at eBay. It can then be inferred that the customer is not so much looking to avoid a middleman by buying directly from the brand store, rather they are looking for the best price, ceteris paribus. Let's consider the conditions other than price in customer's choice of merchant. Among the important factors are the additional costs attributed to shipping and shipping insurance, availability of preferred payment method, as well as merchant's feedback score and rating. eBay is committed to ensuring quality of service provided by the member merchants. Hence, they regulate sellers, and dismiss the ones who do not meet this performance

standard[1]. Sellers who are consistently rated high by their customers and meet the sales volume requirements are placed in a special category called *Top-Rated Sellers*. This signals to customers the trustworthiness and success of the seller. The branded sellers are more likely to enter this category, compared to the average non-branded seller. Out of all brands considered, fifteen are ranked as *Top-Rated Sellers*, and two are ranked as *Power Sellers*[2]. Out of the *Top Five* non-branded stores considered, two are ranked as *Top-Rated* sellers.

This study is exploratory in nature; the sample set is rather small, but sufficient to demonstrate the presence of certain trends. The time frame of the case study is limited to one year; for most of the companies considered the data is unavailable for a much more extended time period due to the recency of their entry into the eBay ecosystem. At the end of the period studied there is an important change within the ecosystem: brand segregation. Although the ecosystem leader has also entered its own ecosystem as a niche player during the time period, this did not appear to affect its neutrality as the platform leader. This niche entry did not offset the balance of the existing ecosystem, even though the platform leader is in a position to exert influence in promotion of its brands.

Discussion

The case study presented above is an excellent illustration of a contemporary firm that chooses to operate through a platform strategy. As we have observed, the central player, eBay, has constructed a business ecosystem by creating a platform that can support favourable exchanges between two sides of the market and by amassing to date over one hundred twenty million participants, which represent a proportional mix of members offering products for sale and members interested in purchasing these products. To be more specific, as per their most recent 2013 annual report, the marketplaces segment is comprised of 128 million users, the payments segment is comprised of 143 million users in addition to the

[1]Performance standards as outlined on eBay:
http://pages.ebay.ca/services/buyandsell/powerseller/criteria.html.

[2]*Top-Rated* seller is the fifth and final stage of *Power Seller* tiers.

developer community that is comprised of $1,8$ million members[1]. The central player has brought forward the electronic means, i.e. an online platform, for the buyers and sellers to engage in mutually beneficial exchanges. To ensure the continued business activity, the central player exercises control and governance over the participants to provide a safe place for the transactions to take place, as well as capitalizes on successful transactions that take place, while charging no access fee. The participants of the platform are attracted by potential presence of mutually beneficial interactions (e.g. buyer/seller), absence of upfront cost of accessing the interactions, conducting the transactions with no hidden fees, as well as by reassurance of safe, regulated environment in which to carry out transactions. In a sence, eBay is decreasing the transactions costs of its members and capturing part of this value through its transactions-charging system.

Let us examine the definitions of the firm present in the economics and management literature to identify the ones that are able to properly describe a firm like eBay and, by extension, its boundaries. To summarise, the theory of the firm literature reviewed earlier in this chapter has yielded the following definitions of the firm. For brevity the definitions are condensed to their bare minima, yet not so much as to forgo the specificities of each of the definitions considered. In addition, the citations of the seminal sources are kept for easy reference.

1. Legal entity (Chandler (1992a,b)).

2. Collection of productive resources subject to administrative decision (Penrose (1995)). Administrative entity (Chandler (1992a)); institutional device that organizes, consciously plans, and directs (Richardson (1998)).

3. Legal entity bearing a contract component (Jensen and Meckling (1976)).

4. Cluster of contractual relationships (Masten (1988)).

[1]The users in the marketplaces segment and in the payments segment may or may not be same physical persons; as per 2013 annual report, a large amount of PayPal transactions originate on eBay.

5. Transaction cost-minimizing and profit-maximizing employer and resource-director (Coase (1937), Winter (1988)).

6. Rational profit-maximizing producer within a frictionless environment.

7. Rational profit-seeking decision-maker aiming to increase scale by means of utilization of strategic resources (e.g. competence (Winter (1988); Dosi and Winter (2000))) in an environment of uncertainty (Alchian (1950); Simon (1951); Williamson (1985); Winter (1988)). Coalitions of individuals and groups with conflicting goals (March and Simon (1958); Cyert and March (1963); Augier and March (2008)). Bundle of capabilities (Chandler (1992b); Foss (1996)). Bundle of routines, decision rules, procedures and incentive schemes (Dosi and Marengo (2000)).

8. Seller of goods or services (Cohen (1979)).

The literature also presents us with sets of traits that the firm is ought to have (recall table 1.1).

With respect to the entity set of traits, eBay is positioned as follows. It is a legal entity, which is supported by the articles of incorporation as well as obligation by law to file and make available to the public their financial reports through audited government commission of securities and exchange. eBay is also an administrative entity: they hire, manage and pay their employees. The employees represent a coalition of individuals, however from our standpoint it is unknown whether or not they have conflicting goals, since their purpose is to develop and maintain the eBay family of websites to ensure uninterrupted access of members to the platform as well as to ensure business day-to-day operation and further expansion. As an institutional device eBay plans, organizes and directs its business. It acquires productive resources such as employees by establishing contractual relationships. In this sense, eBay represents a bundle of routines, decision rules, procedures and incentive schemes to carry out its core business activity. As is evident from its financial statements, eBay is a profit seeker. It is, however, difficult to say whether it in fact aims to maximize profit; when analysing this kind of firms the marginal revenue vs marginal cost perspective is not easily applicable, as cost is in a way correlated with

the volume of website traffic, yet it is not contingent per se on the number of participants or transactions.

Hence, it can be safely assumed that eBay fits into the traditional definition of a firm; it is a legal and administrative entity who employs, plans, organizes and directs, who represents a bundle of routines, decision rules, procedures and incentive schemes as well as is a profit-seeker.

However, were we able to encompass the whole entity such as eBay through these definitions? Are there qualities that these definitions, even in combination, have omitted? Through defining an entity like eBay as a firm, we did not gain understanding how do the over hundred million of its constituents fit in? Are they the market? Or are they part of the firm? Does eBay have any legal or administrative authority over these constituents or are they free to come and go as they please? In other words, where do we draw the boundaries?

To address the issue of belonging of constituents, let's consider the following. A typical firm acquires the missing capabilities through hiring qualified employees or through outsourcing to contractors. In other words, it tends to establish some form of contractual relationship to ensure possession of required capabilities. No firm, however, is able to manage over a hundred million contractors simultaneously. To acquire additional capabilities eBay does not engage itself in contractual relationships; instead, it employs one of the following methods. Within its business ecosystem eBay projects an environment of positive interactions that tends to attract non-contractually bound[1] platform participants whose contribution is unknown until they commence their activity. Alternatively, it systematically chooses to acquire and internalize bearers of capabilities that are of interest to eBay. One prominent example of such acquisition is purchase of PayPal, but there are many more including but not

[1]We must elaborate on the use of this adjective; we say *non-contractual* to emphasise the vast difference between terms to which eBay members agree in order to join eBay and a typical employer-employee, sales, or partnership contract. Although there are some form of contacts between eBay and its members, these contracts are focused on maintaining a safe environment for the transactions to take place. eBay members have no obligations towards eBay in terms of monthly sales volumes, minimum monthly purchases, or obligations pertaining to the duration of their operation through the eBay platform. Moreover, there are no membership fees or subscription fees. In turn, eBay pays them no salary and does not prevent from multihoming: members are free to come and go as they please.

limited to GSI Commerce Inc., Brands for Friends, Billpoint and etc. In a manner, acquisition of capabilities such as these enables eBay to enhance its environment and to minimize transaction costs that pertain to operating the contractual relationships as well as frictions such as agency problems and risks such as breaches of contracts. Moreover, eBay subsidizes entry of members on both sides to ensure maximum entry and attractiveness of the platform to both types of members. The members, both merchants and buyers, are free from strong contractual obligations, and yet the merchants are motivated to emit per-listing and per-transaction payments to eBay in exchange for exposure to a pool of buyers and potential for engagement in successful transactions, while the buyers are willing to accept prices that are likely to incorporate transaction-related fees that merchants transfer to their customers. This complex micro-fees structure is enabling eBay to capitalize on interactions between individual members, while not taking an active part in these interactions short of facilitating a secure environment where the match-making can take place.

With the above in mind, weak and nearly non-contractual relationship between the platform creator and the platform members yields a situation in which the platform members are free to release themselves from their membership at any given point in time, while the platform creator toils to maintain attractiveness of its platform through on-going platform improvements and new service propositions. In a way, part of the eBay platform members are eBay's customers: they purchase the service of exposure to potential buyers through the facility of the eBay platform; yet, inevitably a vast part of the platform members serve the platform as inputs, a mean of attraction of members to the other side of the platform, for in their absence eBay would be unable to attract and retain paying customers (merchants). Hence, the boundaries drawn solely around the legal and administrative span of eBay's action would be erroneous, as they would fail to incorporate most of the firm's driving force.

There still remain several traits which are brought forward by the theory of the firm literature and were not yet addressed. Is eBay a scale maximizer? It is a seller? Does it utilize any strategic resources? Is it operating in an environment of uncertainty? And, finally, is it rational? Let's begin by addressing the first of these questions. eBay admits to targeting aggressive expansion of

business, but when referring to eBay's scale what ought we to consider? eBay is an online platform, that intermediates buyer/seller interactions. It does not produce any goods, per se, and the service it provides is not individualized. One only needs to acquire membership, free of charge, to gain the access to the platform-catered services. The productivity of these services is best measured through the annual gross merchandise volume, which is inevitably contingent on the number of active users that eBay is able to attract and retain. eBay is indeed making an effort to expand their website traffic to specific regions as well as to enlarge its user pool and motivate the users to actively participate on the platform. With its online presence in many countries through operation of local domains in relevant languages and its 128 million active users does eBay qualify as a scale maximizer? eBay can be considered a provider of intermediation service on which it is able to capitalize. It charges no access fee to participate on its platform, and only bills one side of its users on per-item listed/sold basis. eBay does not really possess any strategic resources that it could potentially utilize. It can be safely assumed that the environment within which it is operating is uncertain, however it is debatable whether it behaves rationally since, not unlike other firms of today, its rationality is bounded through presence of various environmental frictions (asymmetric information; incomplete information, etc.).

Another way to look at the definitions of the firm is from structural versus interactive perspectives, both of which can be addressed from internal or external locus. From the point of view of internal structure the firm represents an administrative unit that organizes, plans and directs its resources and capabilities. Its internal interactions are comprised of employer/employee relationships through the incentive programs, as well as establishment of routines and procedures to ensure well-oiled operations. The administration needs to maintain positive employer/employee interactions as the employees can be considered part of firm's capabilities and productive resources. When viewed from the external locus, the firm is a legal structure that exercises contract-based interactions. Selling its products and services can be thought of taking part in external mutually beneficial interactions between seller (the firm) and its buyers. The table 1.7 concisely summarizes this approach.

		Definition Components	
		Structural	**Interactive**
LOCUS	**Internal**	Administrative Organizer Planner Director	Employer Incentives Routines Procedures
	External	Legal	Contracts Seller

Table 1.7: Structural and Interactive Components of Firms as per Definitions of the Firm in Academic Literature.

In an essence, even though many traits as set out by the theories of the firm can fit in one form or another an entity such as eBay, none of the traits address the ability of the firm to attract players who are willing to pay for participation on its platform and agree to subject themselves to the platform's governance through non-contractual arrangements in exchange for exposure to potential customers. Moreover, having solely virtual presence with particular capitalization and governance structures as well as peculiar methods to increase scale and scope, the traditional concepts pertaining to defining firms do not operate smoothly. In addition, the theory does not clarify the question of boundaries of such a firm. In a scenario of intermediation where all income is reliant on successful interactions between users that somehow became attracted by the platform, but where the platform is not responsible for hand-picking the potential participants of successful transactions and merely facilitates friendly environmental conditions for such transactions to take place, it is unclear where to draw the firm's boundary. Does it enclose the firm exclusively as a legal entity? Does it encompass the administrative functions of the core of the firm aimed at creation and maintenance of the virtual platform? How far

do the boundaries span? If platform participants play such invaluable role in the platform's viability, should they too be immersed into the span of the boundaries, and hence are in a way part of the firm? But if they are indeed part of the firm how then can they also be part of the market? Furthermore, the theory of the firm literature does not respond well to defining entities who recruit participants through non-contractual relationships, where – for the platform – participation is an integral part ensuring its own viability.

Let us consider eBay through another prism. Could we say with confidence that eBay provides a place, although a virtual one, for sellers to offer their wares to potential customers? – Yes. We can observe the presence of two types of agents who want to interact, and these agents can carry out their transactions by interacting through eBay. eBay, in a sense, is a medium (or platform) that facilitates transactions (interactions) between two groups of participants: a group the members of which have something to sell (sellers) and a group the members of which are willing to buy at a good price (buyers). These two groups are able to meet each other on eBay and execute mutually beneficial transactions at a reasonable transaction cost through the eBay platform. Could we insist that eBay is ensuring the choice of medium of exchange and that transactions are carried out in a safe environment? – Yes. Not only does eBay provide an access to payment system, which takes care of currency conversion, when necessary, it also provides means for members to follow up on the transactions they carry out, rate members with which they interacted, and facilitates a way to mediate and resolve disputes between members. In addition, eBay is committed to attracting more and more active members to ensure thickness, and deals with the potential congestion problem by categorizing items available for sale and enabling potential buyers to easily search, rank and compare their search results. In other words, it appears that eBay also fits the definition of a market. Is that really so?

Formally speaking, eBay is offering to these groups of agents:

1. An allocation mechanism: a system of auctions that allocate the product to the highest bidder coupled with a system in which the buyer purchases the item at a price pre-defined by the seller (*Buy it now* pricing).

2. A system enforcing the terms of exchange: eBay caters a facility (PayPal) to mediate and resolve transaction-specific issues that may arise between buyers and sellers and that buyers and sellers are unable to resolve on their own; PayPal payment system also secures and guarantees the monetary transfers between buyers and sellers at a reasonable cost per transfer.

3. All the necessary information pertaining to the items for sale and the potential transactions is available for evaluation and comparison (ranking of buyers and sellers, comparisons of similar items, listing of all the possible deals).

In addition, eBay platform:

1. Shows thickness: it attracts a sufficient proportion of potential buyers and sellers who are willing to interact (122 million of registered active users). This ensures a high likelihood of transactions.

2. Does not suffer from the congestion related to its thickiness. The functioning of the platform is smooth since the sellers are required to input maximum details to make it easy for the buyers to search in relevant categories using keywords.

3. Makes participation safe, fast, secure and free. Transactions outside the eBay platform are either less efficient (selling second-hand products by other means like word of mouth or small adds) or less beneficial for the participants (opportunity to reach new customers on eBay and advertising brands, higher number of potential buyers or sellers).

Hence, eBay indeed performs the functions of a market. In this sense, eBay can be viewed as a market (or a market segment) as well as a firm.

V Conclusion

Traditionally, it has been thought that markets ought to form spontaneously. It may have been so sometime in the remote past; however, the undertaking of such endeavour is costly, and presupposes the risk of failure of market formation due to frictions such as information asymmetries. Since some time in the antiquity physical space for markets to occur was defined by the governing entity[1], whose motivation was to enable mutually beneficial interactions between the two groups of participants. This act of provision of a space in which for the two sides of the market to meet and carry out transactions can be thought of as platform creation, where successful creation of a platform translates into market creation. Today the role of platform creation has been assumed by entrepreneurs, willing and able to make up-front investment into platform-building as well as assume the risk for market creation failure. Creators of successful platforms, hence, are market creators, motivated and able to attract participants on both sides of the market through proper price structure, where prices are charged for platform-provision services, which may or may not include platform membership, within-platform exposure to the other side of the market, and realized transactions between the two sides. Platform strategy then is the planned course of actions which lead an entrepreneur to creation of platform, attraction of the compatible sides of the market (match-making), governance, and capitalization.

As we have just seen with the case of eBay, platform creation and operation fit with the traditional functions of the firm and the market. To resolve this gap in the literature we will consider the issue of definition of this new form of competition through the concept of *firm/market equivalency*.

[1]The governing entity would also provide the definition for the standard of medium of exchange.

Annex

Top Five eBay Stores (source: http://pulse.ebay.com/)									
Company	Division	Ownership	Founded	on eBay since	Site	FB Score	FB Total	FB 12m	Products
Rakuten, Inc.	Buy's Internet Superstore	JASDAQ:4755	1997	12/02/2002	US	99,6%	1941167	588315	2298035
Grand Eagle Retail	none			16/09/2010	US	99,6%	49282	56592	1114004
eCom Electronics	none			13/09/2006	US	99,4%	54266	27884	454000
Powell's Books	Powell's Bookstore	Private	1971	23/07/2008	US	99,5%	84645	32057	447768
Radwell International Inc.	Plc Centre Supply Industrial	Private	1979	01/11/2001	US	99,4%	32541	20755	316896
Branded Stores (source: http://brands.ebay.com/)									
Company	Brand	Ownership	Founded	on eBay Since	Site	FB Score	FB Total	FB 12m	Listings
Stanley Black&Decker Inc.	Black&Decker	NYSE:SWK	1910	08/04/2008	US	99,8%	46979	33283	185
	DeWALT		1997	06/11/2009	US	99,5%	602	628	74
	Porter Cable		1906	05/05/2010	US	99,9%	3982	4181	26
Creative Technology Ltd.	Creative	SGX:C76	1981	08/09/2010	US	99,6%	272	281	61
The Timberland Company	Timberland	NYSE:TBL	1952	30/09/2009	US	99,6%	2018	2229	2724
Dell, Inc.	Dell	NASDAQ:DELL	1984	15/09/2009	US	97,5%	10862	7646	206
Whirlpool Corp.	KitchenAid	NYSE:WHR	1919	17/05/2010	US	99,9%	1078	1120	81
Jockey International	Jockey	Private	1876	30/01/2009	US	99,5%	28335	37316	2004
Toys 'Я' US, Inc.	Toys 'Я' Us	Private[a]	1957	30/09/2009	US	98,9%	20138	22234	28229
	Babies 'Я' Us		1996	17/08/2010	US	99,2%	4580	5139	10528
Drugstore.com, Inc.	Drugstore	NASDAQ:DSCM	1998	11/11/2010	US	99,5%	16765	18072	16182
The Lenox Corp.	Lenox	Private	1889	12/08/2010	US	99,6%	1441	1646	4484
Barnes&Noble, Inc.	Barnes&Noble	NYSE:BKS	1873	01/10/2010	US	99,2%	16933	18598	848
GSI Commerce	Fogdog Sporta	GSIC:US	1998	30/09/2009	US	98,7%	20409	21729	141439
PC Mall, Inc.	MacMall	NASDAQ:MALL	1987	25/02/2010	US	99,3%	22824	23815	33864
Skullcandy, Inc.	Skullcandy	Private	2003	01/05/2009	US	99,4%	48644	55774	413
Brookstone Company	Brookstone	NASDAQ:BKST	1965	25/06/2010	US	99,1%	5091	5399	1037
eBags, Inc.	eBags	Private	1998	01/09/2009	US	99,7%	51937	42083	19815
Buy Direct									
Company	Brand	Ownership	Founded	on eBay since	Site	FB Score	FB Total	FB 12m	Listings
Brooks Brothers	Brooks Brothers	Private	1818	29/01/2010	US	100%	436	487	645
PVH Corp.	Calvin Klein	NYSE:PVH	1968	30/09/2009	US	98,7%	2054	2658	12401
	Tommy Hilfiger		1985	11/11/2010	US	99%	392	529	5756
Custo Barcelona	Custo Barcelona	Private	1996	21/07/2010	US	100%	94	110	354
William Rast	William Rast	Private	2005	28/08/2010	US	99,6%	269	307	512
Brand Outlet (source: http://brandoutlet.ebay.ca)									
Danier Leather	Danier Leather	TSX:DL	1972	08/06/2001	Canada	99,5%	237	226	28
Dyson	Dyson	Private	1993	02/09/2009	US	99,4%	500	540	1
Gemstone King	Gemstone King	Private	1903	14/08/1999	US	99,6%	162693	101711	237876
Henry's	Henry's	Private	1909	05/02/1999	Canada	99,7%	154174	10570	172
M&B Acquisition, Inc.	Moneysworth&Best	Private[b]	1991	03/05/2011	Canada	100%	5	9	89

Table 1.8: Key statistics on *Top Five* non-branded merchants as well as the twenty-eight brands, sorted by category. Time frame for non-static data collected: July 1, 2010 - July 1, 2011. Feedback (FB) figures approximate the number of items sold within the specified time frame. All listings as of July 1, 2011.

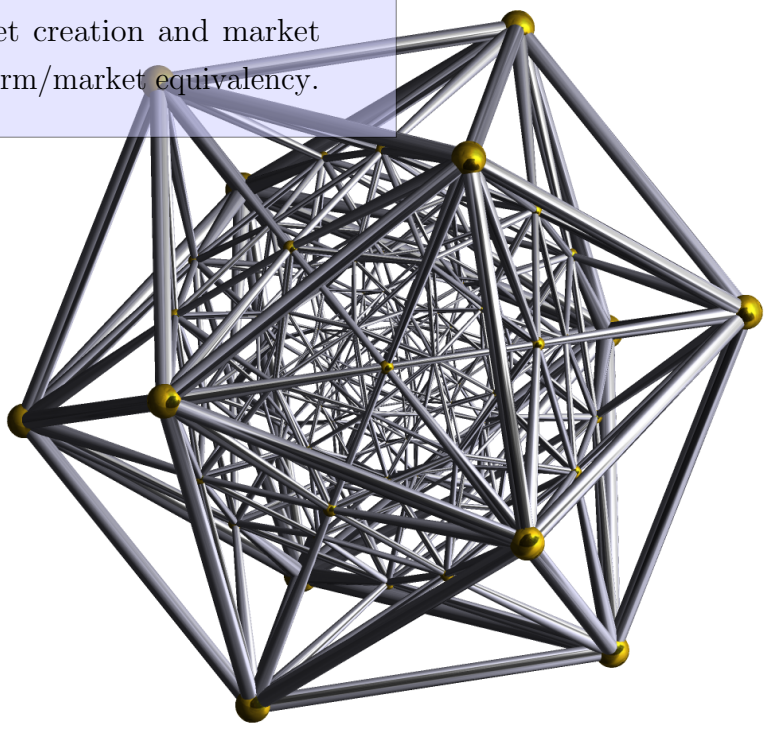
[a]Public: 1978-2005.

[b]Public: 1997-2000.

Chapter 2

Firm/Market Equivalency

What the economists call a market failure, the entrepreneurs call a market opportunity. Firms today are the intricate interlacing of interactions, which arise in response to market failures. Market opportunities that emerge as a result are addressed by the firms through market support strategy, i.e. platform creation. Not only do the firms facilitate market activity by providing participants with basic resources, firms also take up a leading role in the regulation of all of its creation's activities. The purpose of this chapter is to explore the phenomenon of concurrent double function of firm: market creation and market support through the concept of firm/market equivalency.



CHAPTER 2

As seen in the previous chapter, the process of competition has changed and a new mode of competitive pressure has emerged: strategic partnerships and third-party players are the key tools for the firms that aim to enhance their competitive and economic power. Definitions of neoclassical economic theory are no longer relevant, and the concept of a firm as a black box is non-existent. Today's firm is a complex entity that toils to create a nexus of interactions and relationships. Not only does the firm facilitate activity of the overall system, providing bare necessities for collaboration, it is also responsible for regulating it. Needless to mention that there is a strategic intent in doing so. This facility yields the ability for firms to model their environment and their market as they see fit. They can influence the rules of the competitive game within an industry such that the market conditions become more favorable and architecture becomes more suitable. The task of market creation is now but an initial step in a modern firm's life cycle, as today's firms also support the markets they create.

In this chapter we explore the phenomenon of concurrent double function of firm: market creation and market support, through the concept of firm/market equivalency. We define firm/market equivalency as a platform-based cohort founded on mutually beneficial cooperative interactions between a platform leader and firms-satellites, that gravitate towards the platform leader, subject to certain conditions, which we will discuss further in this chapter.

This chapter is organized as follows. Section I studies the theoretical foundation of the phenomenon: market failure and market creation. We argue that market failures create business opportunities that firms address through platform-based or intermediary strategy. Section II defines the concept of firm/market equivalency and discusses its main determinants: control and governance of the system, as well as capitalization (value capture). Section III proposes a way to assess the extent of firm/market equivalency through interactions. In section IV we use our framework to present a case study of the Apple iPhone. The conclusion of the chapter outlines some implications of firm/market equivalency for antitrust policy.

I Market Failures as Business Opportunities

In the ideal world of classical economic theory the invisible hand leads the market to efficiency. Such theoretical market structures are meant to ensure that all possible mutually profitable transactions take place. Nevertheless, at the grace of the real world frictions and inconsistencies many market institutions are unable to support the desirable economic activities or to avoid obsolete ones (Bator (1958)).

A useful interpretation of this argument was proposed by Williamson (1975), who developed three conditions that, alone or in combination, give rise to market failures:

Condition 1: *Bounded rationality* of economic agents: in complex or uncertain environment economic agents make wrong choices because of their misunderstanding of the situation or because of their attitude towards risk. Bounded rationality therefore leads to market inefficiencies.

Condition 2: *Opportunistic behavior*: it emerges in markets with a limited number of buyers or sellers. Collusive agreements, or cartels, are the examples of opportunistic behavior related to market failures. Such behavior impedes entry of more efficient competitors, delays development and roll out of new technologies, and potentially can even prevent new technologies from being developed.

Condition 3: *Imperfect information*: it weakens the decision-making process. Information asymmetries or incomplete information induce market inefficiencies by impeding profitable transactions from taking place, or by reducing the availability of strategic choices.

Market failures create untapped opportunities of mutually profitable exchanges and innovations. In a way, market failures pinpoint the inability of the productive system to reach efficiency due to either the inadequacy of the business models or the deficiencies of market structure. Myopia of economic agents (condition 1) and their attitude towards risk give rise to difficulties in understanding medium- to long-term consequences of strategic behavior.

Even if opportunities arise, stakeholders' risk aversion and lack of reliable information slow down the decision-making process (condition 3). Moreover, many economic players are followers and very few are visionary. Hence, many economic agents make use of standardized or generic strategies (condition 2).

The inability of economic agents to interact effectively in order to complete all mutually profitable exchanges as a result of inefficient market organization is neither market-bound, nor industry-specific. It often leads to failures at the highest level of the economic system: economic agents are unaware of the existence of profitable exchanges and innovation opportunities outside their markets.

Firms may arise by adopting a particular organization that may weaken the effects of market failures (Williamson (1975)). Entrepreneurs, often in the form of small single-product firms, are able to identify and exploit some market failures. As Dundas and Richardson (1980) suggested:

> ''Entrepreneurs exploit market failures, although how entrepreneurs identify these remains unstudied [...]. The small single product firm typically comes into existence to exploit a particular class of market failure. The entrepreneur has special skills (finance, technical or market-related), which enable him to do what markets have thus far failed to do, or to outperform competitors, if they exist.''

There is a direct correlation between existence of market failures and entrepreneurship. The very existence of market failures gives rise to strategic response by firms either in terms of new organizational structures, innovations, or new business models. These strategic responses change market architecture and hierarchy. However, even if they succeed in attenuation and eradication of the existing market failures, they are likely to participate in the creation of new ones. This, in turn, calls for the rise of new strategic responses and so forth. This process is at the heart of market dynamics (figure 2.1) and propels the market to evolve towards better use of resources.

Hence, markets evolve. Today's leading firms are conceptually different from the companies that were the most dynamic in the beginning of the last century. Economic history shows that once the markets are built, they evolve

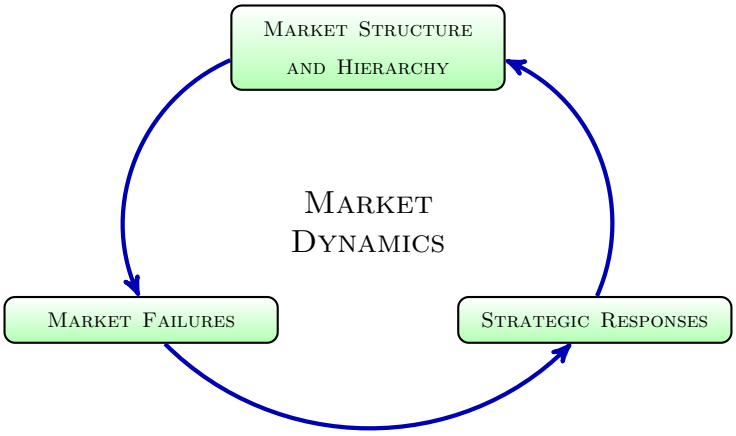


Figure 2.1: Market Dynamics through Market Failures

and undergo transformation. This process entails the movement of resources, knowledge and innovations. Entrepreneurs' capacity to create markets is one of their chief functions. They innovate and build new business models to uncover new ways to address demand with intent to create new markets. This function of market creation ensures the ability of the system to adapt and survive, and optimally allocate the scarce resources. In addition, market creation facilitates the emergence of innovations, technological breakthroughs and helps the society uncover new forms of its development.

The strategic intent of several firms may lead to spontaneous market formation. This occurs, for instance, when a newly-launched product meets its demand without any intensive effort of coordination: new food products or drugs create new markets by using the existing industrial structures. But sometimes the market failures are so intense as to impede the spontaneous emergence of a market. The question is then how to create a market? That is, how to create a place, either physical or virtual, where suppliers offer products or services to other economic agents. Three conditions characterize the existence of a market. First condition is the presence of two types of economic agents, namely buyers and sellers. Second, these economic agents must have a need to interact. Third, the interaction should be mutually profitable. The market supports diffusion of innovations, knowledge and competences to sustain the performance of its

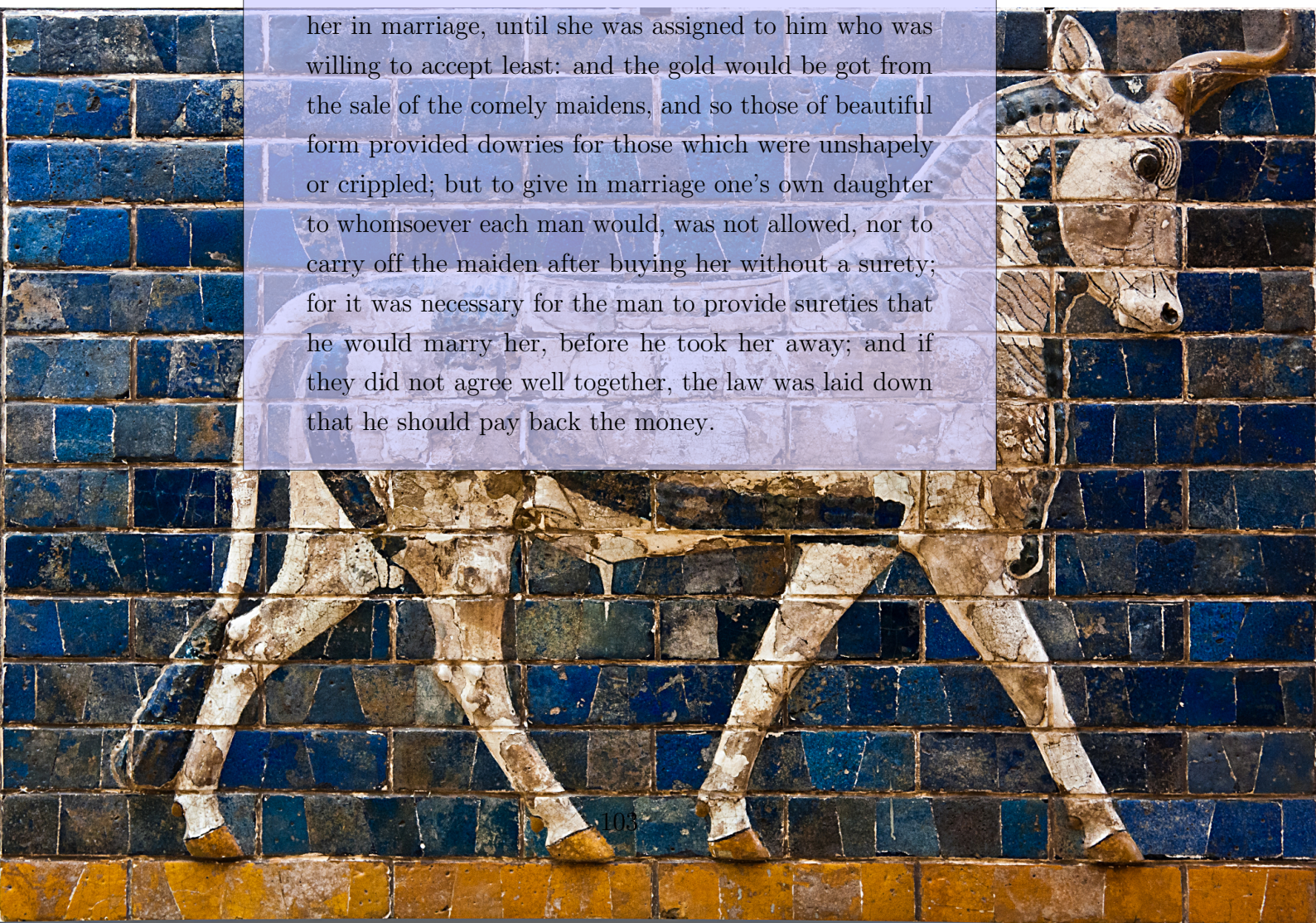
companies. As a coordinating institution of economic agents, a market also performs functions of information diffusion and exchange facilitation. The information function is essential to avoid the third market failure condition (imperfect information). A market may not appear spontaneously, but can be an institution deliberately constructed and organized by an economic agent who elects to perform the role of an intermediary. In order to function properly, markets need rules: mechanism for allocation of products and services, terms of exchange, a system of comparison of value and transactions, where the latter eventually evolves into a pricing system.

Auctions are one example of intentional market creation by an economic agent: they make up for the absence of markets in certain circumstances where market failures are too intense (e.g. small number of providers or consumers, low competitive pressure, specific demand, etc.), and enable interactions of two sides of a market. Cassady (1967) described multiple forms of auctions used throughout the world dating back to four centuries before Christ (see *Dawn of Auctions: an Ancestral Platform* below). Nowadays, auctions still take place, but a new type of market creation appears through platform strategies.

Dawn of Auctions: an Ancestral Platform
- Herodotus on Marriage in Babylon

Such is the equipment of their bodies: and the customs which are established among them are as follows, the wisest in our opinion being this, which I am informed that the Enetoi in Illyria also have. In every village once in each year it was done as follows: When the maidens grew to the age for marriage, they gathered these all together and brought them in a body to one place, and round them stood a company of men: and the crier caused each one severally to stand up, and

proceeded to sell them, first the most comely of all, and afterwards, when she had been sold and had fetched a large sum of money, he would put up another who was the most comely after her: and they were sold for marriage. Now all the wealthy men of the Babylonians who were ready to marry vied with one another in bidding for the most beautiful maidens; those however of the common sort who were ready to marry did not require a fine form, but they would accept money together with less comely maidens. For when the crier had made an end of selling the most comely of the maidens, then he would cause to stand up that one who was least shapely, or any one of them who might be crippled in any way, and he would make proclamation of her, asking who was willing for least gold to have her in marriage, until she was assigned to him who was willing to accept least: and the gold would be got from the sale of the comely maidens, and so those of beautiful form provided dowries for those which were unshapely or crippled; but to give in marriage one's own daughter to whomsoever each man would, was not allowed, nor to carry off the maiden after buying her without a surety; for it was necessary for the man to provide sureties that he would marry her, before he took her away; and if they did not agree well together, the law was laid down that he should pay back the money.



CHAPTER 2

II Platform Strategy for Market Creation: Firm/Market Equivalency

Platforms can take a number of incarnations with reference to both the tangibility of presence and the time parameter: physical, such as a concert hall, a shopping mall, or a fair; virtual, such as eBay or Amazon; permanent, as is the case with the stock markets; or single-instance, as in the calls for tender. Emergence of a platform relies on the need to coordinate the economic agents and thus on the existence of market failures. Platforms are responsible for the creation of links between various groups of economic agents. These links can either be economic, social or commercial.

As seen in the introduction, the economics literature refers to this functional compilation as multi-sided markets (Armstrong (2006); Rochet and Tirole (2003, 2006)). However, this terminological cross-reference is inherently confusing since markets in their essence are multi-sided. In general, two-sided markets are a subset of multi-sided markets, where one side is typically represented by the sellers, while the other side is represented by the buyers. Recently, Rysman (2009) argued that market multi-sidedness is rather contingent on the company's strategic intent than on the market's intrinsic structure. The management literature refers to this concept as business ecosystems (Moore (1993, 1997)). The literature defines this term as intentional communities of economic actors whose individual business activities share in some large measure the fate of the whole community (Moore (2006)). Iansiti and Levien (2004) have shown the crucial role of a central firm and niche players in the survival and dynamics of business ecosystems. This central firm can affect the overall systems in two ways: as a member of the business ecosystem, and hence exerting some competitive pressure onto other members of the ecosystem, and as an intelligent biotope providing the other participants with elementary building blocks, such as competences, knowledge, information, database, etc., in order to sustain their economic activity. The regulatory power of the system relies on the latter role: as an intermediary, the central firm regulates and controls its business ecosystem, and proposes a vision of the market. This intermediary role can be played through a platform strategy.

For Evans et al. (2006),

> ''those software platforms are at the heart of ''economies'' or ''ecosystems'' that consist of mutually dependent communities of businesses and consumers that have a symbiotic relationship with the platform''.

Business ecosystems, platforms and multi-sided markets refer to the same phenomenon: companies performing the function of a market in response to a market failure. The terms above carry inherent inconsistencies due to adoption from other fields of studies or misinterpretation and misrepresentation in the literature; although the term ''business ecosystem'' emphasizes the interdependency of its members, there is much criticism in the literature of the metaphor being too vague, whereas the term ''platforms'' as used in the economics literature is often confused with the look-alike technical term. Moreover, we have already mentioned the recent criticism of the use of the term ''multi-sided markets''. To avoid confusion and in an effort to minimize terminological convolution, we will refer to the situation where a firm carries out the function of a market in response to a market failure as firm/market equivalency.

A platform can be seen as a medium that facilitates interactions or exchange between at least two sides of a market, and which was either created or formed spontaneously as a result of a market failure. In this context, firm/market equivalency refers to a platform-based cohort founded on mutually beneficial cooperative interactions between the platform leader and firms-satellites that gravitate towards the platform leader, given that the platform leader is the market creator who exercises control over its satellites and capitalizes on the interactions that take place.

III Governance, Capitalization and Interactions within the Firm/Market Equivalency Framework

The firm/market equivalency condition does not imply that the boundaries of the firm and the market coincide. Rather, it refers to a firm, which supports the market activity by providing market players with basic resources such as knowledge, know-how, standardization, interoperability and rules. However, a firm cannot be regarded as a classical market institution for it is not altruistic. Firm creates a market to enhance its own profitability and survival. Hence, in addition to its market creation function, which does not necessarily concur with functions of providing market support or intermediation, firm/market equivalency can be analyzed through three key determinants: governance of the system (i.e. market), capitalization and interactions.

Governance: Ensuring Stability and Viability

The platform owner must provide governance to the system without being overly intrusive. Opportunistic behavior of certain economic agents poses a real danger to the platform's well-being since such behavior can affect the stability of the entire system. The platform then faces a classic principal-agent paradigm. The agents are the partners who join the platform. The principal, affected by the actions of agents, is the platform owner; the principal uses economic agents to improve the performance of its system and to increase its profitability and odds of survival. The reasoning of the platform owner is long-term (including viability and proper functioning of the entire system), while certain agents (SMEs, small developers) are more likely to adopt the short-term strategies.

An agent who is acting out of his self-interest may be responsible for creation of moral hazard, which can in turn disrupt operation of the entire platform. This can happen if certain elements, which are provided by the platform owner, are used by an agent with malice and intent to capture value. An agent can take different actions to pursue its self-interest:

Hidden action: develop a parallel hierarchy in the system by deploying its own network of partners in competition with the principal.

Hidden information: keep the fruits of its R&D for himself, aiming to stall the development of the other players in the system in order to ensure its own strategic positioning.

Port the developments in the context of one platform to another (competing) platform.

The platform owner cannot ignore these phenomena. Many platforms have disappeared or have been permanently destabilized. The example of IBM and Microsoft's tandem in the 1980s offers an outstanding illustration of creation of a parallel hierarchy.

Mini-case: IBM vs Microsoft

In 1981, Microsoft became IBM's new partner for the implementation of an operating system (called D-DOS at the time; it was subsequently renamed into MS-DOS). The collaboration lasted for ten years, but since the very beginning Microsoft had secured an escape strategy by retaining the right to sell licenses to other manufacturers under the name of MS-DOS. Between 1981 and 1991 Microsoft had gradually expanded its network of partners working with the other industry giants such as Texas Instruments, Compaq, Thomson, Amstrad, etc., and building on PC compatibility. Its platforms, MS-DOS and later Windows, enabled Microsoft to position itself at the heart of a vast network of partners. In 1991, IBM and Microsoft broke their original agreement and decided to develop their own operating systems: OS/2 and Windows, respectively.

> Everyone is aware of the Microsoft's success, what many may not know is that it was built at the IBM's expense. This divorce had weakened the IBM's system; it struggled for several years in an effort to recover.

Solving agency problems requires actions on different levels. First, the platform owner must make its system transparent in order to enable itself to quickly detect harmful actions of its agents. Implementation of interoperability and property rights by platform owner may also be useful. Indeed, interoperability ensures a rapid and effective flow of innovations in the system. The platform owner may also take actions in an effort to keep its partners in a state of non-maturity: preventing its partners from growing ensures reliable protection against agency problems. In other words, it is essential that the platform owner stays in control of links and relationships with its partners.

eBay's strategy for ensuring its survival and viability includes acquisition of firms that enhance its overall capabilities or are potentially able to drive away parts of its own business. For instance, acquisition of companies such as Billpoint, PayPal and GSI Commerce ensured elimination of any sort of agency problems that could potentially arise as a result of partnership between eBay and these firms. Instead, the acquired capabilities served as enhancements of the eBay overall system, resulting in increased attractiveness of the platform to the potential and existing platform participants. As Billpoint was in the past, PayPal is a business segment that caters payment services to eBay platform participants, while eBay has absolute control over payment segment expansion into activities past the scope of the parent platform. eBay Enterprise (formerly GSI Commerce, Inc.) is eBay's business segment that ensures quality e-commerce solutions for potential large-scale eBay platform participants on the merchant side. As with PayPal, control of this highly specialized e-commerce solutions provider ensures that its expertise is only benefiting the participants of the eBay platform and not the potential competitors. To ensure the control over the scope of its platform over the past years eBay has acquired a number of local eBay-like businesses. Most notably, acquisitions included firms like

Brands for Friends, GittiGidiyor, as well as eBay's expansion into the free-listing segment through launch of sites such as Kijiji. Acquisition of Brands for Friends ensured control over an emerging startup out of scope of eBay, who managed to amass over $3,5$ million members. Following the acquisition, eBay has expanded its services into the branded segment. GittiGidiyor is a Turkish online market place, an eBay look-alike, with over $6,4$ million registered users. Previously out of eBay's scope, acquisition of GittiGidiyor allowed eBay to expand into a new geographical area. Creation of Kijiji was a response to competitors such as Craigslist and ensured positioning in the free-listing segment. Another method for ensuring platform stability used by eBay is provision of a secure environment to carry out exchanges for its hundreds of millions of members. By imposing governance over its members' behavior[1] in an effort to eradicate fraudsters and members who through their opportunistic behavior can potentially destabilize the system, eBay has created a culture shared across its member base that secures the system stability.

Apple's recent strategy with iPhone offers a good example of control and governance. The App Store associated with the iPhone is a platform that enables the iPhone users to download numerous applications to their mobile devices. Some of these applications are created by Apple while the vast majority of the applications are made available by its partners, the application developers. Hence, the App Store plays the role of an intermediary: a market where the developers meet the consumers. To ensure control of its platform, Apple employs several means. First, Apple requires that the developers use specific software development kit (SDK). This ensures some control over potential opportunistic behavior (hidden action) of the third-party developers: due to encoding specificity the applications written with this SDK can only run on Apple devices, and can be ported to non-Apple devices only if the developers re-code them. Another level of control appears very early in the relationship: developers can download the SDK free of charge, create applications, and test

[1]This governance is delivered in a form of mutual evaluations written by participants of successful transactions. These evaluations give rise to a feedback score, which in turn allows potential transaction participants to evaluate whether or not they want to participate in a transaction with a given member. In case a member accumulates sufficient amount of poor feedback, eBay intervenes to liberate them from their membership.

them on the iPhone simulator only after registering themselves with the App Store. Finally, the distribution of all applications is done by Apple through the App Store[1]. Ex post, Apple exercises rigid control and scrutiny of all the available applications: it can choose to stop distribution of any application at any point in time if the application appears to be inappropriate. Some observers recorded several strategic bans by Apple (e.g. Netshare[2], as well as apps mimicking the iTunes functionalities such as dTunes).

Capitalization on Transactions

A firm that creates and runs a platform performs the function of a market. Its earnings find their origin in the exploitation of market failures. The platform fixes the problem of imperfect information by supplying information and missing knowledge to participating economic agents. As a result of so doing the transactions and exchanges emerge. The platform owner does not monetize on those interactions per se, but has a particular system of invoicing such that the participants are billed for the service of intermediation (percentage on every transaction, usage fee, membership fee).

The Apple's iPhone is also an excellent example of capitalization. Capitalization is two-tiered. First, the application can be made available to the end-users once the developer has paid the Apple Developer Connection membership. Second, Apple retains a 30% commission of the application's sales, where the price of an application is freely set by the application developer. Up until the end of Q1 of 2014, Apple has paid $17 billion USD to the developers, that were participating on App Store[3]. This implies that since the launch of App Store Apple retained $\$7,3$ billion in commission payments for its intermediation function in addition to subscription (SDK) fees collected from hundreds of thousands of developers[4]. Figure 2.2 depicts this.

[1]There are costs associated with distribution through the App Store; we will discuss it in the section on capitalization.

[2]This app allows to use the iPhone as a modem (tethering method). The network operators complained about the iPhone tethering at first, but now allow it and subject to surcharges.

[3]Source: Apple Press Releases 2008 - 2014.

[4]With fees ranging from $99 to $299 per subscription.

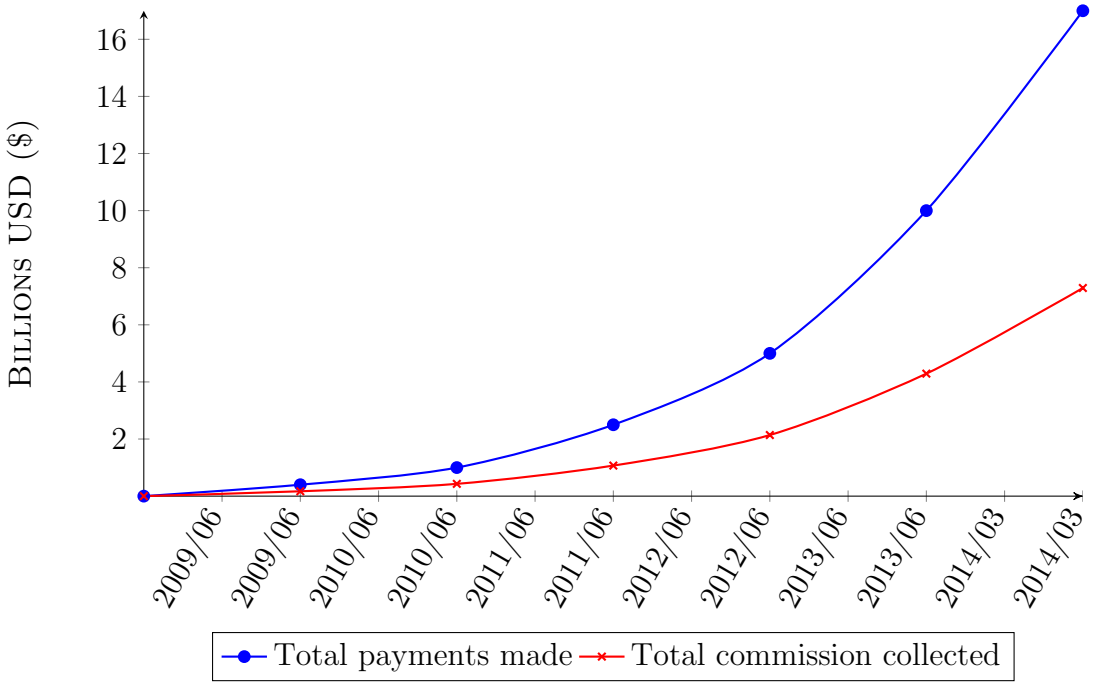


Figure 2.2: Total Payments Emitted by Apple to Developers, Participating on App Store and Total Commission Collected by Apple . Amounts in billions $USD from launch of App Store in July 2008 until end of Q1 2014. Source: Apple Press Releases 2008 - 2014.

eBay's system of capitalization includes an intricate system of billing for various services provided by the platform to members. In the marketplaces segment the members can be subdivided into two broad categories: merchants and buyers. Belonging to a particular category is defined by the member's actions rather than the type of membership. Both types of membership are charged an access fee of zero. Capitalization is two-tiered: first, merchants are billed an insertion fee for listing their merchandise. An insertion fee depends on the listing format (auction, fixed price) as well as whether or not optional listing-related services were purchased (advanced listing upgrade and supplemental services). Second, merchants are billed on the final value for transactions that were successfully completed. The fees vary from country to country. In USA the basic fees start at $0 for insertion and commission of 10% of the final value of item sold, while in France the basic fees start at 0€ for insertion and 9% for

final value up to a set maximum of 45€for items that sell for over 500€. In the payments segment (PayPal business) capitalization takes place as follows. All members are charged an access fee of zero. For transactions that took place on eBay platform the fees are charged to merchants and represent a certain percent of the transaction amount plus a fixed per-transaction fee component. The magnitude of fees ranges from 1,9% to 3,9% plus the fixed component fee. The fees depend on the type of merchant, either regular or eligible non-profit, and whether or not the transaction was bearing the international sales component. For transactions that took place outside the eBay platform the fees are charged to the side initiating the transfer. The sender's fee ranges from 0,5% to 7,4% in addition to a fixed fee component. Similarly, the fees depend on the source of transfer (bank account, PayPal balance, credit/debit card) and whether or not the transfer was domestic or international.

The video game industry offers an example of capitalization similar to the one used by Apple. The capitalization structure of traditional platforms in the video game industry is also two-tiered. In the first tier the customers are charged an access fee equivalent to the price paid for acquiring the game console, while the developers are expected to code their games in a platform-specific programming language. Typically, the price of the console is subsidized by the console manufacturer, and the subsidies are recovered in the second tier through sales of the console-compatible (and traditionally exclusive) games. This way the platform owner connects the end-users (game consumers) and game developers who are able to participate due to platform intermediation (provision of game console). The platform owner is able to capitalize both: on providing access to the platform[1] and on the intermediation service.

Interactions

Relationships among firms can be formalized and viewed through the concept of interactions. Interactions are the consequences of the processes of control, governance and capitalization which are put in place by the central firm

[1]It is true, however, that consoles are often sold at a loss (below cost); this is made up for through volume of sales of compatible games.

that uses a firm/market equivalency strategy. Interactions can be viewed from the perspectives of the parameters of quality and density. Quality of interactions reflects the power exerted by the central firm on its satellites and its ability to control the platform-centric system. Interactive density refers to the consequence of the central firm's ability to attract participants to its platform, where interactive density and platform membership growth are positively correlated.

With regards to quality, interactions between firms-satellites and the central firm can either be competitive, cooperative, co-opetitive, exploitative (Peltoniemi (2006)), or neutral. With respect to other platform participants such as non-firm platform members certain kinds of interactions are not applicable (e.g. competitive). For the purpose of this section we will focus on the interactions that involve business entities: central firms and firms-satellites.

To qualify the different types of interactions, we first define three levels of their potential effects:

POSITIVE:	The effect of interaction is beneficial to the firm (e.g.: increased profits, climbing market share, greater economic power, more advantageous position on the platform, better reputation, etc.);
NEGATIVE:	the effect of interaction is detrimental to the firm (e.g.: decreased profits, declining market share, plummeting economic power, disadvantageous position in BE, stained reputation, etc.);
NEUTRAL:	no effect on the firm.

An interaction is a link between two firms. Interactions can be carried out through a formal (e.g. contract, explicit or not), or informal relationship (e.g. externality). They can also have symmetric or asymmetric effects. The inter-firm interaction effects can be formalized by outlining six distinct states, which are depicted as follows in the figure 2.3.

Each interaction underlies a specific economic situation. The detailed descriptions of inter-firm interactions, effects and implications are summarized in table 2.1.

Interaction Type	Effect
Bilateraly Positive (+/+)	When both firms enjoy the positive effect, the link creates reciprocal and beneficial relationship. **Cooperation** is a prominent example of this situation: two firms pool resources together in order to complete a joint project that is beneficial to both of them. All win/win situations will fall under this category. **Co-opetition** is a special case: the negative effect created by competition is overcompensated by the positive effect of cooperation, yielding a net positive effect. This situation may lead to collusion under particular conditions (small number of players for instance).
Positive/ Negative (+/−)	Such link asymmetry is observed when one firm benefits from the interaction while the other suffers the negative effect. The identity of the firm which benefits is of key importance. In a case when the beneficiary is a platform owner, two forms of asymmetric interaction may arise: **predation** or **exploitation**. In the former, the platform owner uses its economic power to expel a firm-satellite from its ecosystem through predatory behavior. In the latter, the platform owner exploits the resources and competences of a firm-satellite, thus bereaving it of the ability to reach maturity. As a result, the firm-satellite is unable to develop its own business, hence suffering from the negative effect of interaction. Ultimately, the firm-satellite can simply be bought by the platform owner. Occasionally a firm-satellite is in a position to use the resources and competences of the platform owner to create new business opportunities or innovative services. Although such link may appear to be a +/+ interaction, in cases when firms-satellites extract and retain the entire profit as a result of the interaction with the platform owner it is referred to as **parasitism**.

Interaction Type	Effect
Positive/ Negative (+/−) (continued)	**Multi-homing** strategies from firms-satellites is another example: multi-homing creates a positive effect on the satellite (by ensuring more revenue and more profits) but also creates a negative effect on the platform owner by strengthening competition between firm/market equivalency systems.
Bilateraly Negative (−/−)	Both firms suffer the negative effects of their interaction. **Competition** is an example of this situation. Competition compels the firms to abandon (e.g. price or quality wars) or to invest (e.g. innovation) a part of their profits in order to remain competitive and victorious over their rivals. Predation can also emerge especially when the predator incurs cost to eliminate its prey.
Bilateraly Neutral (**0/0**)	Firms choose to neither compete, nor cooperate. The 0/0 - or bilaterally neutral - interaction involves no cooperation and no competition for resources or customers; firms may exist within the confines of the same business ecosystem with no links in common. As an example, consider the link neutrality between the independent firms-satellites, given their simultaneous **coexistence** within the same business ecosystem, such that it in no way affects the businesses of the participants.
Neutral Positive or Neutral Negative (**0/+** or **0/−**)	One firm enjoys a positive (negative) effect while the effect on the other firm is neutral. This is typically a situation of positive (negative) **externality**. The activity of one firm creates a better (worse) economic environment for the others, while the firm itself is neither positively, nor adversely affected.

Table 2.1: Classification of Interfirm Interactions

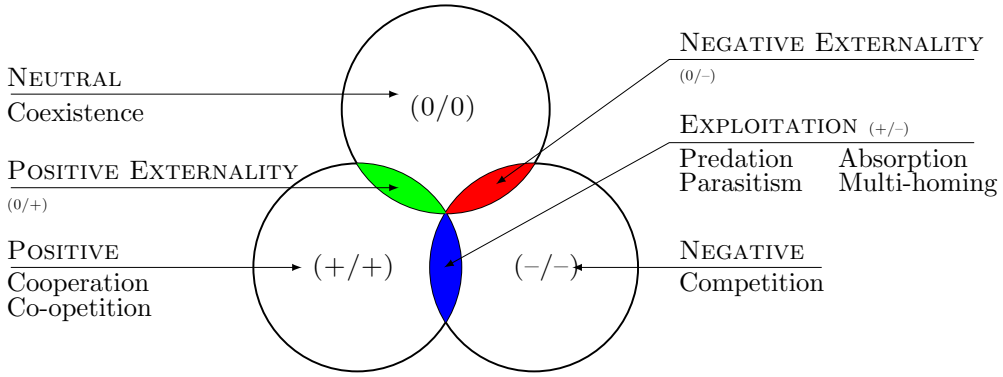


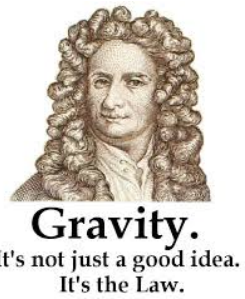
Figure 2.3: The Six Forms of Interaction

The nature of interactions is a good indicator of the platform owner's behavior towards firms-satellites, and vice versa. It states the attitude and the strategy of a player towards the whole system within the context of a platform. Evolution of the platform-centric system is heavily reliant on the quality of interactions.

The first two determinants, governance and capitalization, are essential to understand the emergence of a platform. The third determinant, quality of interactions, is more likely to impact its survival. Of course, the quality of interactions relies also on governance and capitalization systems. A tough system of capitalization where the central firm is aiming to extract value and where hardly any profits remain for firms-satellites to reap is very likely to lead to the inevitable collapse of such platform. Similarly, heavy and invasive control of interactions that take place between the constituents of a platform can also lead to the system's collapse. However, the in-depth analysis of interactions can highlight indicators of platform health; these indicators can help us understand strengths, weaknesses and the likely evolutionary path, which the platform system can take.

The density of the firm's external interactions constitutes what we call the firm's *gravity*. Gravity as the term is drawn on the definition used in physics, which we accommodate and interpret as follows. In physics, gravity is the force that attracts one physical body toward any other physical body that has a mass; gravity is also the degree of intensity of this attraction, measured by

acceleration. For our purposes, we shall define gravity as the force that attracts various economic actors to a particular ecosystem player, as well as the degree of intensity of such attraction. Acceleration is a notion that is to be replaced by a time-frame reference within which the gravitation of one economic actor towards another is observed. Density of the firm's external interactions is the core determinant of gravity, subject to quality of resulting interactions, whether weak or strong. Intensity of the attraction is measured by quality of interactions existent between the economic actors.



Gravity is not necessarily correlated with the firm's size. Instead, gravity is the measure of the firm's interactive influence onto its environment. In other words, firm's own interactive density determines the magnitude of gravity. Firms with significant gravity enjoy the following components of exogenous influence: (a) market power; (b) reputation. Market power is hard to assess. Theoretically, market power indicates the ability of a particular firm to charge prices above marginal costs. This works under the unrealistic theoretical conditions such as the ones of neoclassical economics. In the real world, all firms exert some degree of market power. The question is then one of significance of economic influence. A firm is said to exert significant market power if it can evade competitive pressure from rivals and customers. Market power has an impact on some indicators: performance (profits), behavior (the firm mimics *monopoly* behavior), market share, control of supply, control over certain resources, control of demand, links with large firms or multinationals, and barriers to entry. Barriers to entry (McAfee et al. (2004)) is a very important issue in assessing the market power: if a market is well-protected against entry, then a firm has more discretion to exert monopoly power. This definition of market power is very structural and refers to the concept of contestability (Baumol et al. (1982)). A market is contestable if it exhibits no barrier to entry and exit. Alternatively, the market is non-contestable if entry and exit are difficult, costly and hence less likely. As the market becomes less and less contestable (e.g. when the market leader leverages intentional barriers to entry), the market power of the leader

increases.

Reputation can be a factor of market power but it can also exist on its own. Firms with good reputation can exert some attractive power onto other players without having to have a high market power. Reputation is a direct component of the firm's identity and can give it some social control of others. Even if a firm can have some control over it, reputation is highly spontaneous and is in the hands of others: reputation can be seen as a social image of the firm (e.g. beliefs and feelings) from the point of view of the crowd (i.e. customers, stakeholders, etc.). Reputation is a powerful catalyst of interactions.

Gravity can be measured in two ways:

- By the extent of market power and reputation (this can be seen as potential gravity);
- By the interactive density and interactive intensity, i.e. by the number and strength characteristics of interfirm interactions that the firm in question has (actual gravity).

We choose to define four levels of gravity as outlined in the table 2.2.

Henceforth, we shall consider the company in question as exerting high gravity if any or all of the following occurs: (a) various types of interactive participants actively seek interaction; (b) sizeable quantity of interactive participants are willing to establish non-exploratory/formal/strong bonds with the company in question. Platform owner's decrease in gravity can ramify from either the exogenous gravity shock, i.e. the side effect of entrance of high gravity firms, or from the endogenous gravity shock, i.e. the emergence of high gravity players within the firm/market equivalency system. Alternatively the decrease in gravity can source from the damage to the platform leader's reputation. The platform owner's gravity decrease is an indicator of instability of its system and of a likely loss of leadership.

This approach can contribute to extension of the typology of ecosystems actors as proposed by Iansiti and Levien (2004). From their definition, we can infer that in stable firm/market equivalency systems the platform owner typically exhibits high gravity and the firms-satellites exhibit low or zero gravity. Moreover, if the platform owner plays:

Subzero gravity:	or negative gravity, is attributed to a firm that repels other players. An example of such instance is an eBay merchant with low feedback score due to adverse customer experiences as a result of interaction with the given merchant.
Zero gravity:	a firm has no effect on others. This can be represented by a firm without reputation, no market power and a limited amount of interactions with others.
Low gravity:	a firm has some effect on some players. This can be represented by a firm with some reputation, insignificant market power and a limited number of interactions with others.
High gravity:	a firm has a significant effect on players around it. This is the case of a firm which has market power, strong reputation and enjoys a whole network of partners.

Table 2.2: Four Levels of Gravity

A keystone strategy: the system is characterized by a majority of +/+ interactions (cooperation, co-opetition). The platform owner is highly cooperative and shares the profits of the system almost evenly with its partners;

A physical dominator strategy: the system is characterized by a majority of +/− interactions (absorption, predation). The platform owner is playing an aggressive strategy, aiming to get a tight grasp on the members of its own system by buying or eliminating its partners;

A value dominator strategy: the system is characterized by a majority of +/− interactions (exploitation). This strategy lies in between the keystone and physical dominator strategies. The platform owner aims to extract the maximum value without eliminating its partners. In this case, the firms-satellites are maintained in a state of non-maturity such that to eliminate any potential bargaining power on their part.

The firms-satellites also have their role. They are sometimes described as niche players (Iansiti and Levien (2004)) that use their agility, small size and high specialization to differentiate themselves through innovation. Having a non-exploitative intent, firms-satellites may employ an exploration strategy to scout for business or innovation opportunity with a spin-off, a subsidiary, or through investing in a niche player. This exploration can be a first move towards entry in the market. Firms-satellites may also exhibit anti-gravity behavior: through clustering that leads to sub-system formation, or through the multi-homing strategy, which can induce negative effects on the platform owner: this indicates a loss of power and/or an increase in competition between platforms (see figure 2.4[1]).

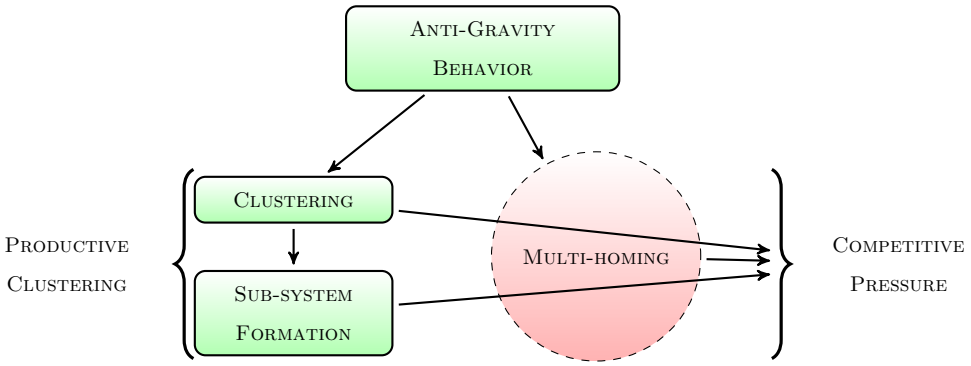


Figure 2.4: Sources and Flows of Competitive Pressure through Anti-Gravity Behavior

The underlying idea is that these negative effects indicate zones of friction within the system, which may lead to the system destabilization and metamorphosis of the entire organization. The preceding elements are stereotyped. Firm's strategy is more complex: while a platform owner can be a keystone for some players, it can simultaneously be a physical dominator for other players. Therefore, a negative effect within a system may indicate either:

- The strategic intent of the platform owner to fully control part of its system to reinforce its competitive advantage (e.g.: eBay's acquisition of

[1]Chapter 3 will provide the detailed analysis of the role of firms-satellites.

PayPal in 2002) or to respond to a change in the environment (decrease of innovation pace, merger of firms-satellites);

- The loss of control or bargaining power over some firms-satellites;
- The reinforcement of the bargaining power of a direct competitor;
- The creation of a system within a system (e.g.: sub-system formation by Microsoft, while being hosted by the IBM (eco)system).

This list is non-exhaustive. Negative effects should act as warning signs for the platform owner and for the firms-satellites as they may signal market failures (e.g.: inadequate market organization) and anti-competitive conduct.

IV Case Study: Apple Inc.



Methodology

The case study presented here of Apple Inc., further referred to as Apple, follows a methodology, that is both descriptive and exploratory (Yin (1994)). Our aim is to investigate the emergence of a platform strategy and its effects on market architecture and dynamics. We choose to study Apple over the period 2007 – 2010 because of the inherent interest of its circumstances and the quickly evolving environment. We collected the data and information from publications (industry studies, books, articles), Google search, players' publications (press releases, financial reports, activity reports) as well as from writings by experts and consultants, who specialize in the relevant sectors.

To analyze the case, we propose to cross our three-determinant framework with the industry-architecture framework of Jacobides and Billinger (2006)[1]. Our aim is to show how a platform strategy may reshape the entire architecture of a market and how it may provide significant economic power.

The analysis includes three elements:

Emergence: identifying the market failures addressed by the platform owner. What kind of market failures are at the origin of the platform strategy? Why would a particular firm aim to internalize lost transactions between different sides of a market (strategic intent and existence of multi-sided markets environment)?

Determinants: identifying the determinants of the platforms strategy (governance, capitalization, interactions). How does the firm build its governance of the system (business model)? Who is controlling the financial flows? What are the characteristics of relationships between actors?

Effect on market dynamics: incorporating the preceding results into an in-depth analysis of the evolution of market architecture: How does the role of different players evolve? Do new roles emerge? Do new players emerge? How does market power evolve? How has the market hierarchy been modified?

Apple in the Mobile Industry

During the last decade, the mobile industry was the field for major changes in its architecture (Jacobides and Billinger (2006)) shifting from an operator-centric model to a device-centric and burgeoning model (Anderson and Williams (2004), Basole (2009), Basole and Rouse (2009), Lescop and Isckia (2010), West and Mace (2010)). The different roles[2] previously held by mobile network operators

[1] Tee and Gawer (2009) used a comparable framework for their analysis of i-mode mobile Internet service.

[2] Ballon and Walravens (2008) distinguished four crucial roles: profile/identity management (CRM, user data, user preferences), service provisioning/service brokerage, charging and billing, service creation environment (set of development and hosting tools for third party developers).

are now under control of different actors: mobile operating system providers, software vendors, independent developers, device manufacturers and network operators.

The roll-out of 3G networks and the emergence of the mobile Internet has created favorable conditions for such change. Apple, with its iPhone, was clearly the catalyst.

The Mobile Industry Before 2007: Emergence of Market Failures

Before the emergence of 3G networks, able to implement mobile data services at a sufficient speed, the mobile industry was highly dominated by mobile network operators and device manufacturers. The former were controlling the access to customers, while the latter were creating new phones able to fulfil customers' needs, e.g.: voice telephony. The value chain in the industry was looking rather sequential, as depicted in figure 2.5.

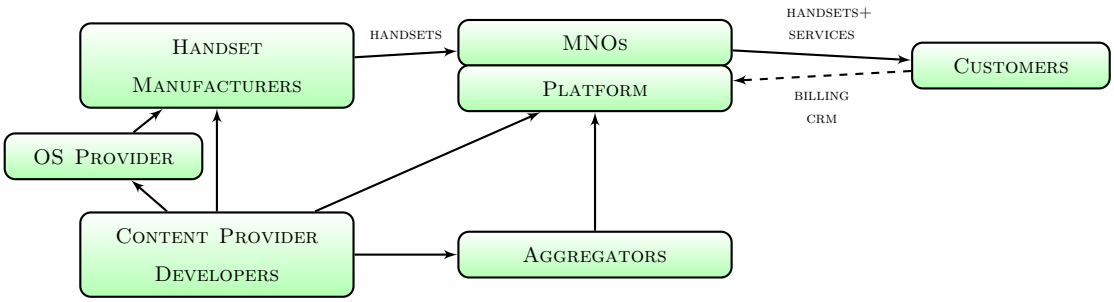


Figure 2.5: Network Operator Centric Value Chain

The economic power in the industry was mostly in the hands of mobile network operators who acted as gatekeepers/interfaces for the access to consumers (hence value). The model was highly telco-centric (Ballon and Walravens (2008)). As gatekeepers, network operators possessed all the information about customers (usages, bills, identity, CRM, etc.) and were able to fix, to charge and to bill the services and content provided to customers. In this sense, the network operators were controlling the financial flows in the system. The content and service providers were remunerated by network operators who used them to create a walled garden of services and content. Some operators

Actors on MNO Platform	Interaction Type with the Platform Owner
Mobile Network Operator (MNO) as Platform Owner	
Mobile Handset Manufacturers (MHMs)	+/+: cooperation* with a tendency to +/–: exploitation
Operating System Providers (OSPs)	0/0: co-existence 0/+: positive externality
Content Providers (CPs)	+/–: exploitation*
Developers (DEVs)	+/–: exploitation* –/–: competition
Aggregators (AGGs)	+/–: exploitation –/–: competition
End-Users	

Table 2.3: Actors and Their Interactions on Mobile Network Operator Platform; *occasionally with exclusive contracts.

even used exclusivity clauses with content providers and devices manufacturers to differentiate themselves from competitors. Mobile network operators were clearly using a platform strategy, granting themselves the position of intermediary between consumers and other actors of the industry.

Tables 2.4 and 2.3 describe the key actors, their roles and their interactions with the mobile network operator. Tables 2.9 in the annex of this chapter gives the detailed analysis of actors' relationships. The +/– interactions (exploitation) are dominating in the mobile network operator's platform: they used their position to extract most of the value created in their system. Using the terminology of Iansiti and Levien (2004), mobile network operators clearly appear as high-gravity value dominators: they occupy a central position in the mobile value chain, while focusing their efforts on extracting value from their ecosystem. Mobile handset manufacturers are able to attract a few players around their devices and hence show a limited gravity in the mobile ecosystem essentially because of a limited and indirect access to final consumers. The rest of the players exhibit nearly zero gravity.

During the 1990s the demand conditions were good: the rate of diffusion was high, and the demand was rather inelastic. This allowed for rapid growth of the

Actors on Mobile Network Operator Platform	Roles	
	Primary Functions	Secondary Functions
Mobile Network Operator (MNO) as Platform Owner	Roll out network	Specify handset functionality and development
	Provide and sell network (access) services	Aggregator: provide platforms for content and applications
	Manage billing and CRM for voice and data	Manage CRM and billing for CP, DEV and AGG
	Sell mobile handsets with or without network services (mixed bundling strategy)	
Mobile Handset Manufacturers (MHMs)	Specify handset characteristics	Aggregator: provide platforms for content and applications
	Sell handsets	Specify operating system (OS) characteristics
Operating System Providers (OSPs)	Specify OS characteristics	
	Sell OS	
Content Providers (CPs)	Create and sell content	Aggregator: provide platforms for content and applications
Developers (DEVs)	Create and sell applications	Aggregator: provide platforms for content and applications
Aggregators (AGGs)	Aggregate content and applications	
End-Users	Buy handsets and mobile services	

Table 2.4: Actors and Their Roles on Mobile Network Operator Platform

sector, profiting to network operators and handsets manufacturers who were dominating the market for devices like Nokia, Motorola, Ericsson or Samsung (see figure 2.6).

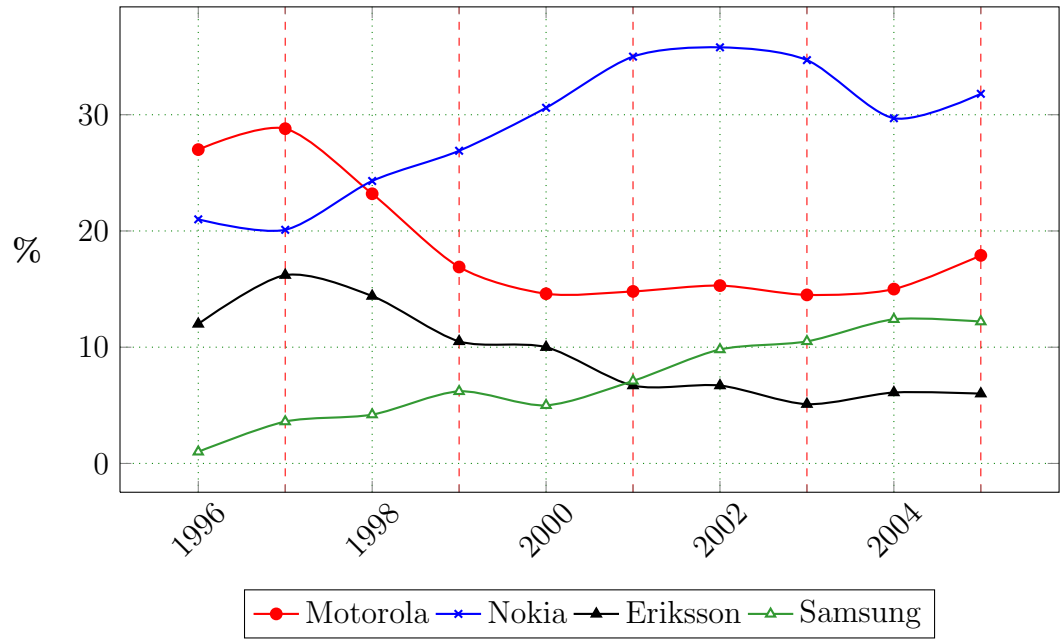


Figure 2.6: Global Market Share of Mobile Phones (%). Adapted from He et al. (2006)

In the mid-2000s the mobile industry was experiencing some declines in revenue: the average revenue per user had declined by 10% in 2006 and by 8% the following year[1]. The voice telephony revenues reached an inflexion point, indicating the sector was entering the renewal phase of its business cycle. The phenomenon created pressure: the mobile operators started to fight against each other for market share and had to conquer new customers who were less fond of mobile telephony. A price war was about to emerge. Handset manufacturers were asked to provide network operators with cheap, standardized devices.

During the same period the mobile network operators began to invest billions of dollars in their network to prepare for the 3G roll-out and the emergence of mobile Internet. Despite its fair success in Japan, the i-mode of

[1]Source: Digiworld, Idate.

NTT DoCoMo, working on 2G standards, was not a possible substitute for mobile Internet elsewhere (Tee and Gawer (2009)). Consumers were waiting for mobile Internet and its promises of ubiquitous Internet services, whereas mobile network operators were delaying it while reaping tremendous profits from voice services. This inconsistency between supply and demand created market failures. This is the starting point of the emergence and success of Apple's platform strategy.

Apple and the iPhone: Changing Industry Dynamics (2007-2010)

Development of the iPhone had really began in 2005. The device was created during an 18-month secret collaboration with AT&T Mobility (formerly known as Cingular Wireless). Apple obtained the right to develop hardware as well as software in-house. There were peculiar revenue flows between Apple and network operators, in particular AT&T. AT&T received five-year exclusivity, 10% of revenue from iPhone sales in AT&T stores in exchange for a monthly fee of $10, payable to Apple per AT&T customer using an iPhone. Moreover, Apple obtained the control of marketing and CRM of the iPhone.

Fiscal Year	**Q1**	**Q2**	**Q3**	**Q4**	**Total Units Sold**	**Total Revenue**
2007			0,270	1,119	1,389	$630
2008	2,315	1,703	0,717	6,890	11,625	$6 742
2009	4,363	3,793	5,208	7,367	20,731	$13 033
2010	8,737	8,752	8,398	14,102	39,989	$25 179
2011	16,235	18,647	20,340		55,222	$36 077

Table 2.5: Worldwide Sales of iPhone (in millions of units, revenue is in millions($)). Source: Apple Annual Reports 2007-2010 and Apple 2011 Quarterly Reports

The iPhone was officially announced by Steve Jobs on January, 9^{th} 2007 at the Macworld 2007 convention. Apple has filed about 200 patents for the iPhone. It was sold for the first time in the United States on June 29^{th}, 2007 and became available in UK, France, and Germany in November of the same

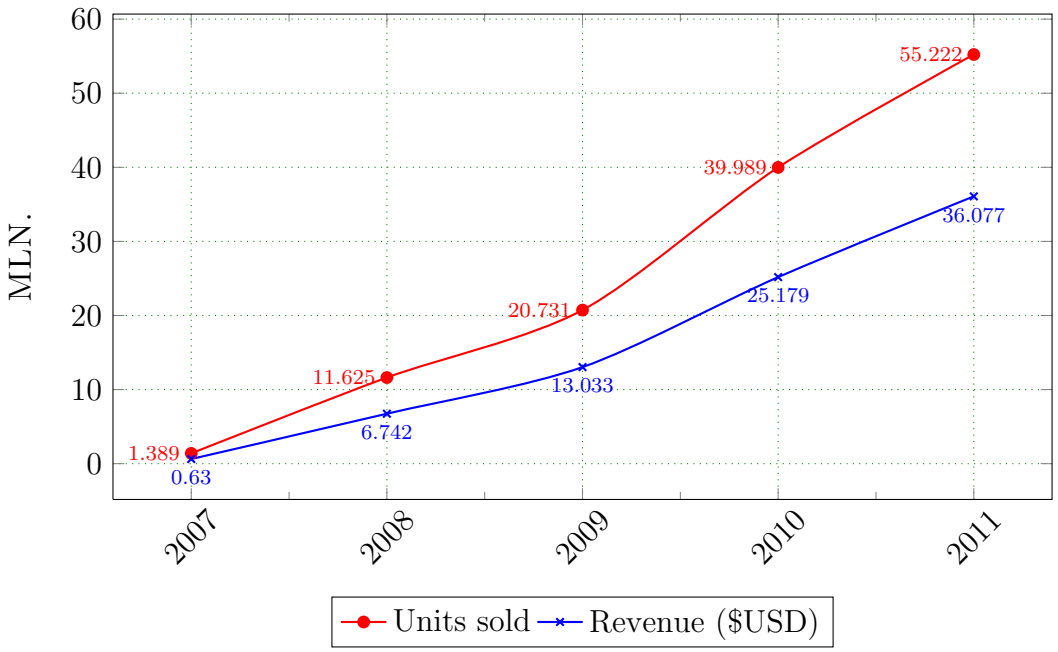


Figure 2.7: Worldwide Sales of iPhone (in millions of units, revenue is in millions($)). Source: Apple Annual Reports 2007-2010 and Apple 2011 Quarterly Reports

year. By July 2008, the iPhone had reached 22 countries. The sales began to explode (see table 2.5 and figure 2.7): by the end of the third quarter of 2007, 270 000 iPhones were sold, reaching nearly 1,4 million units by the end of the year. The initial financial flows between operators and Apple ceased in mid-2008 after the breakup of exclusivity clauses by the antitrust authorities in Germany and France because of massive unlocking in other countries[1]: the financial links went back to the classical subsidized phone model. The iPhone then became available without sim-locking at full retail price.

The iPhone exhibits a double lock. First, network operators imposed sim-locking for the duration of 24 months to restrict the use to their own networks and to warranty return on investment for subsidizing the phone. This relies in part on an exclusivity clause signed by Apple and network operators. Second, to activate their iPhone and to be able to use it to its full capacity consumers

[1]In the USA, despite the exclusivity clause gained by AT&T, 25% of the original iPhones were not registered with AT&T.

must connect to the Apple's platform, iTunes. To do so, consumers need to download and install the latest version of iTunes to their computer. iTunes then interfaces and manages the communication between the consumer and the iPhone: it facilitates updates, upload and download of content such as music, videos and photos, application management and etc. The activation process requires that consumers create an Apple ID, associate with it a valid credit card number, and select a secure password. The credit card information is then used to automate payments for applications and other content downloads when the consumer shops on one of the iPhone-compatible platforms: iTunes or the Apple App Store.

	Connectivity	iPhone Device							
		1^{st} gen.	3G	3GS	4	4S	5	5C	5S
WPAN	Bluetooth	✓	✓	✓	✓	✓	✓	✓	✓
WLAN/WIFI	802.11b/g;	✓	✓	✓	✓	✓	✓	✓	✓
	802.11n on 2.4GHz				✓	✓	✓	✓	✓
	802.11n on 5GHz						✓	✓	✓
	802.11a						✓	✓	✓
2G/TDMA	GSM	✓	✓	✓	✓	✓	✓	✓	✓
	GPRS	✓	✓	✓	✓	✓	✓	✓	✓
	EDGE	✓	✓	✓	✓	✓	✓	✓	✓
3G/CDMA	UMTS		✓	✓	✓	✓	✓	✓	✓
	HSDPA 3.6		✓	✓	✓	✓			
	HSDPA 7.2			✓	✓	✓			
	HSUPA 5.76				✓	✓			
	EV-DO Rev. A				✓	✓	✓	✓	✓
	EV-DO Rev. B						✓	✓	✓
	HSPA+						✓	✓	✓
	DC-HSDPA						✓	✓	✓
4G	LTE						✓	✓	✓
OTHER	GPS		✓	✓	✓	✓	✓	✓	✓
	GLONASS					✓	✓	✓	✓

Table 2.6: Network Connectivity for iPhone Devices Released between 2007 and 2014. Source: Apple documentation and www.Apple.com

Wireless internet connectivity on the iPhone devices is via personal area

network (Bluetooth), local area network (WIFI) and wide area network technologies such as 2G technology[1] (TDMA-based GSM and EDGE), 3G technology[2] (CDMA and its upgrades: UMTS, HSPA and HSPA+, DC-HSDPA), as well as LTE (Long-Term Evolution network connectivity), often marketed as *4G*, on the latest models. The newest generations of iPhone also have GLONASS[3] connectivity. Table 2.6 elaborates on the network connectivity technologies available on Apple mobile devices. iPhone, iPod Touch and iPad run the same operating system, iOS. iOS is maintained by Apple, who issues regular updates and requires users to upgrade their software in order to continue to benefit from the growing pool of available software applications made available by third-party developers as well as Apple, compatible with the above-mentioned devices. In June 2007, Steve Jobs announced that third-party web applications will be available on iPhone if written on Ajax and if they are in line with iPhone interface and design. Following this announcement, the SDK was released on the 6^{th} of March, 2008. Shortly after, on the 11^{th} of July 2008, the App Store was launched. A developer can download the SDK for free, subject to prior registration, create applications and test them on the iPhone simulator. The application can be made available to user phones once the developer has paid the Apple Developer Connection[4] membership fee ($99 standard, $299 enterprise). The application price is then freely chosen by developers and the distribution is ensured through the App Store. Apple retains 30% of the sales price of any given application. An application can be made available for download free of charge. The distribution of all applications on the App Store is under rigid control and scrutiny of Apple: Apple can choose to stop

[1] 2nd generation of mobile telecommunications technology available on iPhone models is based on time division multiple access method (TDMA) and includes global system for mobile communications (GSM), general packet radio service (GPRS), and enhanced data rates for GSM evolution (EDGE).

[2] 3rd generation of mobile telecommunications technology available on iPhone models include upgrades to the code division multiple access method (CDMA) such as universal mobile telecommunications system (UMTS), high speed packet access (HSPA) and its derivatives, as well as dual-carrier high speed downlink packet access (DC-HSDPA).

[3] Global Navigation Satellite System (GLONASS).

[4] Apple's developer network designed to provide software developers with resources and help for writing software for Mac OS X and iOS.

distribution of an application if it appears inappropriate[1].

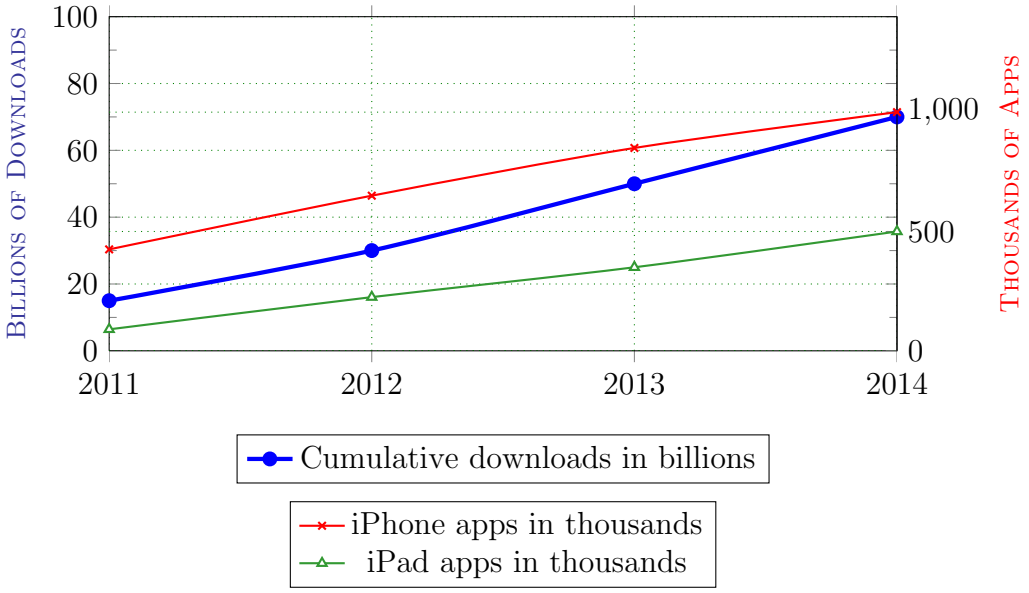


Figure 2.8: App Store Statistics: Number of App Downloads, Number of Apps Available for iOS devices, Number of iPad apps available. Source: Apple.

Despite this, as of April 2014 the App Store is a success with over 70 billion downloads and over one million apps, 500 000 of which are native to iPad, available to over 700 million iOS devices, including iPhone, iPad and iPod Touch, in 155 countries (152 and 90 countries in 2012 and 2011, respectively). Figure 2.8 elaborates on growth of the App Store content and number of downloads to date. As of April 2014, Apple has paid the developers over $17 billion[2] (please refer to figure 2.2 discussed earlier in this chapter for details). In February of 2011, The Economist magazine stated: ‘‘Nokia still ships a third of all handsets, but Apple astonishingly pulls in more than half of the profits, despite having a market share of barely 4%’’ (see figure 2.9). As of end of Q4 of 2013, the global mobile shipments are dominated by Samsung

[1]In 2008, a $1000 application called *I am Rich* was removed by Apple for no official reason. The app had no particular feature and no function at all; when installed on an Apple device and ran by the user, the application was displaying a blank screen with red background.

[2]Source : Apple Press Releases.

at 24,5%, while Apple's market share has grown to 8,4% [1](with the shares of 31,3% and 15,3% in the smartphone market segment, respectively): by the end of Q4 of 2013 Apple pulled in 87,4% of the mobile phone industry profit, while Samsung's share was 32,2% by the end of same quarter [2], compared to 77,8% and 26,1%, respectively, a year before.

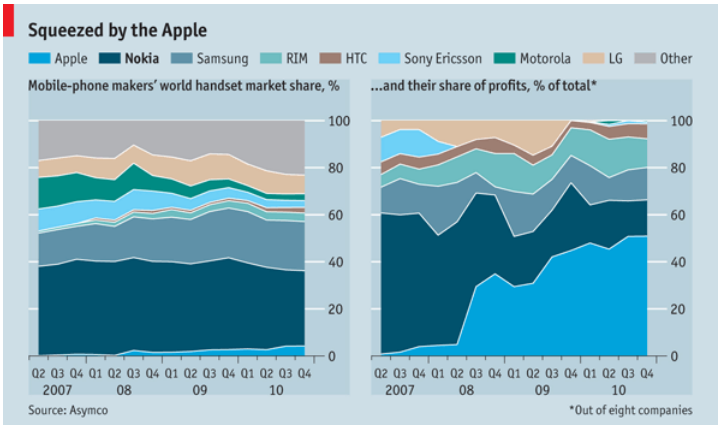


Figure 2.9: Squeezed by Apple (Source: The Economist, 2011)

Network operators were also profiting from Apple success. They have experienced increasing revenues and enhanced usages for their customers. For instance, to quote Laugesen and Yuan (2010):

> "From July 2007 (the launch of iPhone) to December 2008, AT&T market share increased from 28% to 31%, while Verizon gained only 1% over the same period. Since the iPhone announcement in January 2007, AT&T has ranked as the carrier that consumers indicated they planned to switch to, a trend attributable to the iPhone [...]. AT&T reported iPhone subscribers ARPU was approximately 60% higher than the average subscriber, with significantly lower churn rates than the overall AT&T subscriber base."

Analysis

As Volgenstein (2008) from Wired Magazine pointed out:

[1]Source: IDC Worldwide Mobile Phone Tracker, January 27, 2014.
[2]Source: Mac Daily News, February 11, 2014.

> "[...] as important as the iPhone has been to the fortunes of Apple and AT&T, its real impact is on the structure of the $11 billion a-year US mobile phone industry. For decades, wireless carriers have treated manufacturers like serfs, using access to their networks as leverage to dictate what phones will get made, how much they will cost, and what features will be available on them. Handsets are viewed largely as cheap, disposable lures, massively subsidized to snare subscribers and lock them into using carriers' proprietary services. But the iPhone upsets that balance of power. Carriers are learning that the right phone - even a pricey one - can win customers and bring revenue."

Apple clearly changed the architecture of mobile industry in two ways. First, it enabled the customers to experience its mobile device by replicating the computer and fixed-line Internet experience. It hence leveraged consumers' willingness to access the entire Internet in a ubiquitous fashion. This created a breach in the boundary between the mobile Internet (constructed by mobile network operators as a walled garden) and the Internet. Second, Apple was able to create sufficiently attractive platforms (App Store and iTunes) and a device (iPhone) to attract its own ecosystem of developers and third-party actors. Apple simply crafted a new business model relying on two-sided value proposition (see figure 2.10).

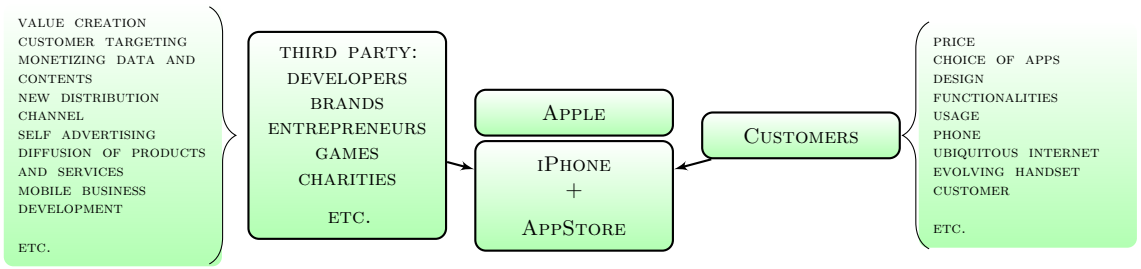


Figure 2.10: Two-Sided Value Proposition by Apple

This was possible thanks to three strategic elements:

- The existence of a mobile Internet market failure: Apple was relying on this market failure to enter the market;

- Apple's economic dominance and high level of gravity in an adjacent market (success of iPod and the iTunes platform) to project its economic power onto another market;

- The reputation, the brand, and a visionary CEO: Apple used its reputation, networks of partners and community of customers to enter the mobile market. Since 2002, shortly after the first release of the iPod, Steve Jobs was convinced that the next step will be a smartphone (with PDA, MP3 and other functionalities).

Apple clearly exhibited high potential gravity in the mobile industry. Apple used all these elements to convince AT&T and other operators to cooperate. Network operators seemed to be unable to launch the mobile Internet and to ensure sufficient returns to cover their huge investments in 3G. To compete with each other, network operators needed to take market share from competitors and to stabilize their own consumer base: the iPhone was used as an efficient beacon for new customers and an attractive upgrade device for the existing ones. For instance, in the US it allowed AT&T to simultaneously increase its market share and average revenue per user. However, this cooperation with Apple had a price tag. Apple succeeded by obtaining direct access to the consumers (direct billing and CRM via iTunes). Apple changed the industry rules by creating a breach in the mobile value chain (see figure 2.11): it forced a change in the balance of power in favor of device manufacturers.

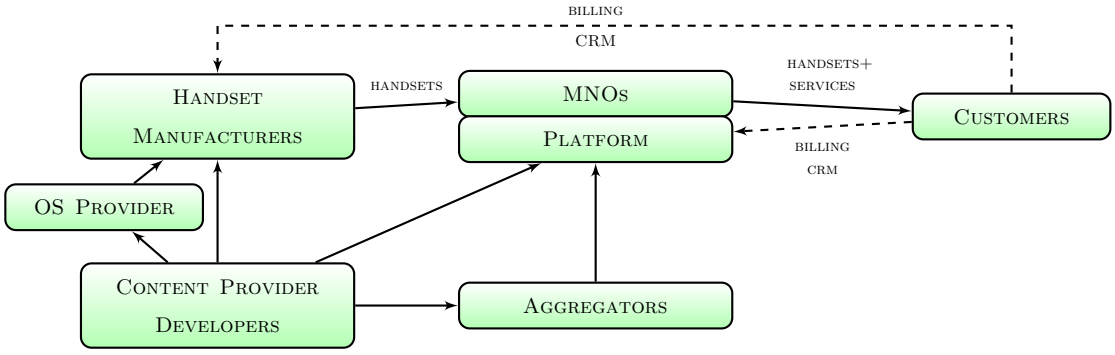


Figure 2.11: The Breach in the Mobile Value Chain by Apple

The entry of Apple into the mobile industry can be seen in many different ways. Following the point of view of the network operators (the former leaders), Apple entered the market in a cooperative way helping them create a profitable mobile Internet, while obtaining a part of the control on consumers and innovation. In this sense, the network operators lost their gatekeeper roles and a part of their economic power in the industry. They lost gravity. For the third-party developers Apple's move appeared as a good attempt to break the walled garden of mobile operators, propose new services and content to consumers, and have access to a part of the mobile Internet pie. Moreover, for non-developers Apple created new advertising and distribution media (game manufacturers, brands, charities, newspapers, TV channels, etc.) via the App Store. For the device manufacturers, the entry of Apple was clearly an aggression, since it enhanced competition by *de novo*[1] entrants (Google, Microsoft) and *de alio*[2] entrants (RIM, Palm/HP). *De novo* entrants came from adjacent industries (PC, Internet). *De alio* entrants (Personal Digital Assistant industry) were operating in niches within the mobile industry. With the success of the iPhone, smartphones became popular and are no longer in a niche, forcing incumbent to adapt. Tables 2.7 and 2.8 depict the impact of Apple on the platforms of the mobile network operators, while the tables 2.10, 2.11 and 2.12 in the Annex of this chapter provide the detailed and comparative description of the actors' relationships.

From the above discussion it is clear that Apple has changed the mobile market architecture and dynamics by using a firm/market equivalency strategy: providing and supporting a platform to facilitate interactions between developers and iPhone users. Even though it accounts for nearly 90% of the profits of the mobile handsets market, Apple has not taken the lead in the industry, it just changed the rules of the game in the industry by rebalancing the economic power and the gravity of players. Since then the mobile industry is punctuated by a rapid pace of innovation. Within a few years the software vendors, operating system providers, device manufacturers, and mobile network operators have had launched their own app stores. Apple's iPhone and its App Store

[1] He et al. (2006).
[2] Op.cit.

Actors on Mobile Network Operator Platform	Roles	
	Primary Functions	Secondary Functions
Mobile Network Operator (MNO) as Platform Owner	Rolls out network Provides and sells network (access) services Manages billing and CRM for voice and data Sells mobile handsets with or without network services (mixed bundling strategy)	Specifies handset functionality and developments ~~Aggregator: provides platforms for content and applications~~ ~~Manages CRM and billing for CP, DEV and AGG~~
Mobile Handset Manufacturers (MHMs)	Specify handset characteristics Sell handsets **Aggregator**: provides platforms for content and applications **Manages CRM and billing for CP, DEV and AGG**	~~Aggregator: provide platforms for content and applications~~ Specify OS characteristics
Operating System Providers (OSPs)	Specify OS characteristic Sell OS	
Content Providers (CPs)	Create and sell content	Aggregator: provide platforms for content and applications
Developers (DEVs)	Create and sell applications	Aggregator: provide platforms for content and applications
Aggregators (AGGs)	Aggregate contents and applications	
End-Users	Buy handsets and mobile services	

Table 2.7: Impacts of iPhone on Actors' Roles on Mobile Network Operator's Platform

Actors on MNO Platform	Interaction Type with Platform Owner
Mobile Network Operator (MNO) as Platform Owner	
Mobile Handset Manufacturers (MHMs)	+/+: cooperation* for smartphones +/–: exploitation (other types of phones)
Operating System Providers (OSPs)	0/0: co-existence 0/+: positive externality
Content Providers (CPs)	0/0, 0/+ or +/0: positive externality
Developers (DEVs)	0/0, 0/+ or +/0: positive externality –/–: competition
Aggregators (AGGs)	0/0, 0/+ or +/0: positive externality –/–: competition
End-Users	

Table 2.8: Impacts of iPhone on Actors' Interactions on Mobile Network Operator's Platform; *occasionally with exclusive contracts.

marked the beginning of the new business cycle in the mobile industry, forcing other players to imitate it: Ovi Store (Nokia), Android Market (Google), App Catalog (Palm), Windows Marketplace (Microsoft), AppWorld (BlackBerry). Meanwhile, mobile network operators realized that the world was changing and that they have to push their own standards for applications in search for new sources of revenue and a certain degree of control over their networks. Yet, some of them are using app stores as a way to generate cash: selling applications and the bandwidth needed to use them. They are also trying to provide web-based services (widgets, mashups), third party services (social search, recommendation tools), and capabilities to others (long tail content).

Apple has helped the whole industry to exit its decline phase and to enter a renewal phase. Now, the industry is in a transitory period with co-leadership between mobile network operators and mobile handset manufacturers, and full expansion. Mobile network operators had lost some economic power, but they gained profits. They are still controlling the network and hence the speed, the security, and the quality of data transmission. Moreover, wireless and fixed-line sectors have initiated their convergence. The transition will probably last several years until the emergence of 4^{th} or, perhaps, even 5^{th} generations of mobile networks.

V Conclusion

As the case study shows, economic players developing a firm/market equivalency model can create and quickly cumulate significant market power on the market created: they control the entry and exit of players, their activities, the financial flows, the innovation process, the resources provided, the flow of knowledge, the structure of the market, its dynamics, as well as the interactions among players. In other words, they exert perfect control on the competition process in their markets. By acting as market support, it appears that these firms suffer no competitive pressure from their partners acting on their own markets.

Following the European or American competition case law, a firm in a dominant position has the ability to behave independently of its competitors, suppliers and final consumers. A dominant firm has a special responsibility

towards its market: its conduct should not distort competition. As such, a dominant position per se is not forbidden, but any abuse is prohibited. In this sense, a firm operating firm/market equivalency model should then be regarded as dominant in its market(s). Hence, any exclusion or exploitation of partners, or any strategic move to eliminate some players and change the market dynamics can be interpreted as abuse of the dominant position (positive/negative or bilaterally negative interactions between the central firm and some of its satellites).

Firm/market equivalency strategies often rely on innovation. Firms like Apple or Google have developed incubator-like structures in which they give access to their knowledge, skills, competences and other resources to smaller partners, who are often more dynamic and sometimes more innovative. This system is sometimes referred to as collective invention or open innovation. But here the system goes farther: the central firm scrutinizes it, perfectly controls it and at any given moment can absorb an attention-drawing innovation into its platform, or choose to diffuse it throughout the system. In this case, the system performs two social objectives: 1) it fosters the increase in probability of emergence of an innovation though opening up the resources and the intellectual property of the central firm, as well as 2) it contributes to diffusion of innovation. These collaborative models of innovation improve the process of the innovation genesis in our society (bilaterally positive interactions). However, it is likely that these systems of markets for innovation could have been created in an effort to protect central firms against the threat of disruptive innovations, which may damage the central firms' existing markets. Central firms possess the power to use their position in order to block, postpone or destroy innovative services or products, which in turn may negatively affect the overall innovation process (positive/negative interactions). The latter case may call for an antitrust intervention.

However, dominance is appreciated in a relevant market, which can be hard to define in the context of firm/market equivalency. The structure of firm/market equivalency involves existence of a central firm and its products, surrounded by complementary and adjacent products or services that are provided by its partners. As an intermediary, the central firm exerts market

power on the structure, and this structure is in competition with the other structures of its kind. For instance, the whole system of Microsoft's operating system (Windows) is in competition with the whole system of Apple's operating system (Mac OS X) as well as with the operating system of Google (Android). In such situation many questions arise: is there one relevant market for each operating system? Is there a relevant market of an operating system? Is there a market for each complementary good (for instance: web browser or media player) on each operating system? The case law seems to follow the latter, segregating each system into separate relevant markets, where the central players are, by construction, the dominant players. However, it is hard to deny the presence of competitive pressure exerted by Google and Apple on Microsoft (bilaterally negative interaction). The key difference lies in the attitude of small players in the systems.

Annex

Actors on Mobile Network Operator Platform	Relationships to Other Actors	Interaction Type with Platform Owner
Mobile Network Operator (MNO) as Platform Owner	Other MNOs: competition MHM: buyer OSP: none or limited CP, DEV, AGG: buyer/reseller/intermediary End user: supplier	
Mobile Handset Manufacturers (MHMs)	MNO: supplier Other MHMs: competition and cooperation (limited) OSP: buyer and/or competitor CP: buyer/reseller/intermediary DEV, AGG: buyer/reseller/intermediary and/or competitor End user: supplier (can be limited)	+/+: cooperation (with sometimes exclusive contracts) with a tendency to +/–: exploitation
Operating System Providers (OSPs)	MNO, CP, AGG, End user: none or limited MHM: seller and/or competitor DEV: cooperation or none Other OSPs: competition	0/0: co-existence 0/+: positive externality
Content Providers (CPs)	MNO, MHM, AGG: supplier OSP: none or limited Other CPs: competition or none DEV: cooperation or none End user: supplier directly through network access (iMode, WAP, SMS,MMS, etc.) or indirectly	+/–: exploitation (with sometimes exclusive contracts)
Developers (DEVs)	MNO, MHM: provider OSP, CP, AGG : cooperation or none Other DEVs: competition or none End user: supplier directly through network access (iMode, WAP, SMS,MMS, etc.) or indirectly	+/–: exploitation (with sometimes exclusive contracts) –/–: competition
Aggregators (AGGs)	MNO, MHM: supplier OSP: none or limited CP, DEV: buyer, reseller, intermediary Other AGGs: competition or none End user: supplier directly through network access (iMode, WAP, SMS,MMS, etc.) or indirectly	+/–: exploitation –/–: competition
End-Users	MNOs: direct buyer of bundles (services + handsets) MHM: indirect buyer or direct buyer (limited) OSP: the choice of an handset conditions the choice of OSP CP, DEV, AGG: indirect buyer through MNOs or direct buyer through network access (iMode, WAP, SMS, MMS, etc.)	

Table 2.9: Relationships Between Actors on Mobile Network Operator's Platform Before Entry of Apple

Actors on Mobile Network Operator Platform	Relationships to Other Actors	Interaction Type with Platform Owner
Mobile Network Operator (MNO) as Platform Owner	Other MNOs: competition MHM: buyer OSP: none or limited **CP, DEV, AGG: limited** End user: supplier	
Mobile Handset Manufacturers (MHMs)	MNO: supplier Other MHMs: competition and cooperation (limited) OSP: buyer and/or competitor **CP: intermediary** **DEV, AGG: intermediary** **End user: supplier**	**+/+: cooperation (with sometimes exclusive contracts) for smartphones** **+/−: exploitation (other types of phones)**
Operating System Providers (OSPs)	MNO, CP, AGG, End user: none or limited MHM: seller and/or competitor DEV: cooperation or none Other OSPs: competition	0/0: co-existence 0/+: positive externality
Content Providers (CPs)	MNO, MHM, AGG: supplier OSP: none or limited Other CPs: competition or none DEV: cooperation or none **End user: supplier directly through App Store**	**0/0, 0/+ or +/0: positive externality**
Developers (DEVs)	MNO, MHM: provider OSP, CP, AGG : cooperation or none Other DEVs: competition or none **End user: supplier directly through App Store**	**0/0, 0/+ or +/0: positive externality** −/−: competition
Aggregators (AGGs)	MNO, MHM: supplier OSP: none or limited CP, DEV: buyer, reseller, intermediary Other AGGs: competition or none **End user: supplier directly through App Store**	**0/0, 0/+ or +/0: positive externality** −/−: competition
End-Users	MNOs: direct buyer of bundles (services + handsets) MHM: indirect buyer or direct buyer (limited) OSP: the choice of an handset conditions the choice of OSP **CP, DEV, AGG: direct buyer through App Store**	

Table 2.10: Relationships Between Actors on Mobile Network Operator's Platform After Entry of Apple

Actors on Mobile Network Operator Platform		Relationships to Other Actors						
		MNO	MHM	OSP	CP	DEV	AGG	End Users
Mobile Network Operator (MNO) as Platform Owner	B	competition	buyer	none or limited	buyer, reseller, intermediary			supplier
	A				limited			
Mobile Handset Manufacturers (MHMs)	B	supplier	competition cooperation (limited)	buyer and/or competitor	buyer, reseller, intermediary	buyer, reseller, intermediary, competitor		supplier (can be limited)
	A				intermediary			supplier
Operating System Providers (OSPs)	B	none or limited	seller and/or competitor	competition	none or limited	cooperation or none		none or limited
	A							
Content Providers (CPs)	B	supplier	supplier	none or limited	competition or none	cooperation or none	supplier	supplier directly through network access or indirectly
	A							supplier directly through App Store
Developers (DEVs)	B	provider	provider	cooperation or none	competition or none		cooperation or none	supplier directly through network access or indirectly
	A							supplier directly through App Store
Aggregators (AGGs)	B	supplier	supplier	none or limited	buyer, reseller, intermediary		competition or none	supplier directly through network access or indirectly
	A							supplier directly through App Store
End Users	B	direct buyer of bundles (services + handsets)	indirect or direct buyer (limited)	choice of handset = choice of OSP	indirect buyer through MNOs			
	A				direct buyer through App Store			

Table 2.11: Annex 1. Relationships Between Actors on Mobile Network Operator's Platform Before (B) and After (A) Entry of Apple

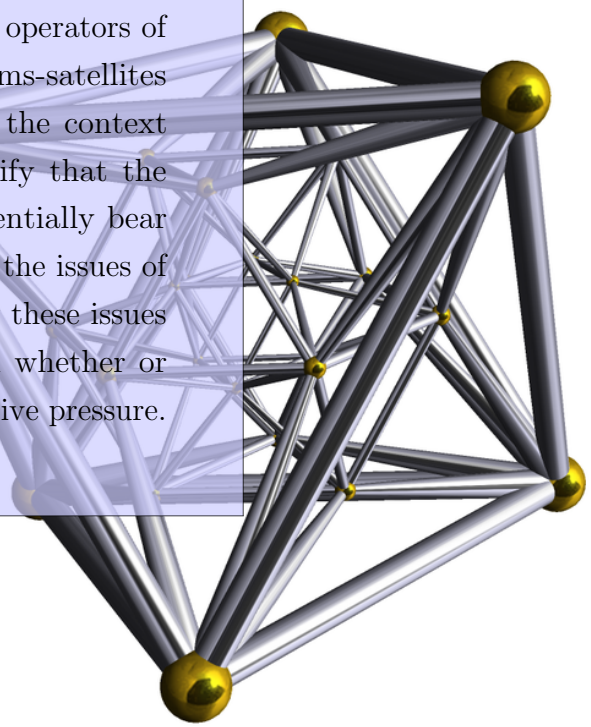
Actors on Mobile Network Operator Platform		Interaction Types with Mobile Network Operator (MNO) as Platform Owner
Mobile Handset Manufacturers (MHMs)	Before	+/+: cooperation* with a tendency to +/–: exploitation
	After	**+/+: cooperation* for smartphones** **+/–: exploitation (other types of phones)**
Operating System Providers (OSPs)	Before	0/0: co-existence 0/+: positive externality
	After	0/0: co-existence 0/+: positive externality
Content Providers (CPs)	Before	+/–: exploitation*
	After	**0/0, 0/+ or +/0: positive externality**
Developers (DEVs)	Before	+/–: exploitation* –/–: competition
	After	**0/0, 0/+ or +/0: positive externality** –/–: competition
Aggregators (AGGs)	Before	+/–: exploitation –/–: competition
	After	**0/0, 0/+ or +/0: positive externality** –/–: competition
End Users	Before	
	After	

Table 2.12: Interaction Types between Actors and Platform Owner on Mobile Network Operator's Platform Before (B) and After (A) Entry of Apple (*sometimes with exclusive contracts.)

Chapter 3

Firms-Satellites in Firm/Market Equivalency: an Unexpected Source of Competitive Pressure

This chapter discusses a different take on the platform creation strategy. Whereas in chapter 2 we focused on the types of firms that create and support the platforms, in this chapter we take a closer look at other constituents of platforms: the small players. In text we address these players as "firms-satellites" due to their tendency to gravitate towards creators and operators of platforms. We study the role of these firms-satellites in the firm/market equivalency model in the context of the mobile gaming industry and identify that the behavior of some firms-satellites may potentially bear threats to the platform owners. We discuss the issues of clustering and multi-homing as well as how these issues affect platform owners, their systems and whether or not these behaviors are a source of competitive pressure.



CHAPTER 3

Apple has reinvented the mobile phone with its revolutionary iPhone and App Store, and is defining the future of mobile media and computing devices with iPad.

– Apple press release, January 7^{th}, 2014.

Bearing a hint of arrogance, this statement is true: in 2007, Apple created a breach in the mobile industry routines and hierarchy by entering with the iPhone. By the year 2014, it is not too bold to say that Apple has reinvented the entire architecture of the mobile industry (as the reader may recall, we discussed it in detail earlier in chapter 2). However, this revolution did not come with the iPhone device, per se. It came on July 11^{th} of 2008 with the release of the Apple App Store, which triggered the opening up of the system, which, as a consequence, had quickly attracted numerous developers (see figure 3.1). From some 500 apps and a handful of developers in 2008, today the App Store's vast selection spans over more than one million applications and draws nearly 300 000 developers and publishers[1].

During 2013, the iPhone, iPod Touch and iPad users have spent more than $10 billion on the App Store, resulting in a some hefty royalties for Apple, which amounted to 30%. During the month of December 2013, Apple users downloaded nearly three billion Apps and paid $1 billion. This tremendous success is attributed to the introduction of iOS 7 (new interface and more than 200 new features and application programming interfaces (APIs)) that allowed developers to redesign the existing apps and to create new apps. Within five years, the developers earned $17 billion on App Store. The App Store app count is exceeding 1,1 million apps that are distributed in 155 countries and span across 24 categories. These categories include news, music, games, sports, health, kids, etc. All of these applications offer unlimited possibilities of customization and recombination for consumers and for developers; this is where the revolution stands and this is what makes the Apple devices so appealing to both: consumers and developers.

[1] As of May 12, 2014, there are 298 172 active publishers on the US App Store and 1 146 303 active apps. Source: http://148apps.biz.

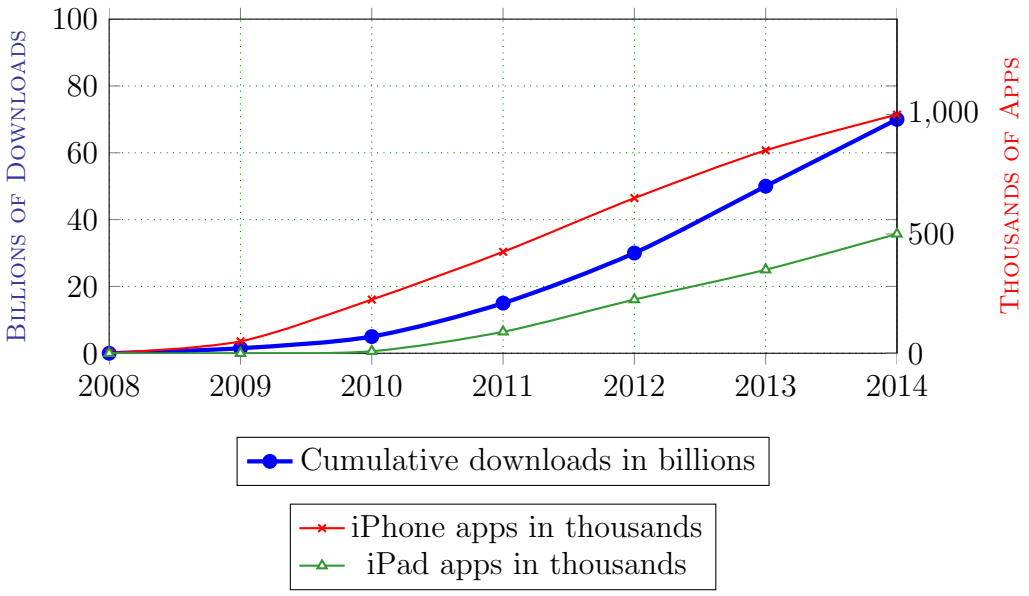


Figure 3.1: Total Number of Applications and Cumulative Downloads on App Store (2008 - 2014) (Source: Apple Press Releases)

Application stores, such as Apple's App Store or Google Play, today are the key driver of this mobile revolution. They build entire firm/market equivalency systems around their owners. However, such a revolution would not have occurred without the collaboration of hundreds of thousands of developers all over the world who were imagining, inventing, creating, crafting new contents, new services, new uses for the smartphones and the tablet devices. They are the ones who enhance and add value to the users' experience of smartphones and tablets. They are the ones providing users with new ways to use their devices. In 2007, Apple (and, later, Google) has clearly opened the doors and paved the way towards this revolution, but today the heart of the revolution is in the hands of these often anonymous developers. From this point of view, hence, the Apple's statement is erroneous.

Who are these developers? They are niche players (Iansiti and Levien (2004)) or firms-satellites in the context of a firm/market equivalency system[1]. A niche strategy is an operating strategy that specializes capabilities and

[1]All firms-satellites are playing in niches, but not all niche players are firms-satellites. The distinction is based on whether or not these niche players are a part of a firm/market equivalency system.

resources to differentiate an economic activity in a particular market or industry. Specialization of the niche players relies on the resources provided by the central player and on the acquisition of capabilities, technologies and resources that can reinforce the niche strategy. Most of these niche players have a very narrow focus on their main activity and try to complement the platform as well as other players by providing added value to the users. Their products, services and developments acquire sense and value in the firm/market equivalency systems developed by a platform owner. Firms-satellites are not necessarily small (see figure 3.2).



Figure 3.2: Who is on the App Store?

On the Apple's App Store one may find participants like Microsoft (Office for iPad), Google (YouTube, Gmail), Yahoo (Yahoo Finances), Facebook, LinkedIn, eBay, and Adobe alongside a myriad of little players most of whom propose but a single app. Firms-satellites vary not only in their activity, but also in their size and economic power: there are some who are as large as to possess and operate a platform of their own in their respective systems. Naturally, their strategy of adherence to the platform may also differ.

This chapter explores the role of these firms-satellites in a firm/market equivalency system and highlights their influence in shaping of the system and

the industry. Facing the overwhelming volume of actors/developers participating on application stores, we choose to restrict our attention to the most active sector in terms of development, revenues and downloads: mobile gaming. Last year the share of game downloads across app stores varied between 33% (Apple iPhone) and 63% (Amazon) of total downloads across all categories; however, in 2013, games represented 77% of total application revenues (see figure 3.3[1]).

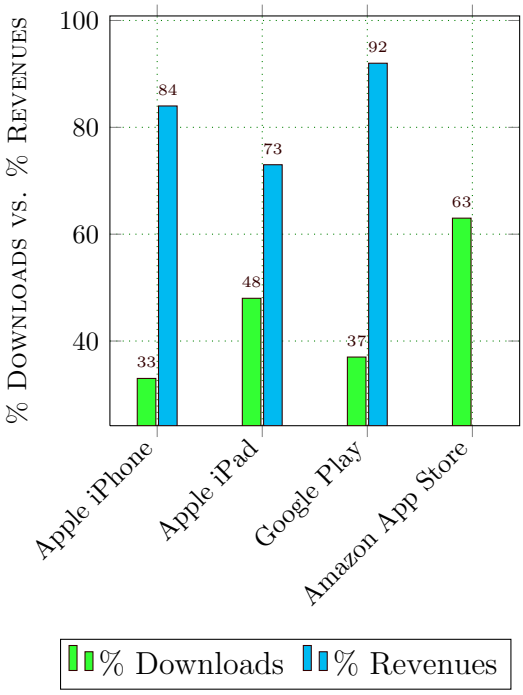


Figure 3.3: Share of Games on Application Stores in Terms of Total Download Volume and Revenues (Source: Forbes, November 1, 2013)

Games developers collect 90%[2] of their revenues on app stores through a very particular business model: the freemium model. In this model, the download is made available to the users free of charge, yet the application is endowed with additional options that are available through in-app purchases. Only 6,1% of the developers' revenues come from paid applications that are not endowed with the in-app purchase options; at a first glance it appears to

[1]Source: Forbes, November 1^{st}, 2013

[2]Source: Distimo, ''Unveiling the Secrets behind App Store Category Dynamics'', March 2014.

be a rather surprising result, considering that the parent industry - the video gaming industry - was built on a *pay to play* model.

This chapter uses the exploratory case study approach to investigate the main drivers of the business models of mobile gaming companies. Section I studies the mobile gaming industry and highlights its main characteristics. In particular, we draw a typology of developers' strategy and business models. In section II, we study a representative firm: Gameloft. With the help of this case we focus on pricing strategy with the intent to explain how zero price can be converted into the sector revenue of €9, 46 billion (2013)[1]. We also depict other particularities of Gameloft's business model: most notably multi-homing. Section 3 highlights the main drivers of the developers' business models inferred from the case study. We observe how that kind of business models affect the shaping of the industry and the competition between platform. The last section concludes the chapter.

I The Mobile Gaming Industry

The video game industry has its roots in the arcade gaming, the age which has begun with Atari's Pong over forty years ago. Since then, the video game industry has been creating content for several support types, including personal computers and game consoles, with content prices ranging from twenty to seventy euros per title. Only recently the content creation started to concern mobile devices and smart TVs.

Overview of the Mobile Gaming Industry

The mobile gaming sector, a subset of video game industry, specializes in provision of gaming content for the mobile devices. Although the content comes in a variety of genres, it is composed nearly entirely of casual games; these games are intended to appeal to a mass audience due to their gentle learning curves. Social games, a subset of casual games, are the games deployed on the social networks with the intent to meaningfully use the player's existing

[1]Source: Gartner, "Forecast: Video Game Ecosystem, Worldwide, 4Q13", October 2013.

social relationships and hence stimulate mass game play. The content is available to smart phones, large-screen devices such as tablets, as well as other mobile devices such as feature phones.

Mobile devices run on a variety of operating systems (OSs), including iOS, Android, Symbian, Windows, Ruby, Brew for the 3D gaming component, as well as BlackBerry, Palm and Bada. Each of these OSs require content programming to be done in a corresponding programming language; some of the OSs offer a choice of programming languages to create the content in. However, as a general rule the content, unless re-coded in an appropriate programming language, is not transferable across the OSs. A number of manufacturers participate in supply of the mobile devices. Some of them specialize devices for the specific operating system (OS) (e.g. Apple devices), while others provide devices compatible with several different OSs (e.g. Nokia, Samsung, LG, Motorola, HTC, Sony Ericsson, etc.).

Over the last three years the size of the video game industry has expanded from €40 billion in 2011 to €66, 66 billion in 2013[1]. With the growing global penetration rates of mobile devices, the mobile gaming sector nearly tripled from €3, 45 billion in 2011 to €9, 46 billion in 2013. In 2011, about 80% of the revenue has been shared among the top four players, jointly representing 52, 9% of registered users in the sector. The two game distribution platforms, DeNA and GREE, represented 37% of revenue. Tencent is a particular player operating exclusively in China. Two years later, in 2013, the market has evolved beyond recognition. The first-ranking player, King, exhibits a market share of 14, 2%, while the top four players jointly represent only 49% of the sector's revenues. DeNA, GREE, Zynga have experienced a noticeable decrease of their revenue between 2012 and 2013 due to fierce competition. Over the same period the revenues of King, Gung Ho and Supercell have skyrocketed. Dominance of the top players has diminished dramatically: the market shows low barriers to entry and hence a high level of risk. Among the top fifteen players in the mobile gaming in 2013, only one entered the mobile gaming sector prior to the year 2000 (Gameloft), eight players entered between the year 2000 but before 2006, and the remaining six players entered in the year

[1]Source: Gartner, op.cit.

2006 or later. The prevailing majority of the companies originate from USA, followed by Japanese-based companies. The details pertaining to the share of the sector revenues are depicted in the table 3.1.

Company	Entry	Origin	Revenue (€M)		
			2011	2012	2013
King	2003	UK/SWE	NK	117,5	1 347
Gung Ho**	2002	JPN	67,2	180,6	1 140
DeNA (Mobage)	2006*	JPN	827,9	1 260	1 100
GREE**	2007*	JPN	449,1	1 100	1 060
Disney Interactive**	2000	USA	703,8	605,6	762,6
Supercell	2010	FI	NK	72,4	639,4
Zynga	2007	USA	766,9	823,4	546,2
Tencent (MVAS)**	2000*	CHN	400,6	424,8	NK
Rovio	2003	FI	75,6	152,2	156
Electronic Arts Mobile	2004*	USA	162,2	192,8	$286,7^{e}$
Kabam	2012	USA	NK	129	258
Gameloft	1999	FR	164,4	208,3	233,3
Activision Pub.	2008*	USA	119,7	117,5	119^{e}
Big Fish Games	2002	USA	14	NK	95,3
Glu Games, Inc.	2001	USA	51	77,4	75,3
Total sector revenue (mobile gaming)			3 450	6 652	9 467
Total industry revenue (video games)			40 000	56 535	66 656

Table 3.1: The 15 Largest of the Mobile Gaming Industry in 2013 (revenue in millions €, * corresponds to the date of entry of the mobile gaming division of the parent company, ** non-segregated data, ^{e} estimated value, CHN = China, FI = Finland, FR = France, JPN = Japan, SWE = Sweden, UK = United Kingdom, USA = United States. Source: annual reports, Gartner, 2013)

Over the past few years players in the mobile gaming sector have toiled to create value. Starting from nearly nothing before the emergence of smartphones in 2007, in 2013 the sector generated nearly €10 billion. Gartner[1] estimates that by 2015 the sector will grow to €17 billion of revenue; this will be greater than revenues generated by the sales of PC games (see figure 3.4). In 2015, mobile games are expected to represent 20% of the total video game industry. Smartphone- and tablet device-based platforms support the whole market for mobile games; the players who build the mobile games are firms-satellites. They are innovative actors who use their unique capabilities for creating games adapted to mobile devices. They also leverage the resources, such as app stores and devices, of central players, like Apple and Google, to reach a vast audience and to develop their business.

Delivery Channels and Pricing

There are four types of delivery channels for the mobile games:

Mobile device: the games can come pre-installed on the mobile device with the help of the mobile device manufacturer. The mobile device manufacturer can choose to purchase a license from the game developer for a flat fee in order to be able to integrate the game into the mobile device prior to selling it to the final consumer, who in turn can play the game at no additional cost.

Mobile device manufacturer's platform: the games can be made available for sale on the mobile device manufacturer's platform. In case when the game is subjected to distribution via the device manufacturer's platform, the game developer pays the platform owner a fee, which represents a fixed percent of the games sales, usually between 30% and 50%.

Telecom operator's portal: the games can be delivered and made available for download via the telecom operator's portal. Just as it is the case with distribution through the mobile device manufacturer's platform, when the game is subjected to distribution via the telecom operator's portal,

[1] ibid.

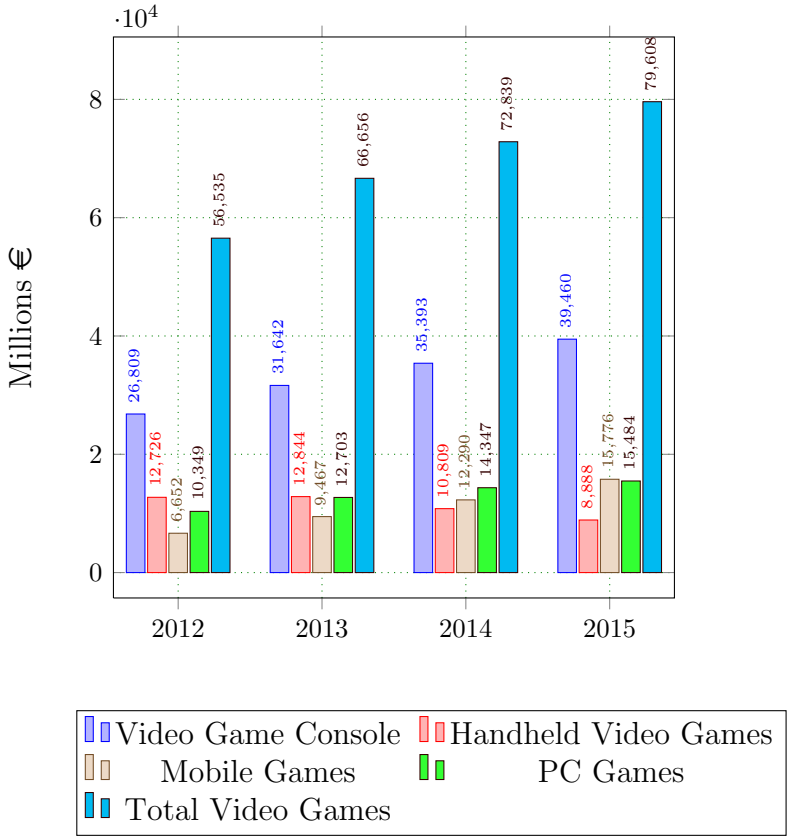


Figure 3.4: The Video Game Industry Revenue, in Millions € (Source: Gartner, 2013)

the game developer pays the portal owner a fee, which represents a fixed percent of the games sales, usually between 30% and 50%.

Game developer's platform: the games can be made available for sale via the game developer's own platform. Although it is attractive to distribute the games through developer's own platform as it is fee-free, the sales are usually far less effective. Some of the reasons for this include low visibility and barriers imposed by device manufacturers to impede third-party content installation.

As for game pricing, there have emerged several distinct strategies: paid download, freemium, ad-supported, and other. Paid download is the core traditional pricing method where the end user makes a one-time payment

to purchase the title. Once paid for, the user gains access to download the game, which is then installed to and played on a single mobile device. The freemium strategy (Anderson (2009)) is a pricing method where the end user is granted access to download and play free of charge, while all the in-game features are available at extra cost, with no obligation to buy them whatsoever. The application of the freemium pricing strategy is often attributed to the emergence of Web 2.0 in 1999. As of February 2014, over 90% of the revenue from mobile games developed for iPhone is generated through the freemium business model[1]. In 2013, the average price among the top 400 applications for iOS devices was 1,67€ for iPhone and 2,56€ for iPad, while it was 1,31€ on Amazon and 2,68€ on Google Play[2]. Today the average price of applications for iOS devices dropped to about 1,06€ for non-game apps, while games for iOS are, on average, priced at 0,52€[3]. The seemingly low prices are attributed to the fact that most of the games are freemium games, hence most of the content has the download price of zero. As per recent survey, out of 216 143 games that were active in the App Store in May 2014, 133 032 of them - or 61,5% - were free to download[4]. The table 3.5 illustrates this for the top fifteen players in the mobile gaming industry.

Freemium games are meant to attract users by proposing zero risk to try the game: the game is free to download, and the user has no obligation to buy. Also, freemium games sometimes promote the full version of the game in cases when such version exists. Aside from benefiting from self-advertising, developers of freemium games are relying on in-app purchases such as micro-transactions and sales of virtual goods, effectiveness of in-game advertisement of their own or third party products and services, as well as in-game sales of real products such as game-related merchandise.

Another pricing strategy is various methods of ad-support, including development of advergames[5]. Advergames are casual games that are funded by and

[1]Source: Unveiling the secrets behind App Store Category Dynamics, March 2014.
[2]Source: appanie.com, April 10, 2013 ; 148apps.biz, April 22, 2013.
[3]Source: 148apps.biz, May 13, 2014.
[4]Source: ibid.
[5]The term *advergames* was coined by Anthony Giallourakis in January 2000, founder of www.advergames.com

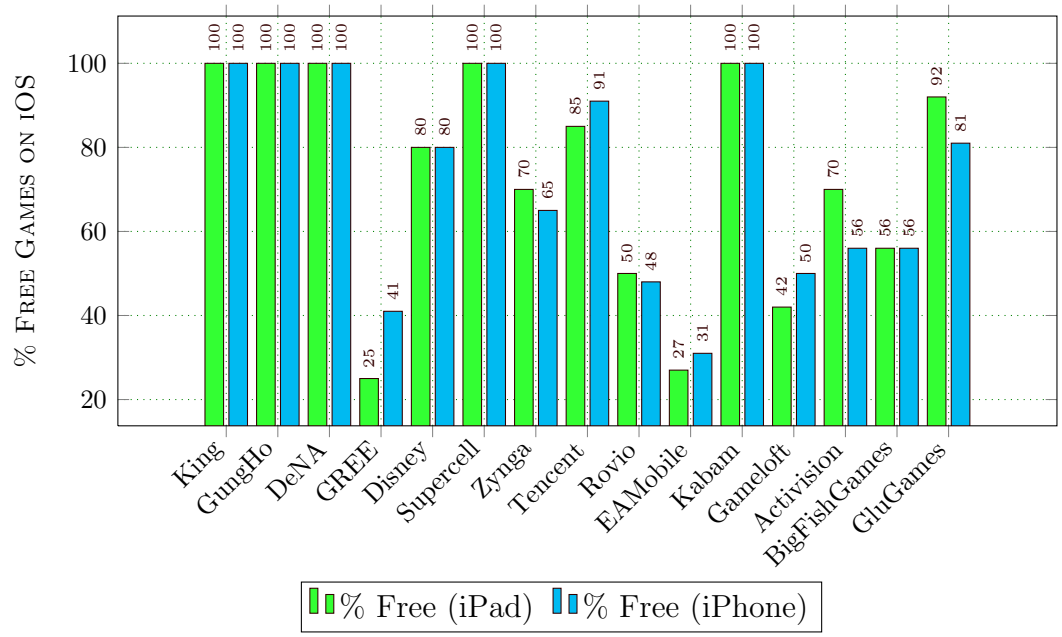


Figure 3.5: % Free iOS Games Across Top 15 Game Developers (Source: Annual Reports, App Stores Data (2013))

meant to advertise a sponsor. These games can be educational in nature with the aim to acquaint the gamer with the range or specifics of the advertiser's products in a playful manner. Such games are available online free of charge, or can be bundled with a tangible product (e.g. box of morning cereal). In ad-supported games the sponsor's brand names or distinct product images appear as part of gameplay. Appearance of such advertisement is either static, i.e. the brand name is displayed passively and blends into the background, or dynamic, i.e. brand name or a distinct image is used as an interactive component in certain parts of the game.

Other pricing strategies include subscription as well as hybrid strategies such as paymium, sub-freemium, or free-paymium. With paymium pricing, the user first pays to download, and then is expected to participate in micro-transactions to enhance his/her gaming experience. Subscription typically requires a term commitment where a flat monthly fee is charged to the user. Sometimes subscription-based games are made available as free-to-play for a limited time during or immediately following the commitment term of the

subscription. Some firms practice a pricing approach where the subscription fee endures for 6-9 months, and then morphs into a freemium strategy, referred to above as sub-freemium hybrid strategy. Other firms offer promotional days when users can download the non-freemium game for free, and then make in-app purchases. In-app purchases are often not required to successfully complete any given game; they are meant to greatly enhance the gaming experience by alleviating stress that the game creates by taking advantage of impatience and frustration of the user.

As of March 2014, the revenues from mobile games on the Apple App Store are generated as follows[1]:

92% from a freemium business model with in-app purchases;

6% from a pay-per-download business model;

2% from a pay-per-download business model with in-app purchases.

The share of paid download games is consistently shrinking, yielding their share to ad-supported games and games featuring micro-transactions.

Elements of the Business Models of the Top-Ranked Firms

The mobile gaming industry is young and fast-paced. As a consequence, business models and design have not yet become stabilized. It is a typical case of high velocity environment (Bourgeois and Eisenhardt (1988)). For Wirtz et al. (2007):

> ‘‘The central feature of a high-velocity environment is the rapid, discontinuous and simultaneous change in demand, competitors, technology and regulation. These characteristics indicate that information is time-sensitive and imprecise, or even unavailable. As a result, market boundaries are blurred, successful business models have not yet manifested and the roles of market players continuously change. Complex and unpredictable changes are frequent and come in the form of market jolts’’.

[1]Source: Distimo, op.cit.

Virtually non-existent barriers to entry, continuous flow of innovation, fierce competition, enthusiastic consumers, and youth of the mobile gaming sector, - all contributed to the business model instability and this, perhaps, is what explains the lightning success of game developers like Supercell, Rovio and GungHo.

Today the market is composed of a myriad of small developers who are creating the volume of casual mobile games, while the fifteen largest players represent nearly 90% of the sector revenues in 2013. The smaller players are here to try their luck in hopes of developing the $1 billion app that will attract hundreds of millions of players. In majority of cases these small players are the individual developers or small groups of developers. They are not necessarily organised into a firm. These small players often sell their developments through distribution platforms like DeNA or GREE; often they abandon their own brand in favor of the platform's brand. These small players enter and exit the market very quickly. This creates a hyperactive competitive fringe that tries to contest the position of the fifteen biggest players. As such, the mobile gaming market appears contestable.

Table 3.2 exhibits some relevant elements of the business models of the top fifteen players in the mobile games market.

We observe three different types of entry in the mobile gaming market among the top fifteen players.

Creation and Specialization. This category hosts new entrants who are specialized in a particular type of a game, whether it is a 3D game, a social network game, a mobile game, or a casual game. Seven of the top fifteen players are new entrants that were founded specifically to operate in the mobile gaming sector. They are pure players in the market even though some of them began to expand their activities to other platforms (PC, game consoles, TV) or other products. Some of them exhibit business models that rely on one or two blockbuster games to generate over 80% of their total revenue. Prominent examples of such players are Supercell with their famous games *Clash of Clans* and

Company	Entry Date	Entry Strategy	Main Functions	Main Revenue Model
King	2003	New entrant specialized in mobile games	Develops and publishes its own games	Freemium
Gung Ho	2002	Entrant from an adjacent market (online auctions)	Develops and publishes its own games	Freemium
DeNA (Mobage)	2006	Entrant specialized in mobile social gaming from adjacent market (e-commerce and m-commerce platforms)	Develops and publishes its own games; Platform strategy	Freemium
GREE	2007	Entrant from an adjacent market (social network)	Develops an publishes its own games; Platform strategy	Pay per download, Freemium
Disney Interactive	2000	Entrant from an adjacent market (entertainment, animated film)	Develops and publishes its own games	Freemium, Pay per download
Supercell	2010	New entrant specialized in mobile games	Develops and publishes its own games	Freemium
Zynga	2007	New entrant specialized in social games for mobile and online	Develops and publishes its own games	Freemium, Pay per download
Tencent (MVAS)	2000	Entrant from an adjacent market (mass media, entertainment, mobile, etc.)	Develops and publishes its own games	Freemium
Rovio	2003	New entrant specialized in mobile gaming	Develops and publishes its own games	Freemium
Electronic Arts Mobile	2004	Entrant from an adjacent market (video games)	Develops and publishes its own games	Pay per download, Freemium
Kabam	2012	New entrant specialized in free to play games for social networks	Develops and publishes its own games; Franchises game development from partners (Hollywood Studios); Platform strategy	Freemium
Gameloft	1999	New entrant, but with a strong link with an adjacent player (Ubisoft (video games))	Develops and publishes its own games; Franchises game development from Ubisoft	Freemium, Pay per download
Activision Pub.	2008	Entrant from an adjacent market (video games)	Develops and publishes its own games	Pay per download, Freemium
Big Fish Games	2002	New entrant specialized in premium casual games	Develops and publishes its own games; Distributes third party developments	Freemium, Pay per download
Glu Games, Inc.	2001	New entrant specialized in 3D freemium mobile gaming	Develops and publishes its own games	Freemium

Table 3.2: Elements of the Strategy of the Fifteen Largest of the Mobile Gaming Industry in 2013 (Source: Annual Reports, Company Websites)

Hay Day, together yielding $2,44 million in daily revenue (2013)[1], GungHo with their *Puzzle and Dragons* and its 91% of the total company revenue of $1,6 billion in 2013[2], Rovio with their *Angry Birds* blockbuster, installed on over two billion devices, and King with *Candy Crush Saga* and its half-a-billion game installations and 575 playable levels. These players' business models are very fragile and often suffer from inability to renew their games catalogue. Rovio's business model is curious: following the blinding success of Rovio's blockbuster, *Angry Birds*, and despite Rovio's attempts to come up with another blockbuster game, they resorted to developing a derivative market and brand licenses, resulting in eight *Angry Birds* game expansions, variety of tangible *Angry Birds* merchandize, expansion into theme parks, film and comic books, as well as licensed character appearances in competitor's games. King is trying to follow up the success of *Candy Crush Saga*, a puzzle match-three game, with another puzzle game: a match-two puzzle *Pet Rescue Saga*. Supercell has most recently released a *Clash of Clans* successor, *Boom Beach*, a strategy game, which ranks as top-ten in terms of downloads since its global release in March of 2014. These players strive to ensure the survival and continued attractiveness of their games (see the insert entitled *Rovio's Angry Birds*). Nearly all of them succeeded quickly. They all implemented a freemium strategy with in-app purchases that relies on a vast audience. Their main strategy is to hold the players' attention by continuing to develop their successful games by adding new features, scenarios, puzzles, characters, enabling the players to interact, and so on.

Entry from the Adjacent Markets: Entertainment and Video Games. Among the top fifteen players, four entrants come from the adjacent markets of entertainment and video games. These players are historical incumbents leading their own markets for

[1]Source: Forbes, 12/2/2014, accessible at: http://www.forbes.com/sites/markrogowsky/2014/02/12/flappy-bird-is-small-change-gamings-new-giants-make-millions-per-day/

[2]Source: GungHo Online Entertainment, Inc. Annual Report (2013).

decades: Disney, Activision, Ubisoft (with Gameloft) and Electronic Arts. These firms are exploring the mobile distribution channel by adapting some of their existing games to smartphones and tablet devices. The mobile activity represents a very small part of their total revenue and does not appear to be highly strategic.

Entry from Other Adjacent Markets. Four entrants among the top fifteen players come from online auctions, e-commerce and m-commerce markets. These players enter the mobile gaming market by leveraging their social network (e.g. GREE) or their customer base. GungHo follows an entry strategy similar to a pure player based on one successful game: *Puzzle and Dragons*. GREE and DeNA leveraged their existing platform strategy by allowing third party developers to propose games to their respective customers.

Adjacent entry can be implemented through acquisitions of smaller developers specialized in mobile or social gaming. For example: Disney acquired *Tapulous*, an applications developer for iPhone and iPod Touch, for $42 million in January 2010 and *Playdom*, a social game developer in July 2010 for $763 million; GREE acquired *OpenFeint*, a mobile gaming platform and its community of over 75 million players, for $104 million in April 2011 and *Pokelabi*, a mobile social game developer for $173,8 million in October 2012; DeNA acquired *NGMOCO*, a developer of mobile games for smartphones and mobile platforms, in October 2010 for $400 million; Electronic Arts acquired *PopCap Games*, developer and publisher of casual and puzzle video games, for $1,3 billion in July 2011[1].

[1]Source: Mobile Gaming Industry Report, Redwood Capital, June 2013.

Rovio's Angry Birds

Rovio Entertainment was founded in 2003. Rovio is renowned for its casual puzzle game Angry Birds that was released on December 10^{th}, 2009 on iOS. Before the end of the following year it was downloaded over ten million times. As of January 2014, the game has been downloaded two billion times, which makes it the most downloaded freemium game of all time. The success of Angry Birds is attributed to its thoughtful combination of addictive casual gameplay, comic style and low (zero) price.

To leverage this success, Rovio decided to create an *Angry Birds* brand and to offer derivative products through franchising. In April 2014, Mikael Hed, CEO of Rovio said:

> "Building on top of our games business, where we moved into free-to-play, Rovio set its foot strongly into the entertainment business. In 2013 we formed a world-class movie animation production team in Los Angeles that is already working on the first Angry Birds feature film, to be globally premiered in July 2016. In addition we built the biggest animation studio in the Nordics for the production of animated TV content, bringing to market 42 Angry Birds Toons episodes in its



> first year. In launching ToonsTV, we introduced new means of content delivery, with 2 billion views already. On the licensing side, we continued to push digital and physical integration''.
>
> In 2013, Rovio also opened numerous Angry Birds attractions in amusement parks in Spain, Finland and China. In addition, Rovio produced comic books in thirty languages and a physical learning space called *Angry Birds Playground*. Some competitors use the franchise in their own games: recently, in November 2013, GungHo introduced Angry Birds-themed dungeons in its game *Puzzle and Dragons*. Rovio's consumer product activity encompasses toys, books, licensing and other derivatives from the game Angry Birds. In 2013 this activity represented 47% of their total revenue.

In the mobile gaming industry the participants can carry out the following main functions: 1) develop and publish; 2) distribute; 3) be a platform.

Develop and Publish. This is the core activity of mobile game companies. They use a differentiation strategy by proposing new game experience to consumers. This function requires creative and innovative developers who are able to understand the demand and the expectations of players. Often, games are launched as beta versions and evolve throughout their lifetime in response to the user experience of various game features. Developers must be reactive: they create correct metrics to assess and modify the most lucrative feature of their game. This presupposes having the capacity to listen to users and then adapting the game accordingly. Most of the developers create blogs or game-bound websites to provide support to

players and collect feedback. Since 2012, the most successful games are casual games, either puzzle/dungeon or battle/strategy-like.

Distribute. Some players, such as Big Fish Games, develop and publish their own games as well as distribute the games of third party developers and editors through their platform. Big Fish Games is specialized in premium casual games: the company presents itself as the leading online marketplace for this kind of games. Big Fish Games offers third party developers a multi-channel distribution approach by making games available on PC, Mac, iPad, iPhone, Android, Kindle, Nintendo Wii, Nintendo DS and retail. More than a market place, Big Fish Games is a distributor (merchant model).

Platform. This last function expands the distributor's role to embrace the firm/market equivalency strategy. GREE and DeNA chose such strategy by opening up their platform (through SDK and API) and customers' base (or social network) to third-party developers; they monetize their investment through the transactions that take place between developers and customers. Figure 3.6 shows the open platform of DeNA. DeNA (Mobage) provides developers with production support through expertise and knowledge, marketing (user acquisition, promotion), SDKs (for iOS or Android), analytics (to monitor the real-time performance of games and to tune the games accordingly), global distribution (worldwide publishing), quality gamer network (about 30 million of active and engaged users). DeNA is mimicking the App Store strategy: providing support to developers to attract them along with their innovative ideas. Small developers are attracted by such platforms since they can benefit from the support, the customer base and reputation of the platform owner. They hence increase the probability of their games to succeed and, in a way, appear less anonymous. By doing so, DeNA and GREE improve the creativity of their value proposition. They create clusters of developers around their platforms within the app store systems. In this sense, Apple's App Store can be viewed as a

platform of platforms.

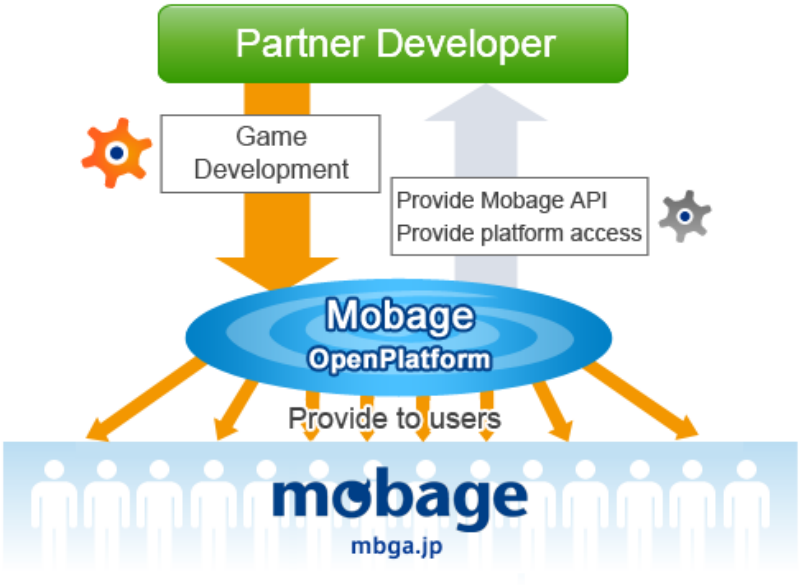


Figure 3.6: The open platform of DeNA: Mobage

These main functions: develop and publish, distribute, and platform are cumulative; i.e. any given participant can choose to carry out the basic function, develop and publish, or they can also choose to distribute, or they can, above all, choose to create and operate a platform (since a platform is also distributing the games of third party developers). We do not observe a strategy of pure platform or pure distributor. All of the top fifteen players are developing and publishing their own games. Among them, eleven are playing the strategy of pure developer and publisher. The biggest platforms, GREE and DeNA, were developed by entrants that came from very specific adjacent markets: social network and e-commerce/m-commerce. The side-competitors from the adjacent markets of entertainment and video games (Disney, Electronic Arts, Activision, Ubisoft) follow the strategy of pure developer and publisher and do not deal with neither the third party developers nor do they take the platform-

based approach. Among the fifteen largest, Big Fish Games is the only example of a distributor, and it is highly specialized in premium casual games. Figure 3.7 draws the link between entry strategy (horizontal axis) and functions (vertical axis).

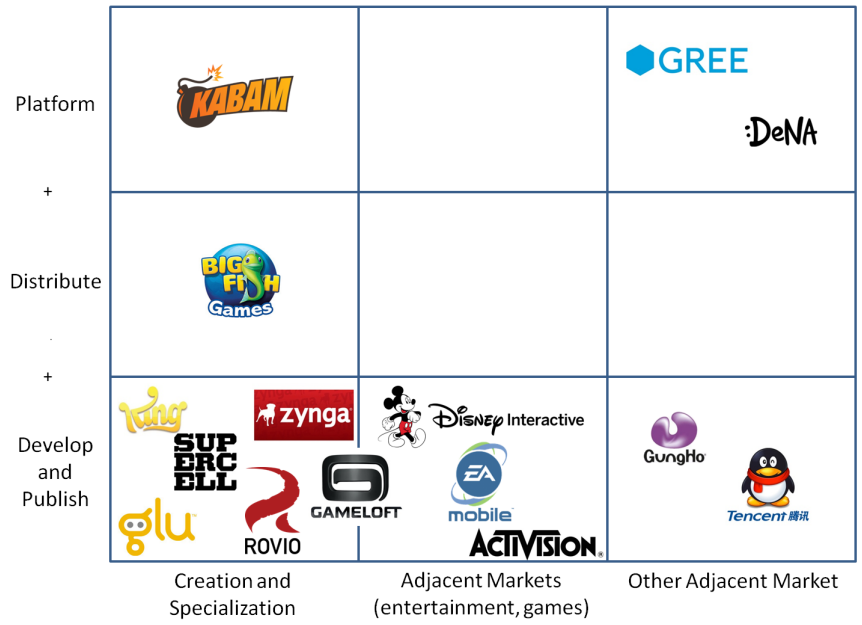


Figure 3.7: Entry and Main Strategy

The forthmentioned elements highlight several main characteristics of the mobile gaming industry. This industry exhibits low barriers to entry and a high level of risk; this pushes firms to continuously innovate and provide players with new and improved gaming experience. Moreover, the market is still rapidly growing, making barriers to entry nearly irrelevant: leader's positions are therefore not stabilized and new leaders can emerge quickly. The shift towards the dominant freemium revenue model forces developers to compete fiercely for time and attention of a mass audience. Mass audience is the key in transforming micro-transactions (in-app purchases) into tremendous profits (that can amount to several million US $ per day). This means that developers need to release appealing games that will meet the player's expectations. To succeed in the spacial component of competition, these games also need to be available for a wide range

of mobile devices. A corollary of the freemium model is multi-homing: developers avoid exclusivity (for instance: on iOS or Android) because in order to reach a wider audience they must port their developments to other operating systems. Exclusivity used to be the rule in the game console market, but it is no longer the rule, nor it is the rule in the mobile gaming market. Most of the developers, in particular the top fifteen, develop on several platforms, that is, for multiple firm/market equivalency systems.

However, simply to be present on several platforms is insufficient: developers need to make themselves be seen. The traditional way to improve visibility is via multi-channel advertising (websites, blogs, application stores, etc.). For small developers this is surely very costly. When the developer's one game is successful, in-game advertising can be used to attract the existing players to developer's new game. Given this need to attract the mass of players, the competing developers sometimes cooperate. The basic forms of collaboration are in-game cross-advertising (e.g. in-game advertizement of a competitor's game) and licensing (e.g. licensing out a character or a game-specific theme to appear in a competitor's game). They also co-develop and co-brand some games to share their experience and reputation with partners: Gameloft regularly cooperates with The Learning Company, producing co-branded games; in 2012, GREE teamed up with Gameloft and Ubisoft to enter the European mobile social gaming market; Rovio licensed Angry Birds to GungHo. The extreme level of collaboration is platform openness, where one firm opens up its platform to other developers.



II Gameloft: a Staying Model

Invention, innovation, new products, or new ideas do not bring value per se. Teece (2010) neatly summarized a common theoretical belief:

> ''In standard approaches to competitive markets, the problem of capturing value is quite simply assumed away: inventions are often assumed to create value naturally and, enjoying protection of iron-clad patents, firms can capture value by simply selling output in established markets, which are assumed to exist for all products and inventions. Thus there are no puzzles about how to design a business - it is simply assumed that if value is delivered, customers will always pay for it.''

This theoretical ideal is just a caricature of the real world and cannot explain the revenue generated in the mobile gaming industry. In particular, it cannot explain why at a point in time customers decide to pay. Business models and business design matter (Baden-Fuller and Morgan (2010); Baden-Fuller and Haefliger (2013); Wirtz et al. (2010)) and are of tremendous importance in the Web 2.0 and the Internet industry (Amit and Zoot (2001); Zoot and Amit (2010)).

The following case study relies on the design of business models to understand the profitability of firms in the mobile gaming industry. Our research is in essence descriptive and exploratory and uses the single case study method (Yin (1994)). By providing a detailed description of the revenue model (revenue design) of the chosen company, we aim to find and clarify the main ingredients of its success in terms of profits. More precisely, the objective of the case study is to dissect the freemium pricing strategy frequently used in the mobile gaming sector. With the help of the case study we explore the method and the path for converting free into profit. We collected secondary data and information from publications (industry studies, books and articles), Google search, players' publications (press releases, financial reports and activity reports) as well as from writings by experts and consultants, who specialize in the relevant sectors.



We had several motivations to select Gameloft for this case study. Gameloft pioneered the mobile gaming in 1999. It is the earliest entrant into the mobile gaming sector among the top fifteen largest developers and publishers in 2013. Gameloft is the early signal from the French-based video game developer Ubisoft, the parent company, to step into an emerging adjacent market, with intent to multi-home on all available platforms (most notably App Store and Google Play). In the not-so-distant past, the developers and publishers who competed in the console business of the video game industry were prompted by the console manufacturers to sign exclusive deals on game releases, hence blocking their ability to multi-home. Since not so long ago, the hit titles like Ubisoft's *Assassin's Creed III* are available on all consoles, in addition to being available on the full range of the mobile devices thanks to their licensing contracts with Gameloft. Gameloft employs 6 391 people among which 5 200 are developers. Gameloft has published over 500 games for mobile devices. Less than 10% of its revenue is attributed to licenses of Ubisoft titles (e.g. *Assassin's Creed III*, *Prince of Persia*, etc.). Gameloft relies heavily on the freemium pricing strategy with emphasis on micro-transactions and in-game advertising. Gameloft displays a stable business model and strategic positioning. As of 2013, Gameloft is still among the top ten publishers[1] worldwide: it ranks second in terms of total downloads[2] and ranks fourth in terms of top game downloads on iOS and Google Play. In terms of revenues Gameloft ranks twelveth[3]. In 2013, Gameloft counted twenty

[1]Source: App Annie Index: 2013 Retrospective, The Top Trends of 2013, App Annie, January 2014

[2]Gameloft ranks second behind Electronic Arts but before Supercell and GungHo.

[3]See table 3.1

millions daily active users, one million daily downloads and one billion downloads to date of its free-to-play games. Gameloft commercializes its games in fifteen languages in over 100 countries, available on over 4 000 different mobile phone models. Gameloft develops its own games and franchises (Asphalt, Real Football, Modern Combat, Order & Chaos), and works in collaboration with international companies like Marvel, Hasbro, FOX, Mattel and Disney. Gameloft is undoubtedly an example of success with a rather stable business model. For all these reasons we consider Gameloft as a exemplar case (Baden-Fuller and Morgan (2010)) of the mobile gaming industry.

Gameloft Distribution Channels and Revenues

Gameloft is employing the freemium pricing strategy for most of its games. In addition to freemium strategy, Gameloft also employs other ways to price, including pay-per-download strategy. We do not observe any subscription-based products. Instead, the company uses social networking approach with the aim to build its own platform-based community of users. The table 3.8 depicts the Gameloft's revenue trend since their inception until the most recent annual report. The official revenue data for the first five years of operation is not publicly available.

In order to create visibility for its products, Gameloft makes its games available for download on the major device manufacturers' application-distributing platforms such as Apple's App Store, Google Play, Amazon's Appstore, Nokia's OVI Store, Samsung Apps, RIM's AppWorld and so on. In 2013, this distribution channel accounted for about 66% of the Gameloft's revenues. The free-to-play model with in-app purchases represented 85% of its revenues. The applications come either pre-installed on the mobile devices and at no additional charge to the final user, or can be downloaded from the device manufacturer's platform. In case of the former, Gameloft sells licenses to the device manufacturers at a flat rate, in case of the latter, Gameloft pays the respective platform owners 30% of its sales revenue.

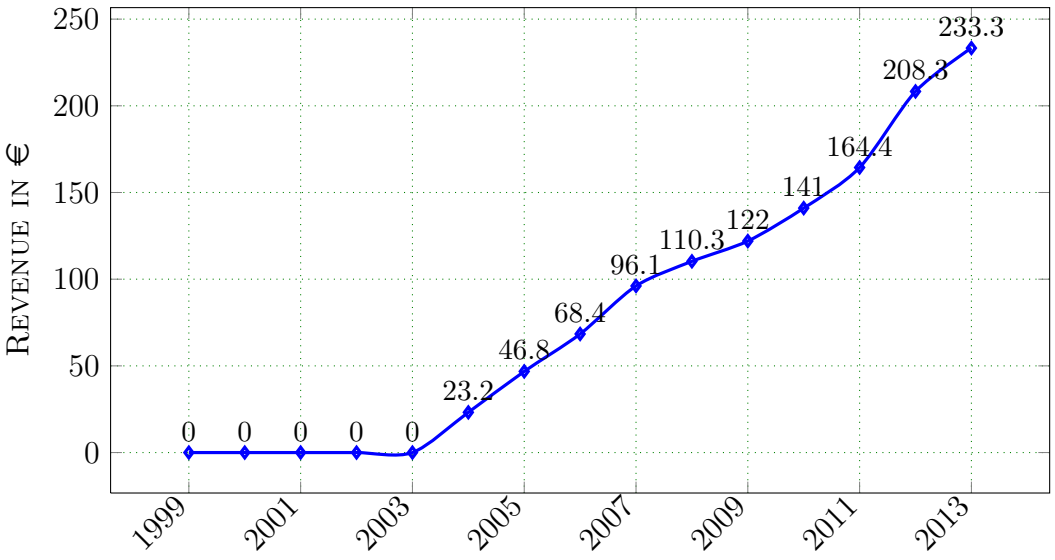


Figure 3.8: Gameloft Annual Revenue in Millions € (Source: Annual Reports)

Another distribution channel for Gameloft's games is through a collection of over 200 telecom operators across more than 100 countries (feature phones segment). This grants Gameloft access to over two billion mobile services subscribers, who can reach the Gameloft content via the operators' portals. Revenue amassed through this distribution channel amounts to about 32% of Gameloft's total revenue, even though a typical telecom operator's commission for using their portal as a distribution channel can be as high as 70% of sales revenue. Lastly, about 2% of Gameloft's revenue is attributed to their activity around connected TV.

Most of Gameloft's revenue is sourced from their mobile applications business segment. In 2012 and 2013, 98% of the revenue was attributed to mobile application sales, while the remainder was earned in game console, PC (social games) and smart TV segments. Gameloft participated in the game console business since 2008, PC games since 2010 and smart TV business since 2011.

Over the last three years the significance of revenue from sales of feature phone content has diminished dramatically from 70% in 2010 to 32% in

2013, while the revenue from sales of smart phones and tablets content has more than doubled reaching 66% in 2013. In terms of revenue by geographic region, the figures are rather stable: North America represents 28%, Europe 32%, Asia Pacific 19% and Latin America - 21% of revenue.

Finally, it is interesting to observe that R&D represented 46% of Gameloft revenues in 2013. The figure of such magnitude is quite standard in a high velocity environment. The high level of Gameloft's R&D expenses indicates the necessity to continuously adapt to market changes and evolution in the mobile gaming industry.

Gameloft Model: the Price Tag of Impatience and Release

We have reviewed a number of freemium Gameloft games with respect to the pricing strategy and conversion of the non-paying users into revenue contributors. All of the games we reviewed share common elements. With the help of an example of the game entitled *''The Oregon Trail: American Settler''*, we highlight these elements and explain how the game compels non-paying user to convert to paying customer. These common elements are transferable to other freemium games.

The game starts out by presenting the user with the need to manage a limited number of resources: coins, cash, wood, food, energy and hearts. Coins, wood and food can be obtained by doing chores and quests throughout the game. Each of the actions is time sensitive: upon commencement of an activity, a timer is assigned to each action; as the time set out by the timer elapses, the user is enabled to collect resources such as food and coins. The wood resource is collected in a similar fashion, yet there is insignificant time delay between the commencement of the action (cutting wood) and the collection. All of these resources can be collected at a cost of one energy resource per action. Although wood is somewhat of a scarce resource, it is not obstructing the gameplay, as more trees can be planted throughout the course of game, hence making this

scarce resource renewable. Cash, energy and hearts are scarce resources. In the beginning of the game, the user is occasionally presented with these resources in form of a bonus. Hearts can be collected by helping a neighbouring town to do chores, and can be further used to upgrade buildings in the user's own town to increase coin payoff, or to play a lottery, where the user can win in-game items, cash or energy. Lottery can also be played for free once every 24 hours. Hearts can also be purchased with cash. In the second half of the game, the option to earn hearts disappears, and only the option to buy hearts with cash remains. Energy is needed to do all actions in the game that yield payoffs. Energy resource is limited and builds up to a maximum of fifty energy points as the user progresses within the game. There are several ways to replenish the energy: win a lottery, using hearts or cash to participate; level-up by doing chores to earn experience points, which in turn promotes the user to the next level; wait three minutes to replenish one point of energy for a maximum of three minutes x 50 points = 150 minutes; earn as bonus for doing chores; or buy more energy with cash.

Cash is the most curious resource of all. In the beginning of the game, cash is frequently offered as bonus. The user also has an option to get free cash by watching short 20-30 second advertisements of other Gameloft games. For each advertisement watched, up to a maximum of five per each 24-hour period, the user is offered one unit of cash to be spent within the game. Later in the game, Gameloft advertisements disappear, and in their stead appears a list of Gameloft partners who advertise their products and services with the help of Gameloft. In exchange for filling in your personal information or purchasing real merchandise from these partners, Gameloft grants cash for use in-game to the participating user. The cash can be spent to buy all other resources, including the scarce resources, to hurry production, hence eliminating the need to wait until the timers elapse, or to buy in-game items. The in-game items can be either functional (e.g. providing or enhancing coin resource), or decorative (e.g. outfit of your game character or the character's gender). The cash, in turn, can be purchased for real-world money using your

credit card. The rates are presented in such a fashion that they compel user to buy a larger pack of cash rather than a smaller one: see table 3.3 for details.

Amount	Bonus	Name of Cash Pack (2011-2012)	Name of Cash Pack (2013)	Price
10	0	Baby-sized pack	Pouch of cash	1,79 €
25	1	Starter-sized pack	Bushel of cash	4,49 €
50	5	Medium-sized pack	Sack of cash	8,99 €
100	20	Big pack	Barrel of cash	17,99 €
250	100	Extra-large pack	Wagon of cash	44,99 €
500	300	Super-sized pack	Bale of cash	89,99 €

Table 3.3: The Oregon Trail: American Settler - Cash Pricelist

What compels the users to buy these packs of cash? What drives some of the users to convert into paying customers? Since the beginning of the game the user is faced with real-time delays throughout the game: production of collectable resources takes real time, and each item in the game (house, business, farm animal, etc.) has an associated timer. Upon the expiry of the timer the resources can be collected (taxes, items produced, harvest, etc.). Each action that the user's character does costs one unit of energy. Energy recuperation is also associated with a timer. Moreover, free lottery, free cash, and land expansions - all have an associated timer. The farther the user is progressing into the game, the more each producing entity yields, but also the longer is the associated time delay. In addition, the larger the town becomes, the farther it stretches, the longer, in real time, it becomes for the character to walk from one place to another in order to do the chores. The user has a choice to make in-game purchases of virtual content that will enable the

character to walk faster and to rush the in-game timers. Such items are offered exclusively in exchange for in-game cash. Hence, playing on the impatience of the user created by the need to wait all the time, the game is offering a quick solution to relieve impatience through purchases of packs of cash, which can then be spent to purchase the play time (in lieu of wait time).

How does the game publisher manage to attract millions of registered users? How does the company manage to retain their user mass? With a wide selection of free games that sport high-quality graphics, it still appears to be a challenge. However, one of the keys of success of the social games is their aim to employ the user as vector of advertisement among the user's social connections. The game tries to become ''social'': it encourages the user to invite friends through social networks (e.g. Facebook) to join the game by offering bonus in-game resources and the ability to interact with the befriended users and their games. Such offer of interaction encourages so-called items race: a given user's town must be better than the towns of his/her friends that are playing the same game. This drives the purchases of decorative and non-essential items to be able to stand out within the circle of peers. Other important factors are the appearance of the game as free-to-play, the game's addictive qualities as well as visibility throughout major application distributing platforms (e.g. Apple's App Store, Google Play, etc.). By enabling users to download the game for free, users bear no risk for trying the game, hence, they are not reluctant to take a few minutes and install the game to their device. Once the game is on the mobile device, it has the idiomatic ''leg in the door''. Therefore, what it then needs is to possess an addictive component. This can be achieved by controlling - and limiting - the user's play time. If the user is not satisfied with the allowable game duration, one of three scenarios will occur. The user will either play again shortly thereafter (e.g. when the user's energy has been refilled), will purchase the play time by buying cash and spending it to accelerate the pace of the game or to buy the ability to instantly refill energy (i.e. more play time), or never play a given game again. In addition, the game is encouraging the users

to play often and check-in daily by offering daily, weekly and monthly attendance prizes. The prizes are only earned if the game is accessed on daily basis. Another method used to ensure that the user returns to the game often is the reaction of the in-game characters to the absence of the user: when the user does not check back regularly, the mood of the in-game characters decays from jubilant to depressed, which affects the production yield. This contributes to user's motivation to interact with the game daily.

Analysis of the Case

With the help of the Gameloft case we looked at the way the mobile gaming sector converts free products into profit. The constituent features that were observed throughout this case are present in all freemium games. These features include limiting play time, selling additional play time as well as selling seamless gaming experience. In the age of early mobile phones and early feature phones one way for the mobile game developers to monetize their games was to provide what used to be referred to as demo-versions of their games; sometimes these demo-versions were pre-installed on the mobile phones for the phone users to discover. The demo-version game play was, too, limited: it provided 30 seconds of free game play (e.g. Electronic Arts' *Bejeweled* (2001)), in hopes that the phone user would be lured to buy the full version of the game. The method of limiting play time changed, and so did the ability of the game developers to monetize their games. Although there is no one universal recipe for generating revenue in the mobile gaming sector, with the help of the case study we can derive five main drivers of profitability. These drivers are: 1) Be visible; 2) Be free; 3) Be addictive; 4) Capitalize and 5) Offer more.

The First Driver: Be Visible. Being visible means being playable on a vast array of different devices, and that requires the game developers to multi-home. Since the entry into the mobile gaming sector is nearly barrier-free, over the past several years the device manufacturer's application distribution platforms have been flooded with talented amateur game developer wannabes, small developer firms as well as heavy-weight entrants from side markets; most notably these are the veterans from the video game industry. Today there are hundreds of thousands of developers (e.g. the number of developers publishing on the Apple's US App Store is 298 172[1]) that are delivering a wide variety of content. Gaining visibility in this sea of competitors is key. Multi-homing is a necessity: the time of exclusivity in gaming is over. Multi-homing on multiple platforms ensures maximization of the potential audience. It is necessary to be visible, but simply being visible is insufficient.

The Second Driver: Be Free. Games need to be free to play. The mobile gaming customers expect the content to be provided to them free of charge. This expectation has been built over the years by the device manufactures, who considered it to be of importance to distinguish their devices from the ones of the competitors. They were doing so by pre-installing often exclusively-licensed content, including mobile games, directly to the mobile devices. Hence, such content came at no extra charge to the final users, who have developed the expectation for the content to be free. Although some of the users are willing to pay for their apps and most customers are okay with the low-end prices of applications that range between 0,99€ and 4,99€, in general, customers prefer to try their apps risk free, paying the price of zero for download. This does not bereave the game developers from generating profit, yet they found themselves in the position needing to re-vamp their pricing strategy and source their revenue from sales other than application sales. This need has prompted the roll-out of the freemium pricing strategy as the dominant strategy (and even a routine) in the mobile gaming sector. Free

[1] As of 12/05/2014. Source: 148Apps.biz, op.cit.

to play strategy ensures that a vast number of users will try the game. As such, acquisition of new players seems easy, however, retention is a more complex issue (see insert entitled *Retention and Revenues from New Players*).

Retention and Revenues from New Players

In April 2014, Swrve, a US consulting company specialized in mobile apps and games, published a report *The Swrve New Players Report* on the behaviour of new players in the mobile gaming industry. The report focuses on determining the length of stay of new players in the game (retention) and the amount they pay (in-app purchases). The report uses the data collected from a set of 10 million new players, that is new users of a number of particular games. The data collection began in November 2013 and was collected over the course of 90 days. Swrve reviewed 30 free to play titles, which include, most notably, games from Activision, Electronic Arts and Gameloft. The main results of this survey are:

19% of new players played the game once;

45,5% tried it fewer than five times;

$\Longrightarrow$ A large proportion of new players do not make much effort to learn a new game. They just spend a limited amount of time to discover it. Games need to be particularly appealing to the users to retain them. A flat learning curve in casual games often helps with retention. This result also shows that players do not hesitate to download many

games just for trying;

33,9% of new players are still active after one day, and only

5,5% are active after 30 days;

$\Longrightarrow$ Acquisition of players seems easy, but retention is a complex issue;

2,2% of new players made at least one in-app purchase during the first 90 days. Those players spend on average \$20,62 in the same time period. Among them, 6,2% made more than 10 purchases;

53,5% of all revenue was generated during the first week following the download by a new user;

$\Longrightarrow$ The commitment to a game is short-lived; users like to shift to new activities quickly. Only few users stay with the game for extended periods of time. Hence, games need to be particularly engaging during the first week of play;

0,22% of all new players provide 46% of total revenues;

$\Longrightarrow$ These are the ideal players to focus on;

\$0,45 is the average revenue per installation (per download).



The Third Driver: Be Addictive and ‘‘Impatience, Stress and Release’’ Your Players. For Mike Lu (2014), VP of Product at GREE,

> ‘‘One of the elements that make free-to-play unique is that we give the games away for free and then are dependent on players enjoying the game and any new content enough to spend within that game’’.

Creating value is an inseparable component of an enjoyable gaming experience, and hence a successful game.

Before monetizing, developers need to engage their players. Being addictive and using methods at hand to frustrate the player, such that the player eventually cracks and pays up, are the top ingredients in value generation and capture. As we observed with Gameloft, the games are built in such a way as to put the time pressure throughout all aspects of the game. This time pressure yields two things. First, it takes away the ability from the players to saturate themselves with the game by overplaying; limited gaming periods in which the player does not have an opportunity to finish all actions/chores/quests that they want make them return to play the game later. In addition, the game encourages daily playing by offering bonuses. Second, the time pressure gradually builds up a level of impatience so that the player is frustrated and either converts into a paying customer or simply stops playing. Both of these scenarios can be viewed as desirable by the game developers, since their objective is not necessarily to maintain the large-number user base; instead, it is advantageous to maximize the revenue per active user. Moreover, addicted users use their social networks to make their friends play as well, hence bringing more potential paying customers to the game developer.

Another useful technique in retaining the players is ‘‘stress and release’’. To the question ‘‘Do you try to erase the user’s stress with design [of your games]?’’, Kenji Kobayashi, Director at DeNA, answers:

> ‘‘It’s not that we erase it; we control and release it. When

> you think about what games are at the core, they are about delivering stress to the user. It wouldn't be fun if it's something that anyone could finish – you put up obstacles for the user, and they feel a sense of achievement when they overcome them, which is fun.''

The game plays with the players' eagerness to solve different kind of puzzles or strategic (combat) situations. This is where the value of the game stands for players: the value of the game is proportional to its capacity to entertain the players by stressing them, i.e. putting them in front of a problem/issue to solve, and then releasing them by providing them with the tools to solve it (by either giving or selling the tools). The underlying idea is very basic: the firms should know their players and know what it is that they like such as to provide them with the best playing experience. This strategy is the very basis of success of games like *Clash of Clans* (Supercell), *Angry Birds* (Rovio) and *Candy Crush* (King).

The Fourth Driver: Capitalize. Capitalization – or the ability to capture value – is essential for the company employing a mainly freemium price strategy to thrive and endure. Even though there is a lot of effort made to retain the user, the game developer's ultimate goal is not to maximize the number of registered users, but to maximize the conversion of active users into paying users. As is evident with the mobile gaming leaders, having highest profit per user is superior to managing the highest number of users. As in any business, capitalization must enter the value chain at some point in time for the business to stay afloat. Capitalization in the mobile gaming sector with dominating freemium pricing strategy lies in selling limited spans of the user's attention to advertisers, as well as generating value from user stress and impatience by enabling and encouraging them to participate in micro-transactions. The companies in this industry are able to afford a vast number of non-paying users due to nature of the product: virtual content. The non-paying users, however,

may play role in advertising the company's products and attracting new users who may eventually convert into paying users. The non-paying users are also often needed to ensure the playability of the game: in certain games a good balance between paying and non-paying users should be kept, otherwise the resulting disbalance may affect the fluidity of playing experience of the paying users.

Capitalizing is not an easy task. Neither the average revenue per user nor the average revenue per paying user gives the clear image of reality. According to 5^{th} *Planet* chief executive Robert Winkler, 40% of revenue comes from 2% of players each of which spends $1 000 or more per year, 90% comes from players who each spend $100 or more per year. Some top players can spend even up to $6 700 per year. This kind of players is often referred to as *the whales*. They represent only a small percentage: about 3-4% of paying users. As of now, developers are not able to outline their profile: are the whales old or young? Are they managers, doctors, office workers, etc.? There are no specific demographics that can help to distinguish the whales from all the other players. Lu (2014) explains that these players are not compulsive: they spend in-game strategically and only if they feel it is worth doing so. To track these players, developers have invented batteries of metrics and analytics able to accurately measure and develop the economic design of their games: how and when are the players buying? What are they buying? At what level of the game are they ready to spend? These metrics make their games more agile and adaptable.

The Fifth Driver: Offer More. To strengthen their customer base, in addition to taking the steps as described above, the game developers try to up-sell and cross-sell to their existing registered users. This includes advertising other games, including games of their own and third-party developments, if the latter are willing to pay for the in-game advertisement. By offering more, the game developer eliminates the need for the registered users to wander around and check out the competitor's products. The

game developer strives to create a playground – or a platform – for its users to be able to find things to their linking once they are tired of their current game, hence keeping the potential and actual paying customers from leaving. Moreover, contrary to console games, users on mobile play several different games at the same time and can jump from one game to another very quickly: suturing the playing time of each user is of great importance.

III Conclusion

Games are evolving from the traditional console-based model to digital titles available on mobile devices and connected consoles. The mobile gaming industry is young and fast-paced. It is the most dynamic part of the gaming sector. Mobile gaming has dramatically evolved from its early beginning on feature phones to more sophisticated game experience on smartphones and tablets. Today the vast majority of games are casual: social, puzzle or strategy/combat games that can be played in short sessions. Today's mobile gaming industry architecture is structured around three fundamental elements:

- mobile platforms and – most notably – app stores that offer access to a large audience;
- free-to-play business model and advergaming;
- technological advances that improve the users' gaming experience and the gameplay (user-friendly OS, better screen, long-lasting batteries, seamless Internet connectivity, etc.)

In the high-velocity environment of mobile gaming, companies are still on the quest for the ideal business model and the ideal way to reach the players. This has recently generated a regulatory threat (see the insert *A Regulatory Threat to the Mobile Gaming Industry*).

A Regulatory Threat to the Mobile Gaming Industry

Some consumers' unions are complaining about the way mobile gaming companies are billing. Recently in the UK the OFT investigated the industry practices of online and app-based games. They observed ''industry-wide practices that were potentially misleading, commercially aggressive and otherwise unfair'' (OFT (2014)): lack of transparency of items' pricing, misleading commercial practices, exploitation of children's inexperience and vulnerability and quasi-automatic payments taken from accounts holders without their knowledge or explicit authorization. The OFT published a list of principles[1] that should be implemented by online and app-based games to comply with consumer protection law. The principles most notably force mobile gaming companies to precisely outline all the costs associated with the games (especially for in-game purchases) and impose that in-game payments must be authorized (or rejected) by the account holder. As for now these rules apply only in the UK. However, other regulatory bodies may follow the example of OFT[2]. The first impact of these rules will be on the fluidity of the revenue flows. Regulation may force companies to adapt their business models again.

[1]The list is available at: http://www.oft.gov.uk/shared_oft/consumer-enforcement/oft1519.pdf

[2]See the US Federal Trade Commission in-app purchasing complaint against Apple. Apple recently offered 32,5 million US $ in refunds to any Apple account holder who can prove they were billed for in-app purchases made by their children. Accessible at http://appleinsider.com/articles/14/01/15/apple-settles-app-store-in-app-purchase-lawsuit-with-us-government

Competition in the mobile gaming industry is in its essence spatial: developers have to occupy the virtual space of mobile gaming created by application stores such that they are visible and able to reach the widest audience possible. Even though it is technically unlimited, this virtual space is a common resource, which exhibits rivalry and non-excludability of access. The latter occurs because platforms do not discriminate against developers who want to enter on board. The former arises due to the following two conditions: 1) storage space available on any given device is physically limited, which restricts the number of applications any given user is able to keep on their device simultaneously; 2) the audience cannot be stretched ad infinitum, since players can only focus on a limited number of games at a time. This and the existence of multiple firm/market equivalency systems has led developers to resort to multi-homing, hence optimizing their visibility. The detailed knowledge of the characteristics and habits of the users is undeniably a key factor of success. Fine-tuned metrics and analytics of the users' data ensure the on-going adaptation of these firms' design and revenue models. Consolidation has not yet occurred, but it is on its way.

All these elements shape the industry in a particular fashion. Figure 3.9 depicts the current shape of the architecture of the mobile gaming industry.

The core of the mobile gaming industry is constituted of two large firm/market equivalency systems, Apple's App Store and Google Play[1], surrounded by smaller firms-satellites. These firms-satellites are developing either for only one or for both of these systems. When they develop for multiple systems, they multi-home; as such, they create links and interdependencies between systems and become less dependent from any one of these systems. In a way, they slightly decrease the force of the link between themselves and the main platform; in other words, they try to resist the main platform's gravity. This is further reinforced in the event when firms-satellites multi-home while playing a platform strategy:

[1]As of today, Microsoft is present at this level, but has a negligible market share.

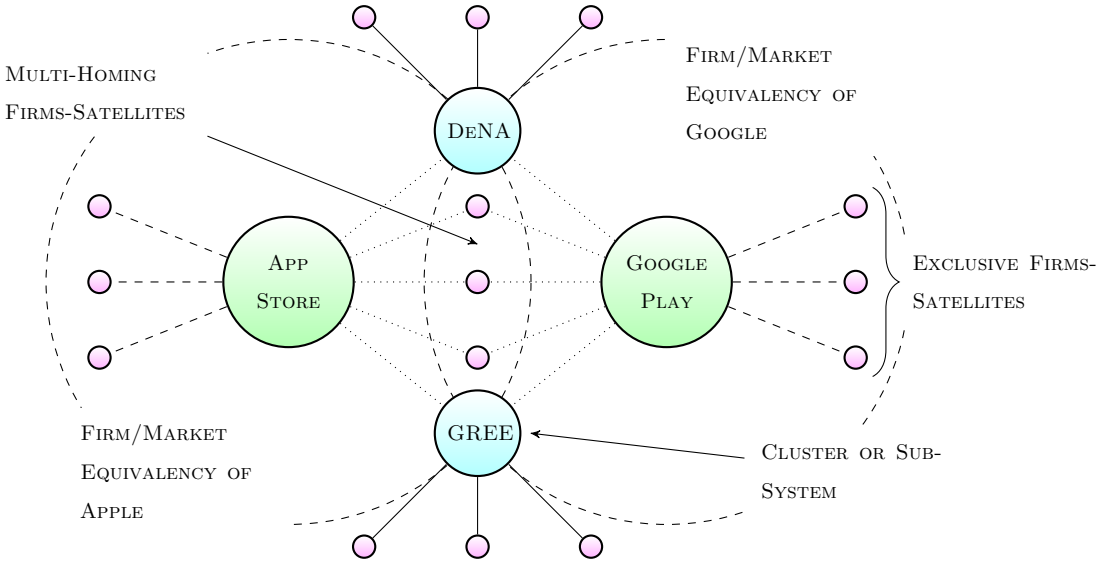


Figure 3.9: Architecture of the Mobile Gaming Industry

this behavior results in creation of independent sub-systems within the main system. These sub-systems exhibit their own gravity and capture part of the value created. We refer to such behavior of firms-satellites as *anti-gravity behavior*.

As a result of anti-gravity behavior, the ties between the central platform and its firm-satellites become more loose. Loose ties allow the entire system to be more agile and flexible as they enhance the recombination possibilities: the whole system becomes more creative, more innovative and faster growing. However, loose ties give more independence to firm-satellites: they gain economic power over the platform owner. This counterbalances the power and governance of the platform owner. High specialization and multi-homing have multiple effects on the architecture of competition in the mobile industry. Specialization is a compulsory ingredient of strategy for firms-satellites, since it makes them more competitive in comparison with the other firms-satellites. High specialization combined with multi-homing also provides protection against the platform owner. In fact, multi-homing implies a recombination of resources outside the scope of a particular platform, hence decreasing the level of

control and governance by a platform owner. Today, even if they rely on app stores for their business model, the top fifteen players of the mobile gaming industry are not really under control of the platforms. Moreover, multi-homing decreases the risk associated with tying one's fate to a particular platform and protects against the risk of collapse of a particular system. Multi-homing then is both: offensive and defensive. The offensive elements include the search for new market opportunities and a better audience, while the defensive elements are a form of insurance: protection against the threats and risks associated with a particular system. In the app stores' systems, multi-homing provides the firms-satellites, i.e. developers, with strategic and economic independence: without doubt, these are the developers' main objectives.

More generally and as is the case in the mobile gaming industry, firms-satellites create networks of interactions within the firm/market equivalency systems. They use the available resources and recombine them with their own resources, or with the resources from other systems, to create new products and services. Firms-satellites are vectors of interactions and development. The competition between firms-satellites push the boundary of the firm/market equivalency system outwards. To avoid competition from other small players in the system, firms-satellites try to develop their business at the boundary of the system (e.g.: social mobile gaming pushing mobile gaming towards the social network arena) by occupying new space of opportunities. This boundary strategy is vital for their survival: being too close to a platform owner may induce absorption or commoditization/standardization. Doing so, they increase the complexity of interactions within the system and between the systems. Their outward movement is causing outflows of innovations and value. They also spawn competitive pressure that affects the firm/market equivalency systems: anti-gravity behavior such as multi-homing can potentially invert the balance of power within the system. In the world of exclusivity, most of the time the small players are competing to secure some exclusivity clauses. In the world of multi-homing, the products or services of the satellites that multi-home can potentially become a *must*

have: consumers would like to have the ability to download Supercell or Rovio games on any tablet or smartphone because many consider these games to be a *must have*. This phenomenon puts pressure on the platform owners who then compete to acquire and retain such firms-satellites. From this point of view, firms-satellites that multi-home can become the vectors of competitive pressure.

Another manifestation of anti-gravity behavior is through clustering. Clustering refers to extra-cooperative inter-firm interactions that may exhibit elements of strong ties. Overtime, as a response to positive interactions, the loose ties between certain firms-satellites can solidify and clusters can develop. These clusters under certain conditions can enlarge and morph into sub-systems. These larger clusters assume a specialized position within the system by addressing a failure that they were able to identify within the system. These clusters are likely to mimic the strategy of the main platform (e.g. GREE or DeNA vs App Store or Google Play). Clusters are not always detrimental to the health of the central platform; when a firm/market equivalency attracts a lot of small players, congestion can emerge. The central player is not omnivalent and may struggle with the task of governing the entire system alone, hence allowing for some system failures to emerge. In the mobile gaming industry the developers' main concerns are visibility and reputation. Sub-systems like DeNA and GREE help low-gravity and zero-gravity developers acquire visibility and build reputation by giving them access to resources and audience (in exchange for royalties from sales of these developers). Clusters create partitions in the main system. Within these partitions the rules and governance are under the control of the cluster founder. In a way, it may appear that clusters are contesting the governance of the main platform. In reality clusters may instead help to reinforce the central player's governance as well as the system stability. However, the true anti-gravity behavior occurs when clusters engage in multi-homing. As clusters enlarge to become sub-systems with intent to multi-home, they constitute one of the chief threats to a firm/market equivalency system: a multi-homing cluster is a pre-requisite for the

creation of a stand-alone system, which in turn can rupture or breach the existing firm/market equivalency system. Figure 3.10 summarizes the paths of anti-gravity behavior within firm/market equivalency systems.

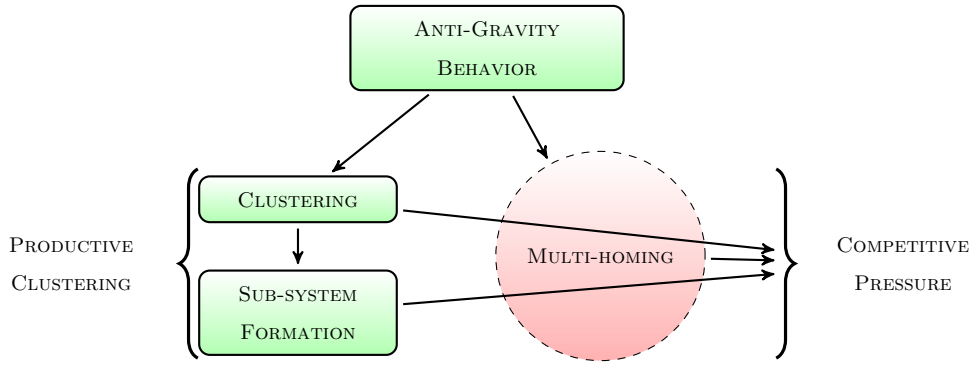


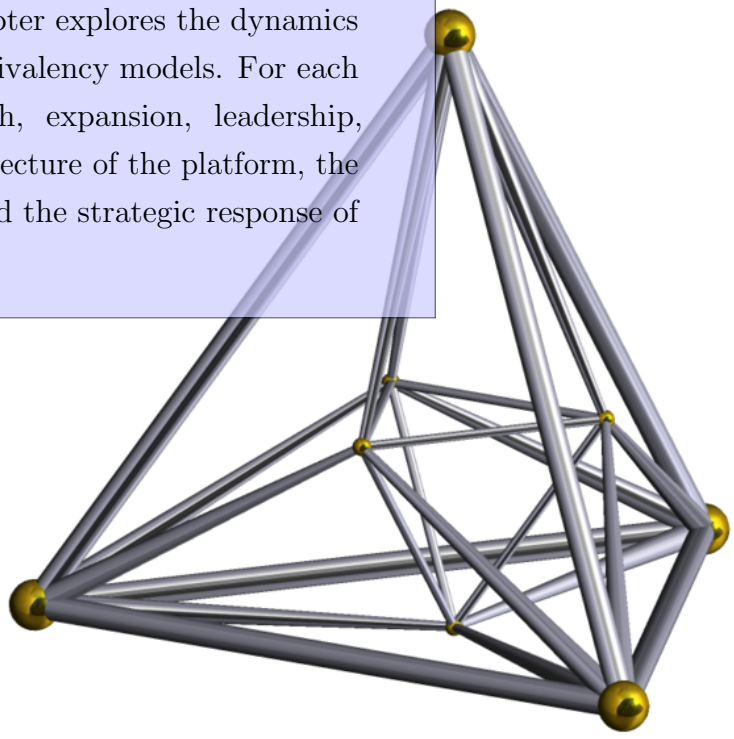
Figure 3.10: Sources and Flows of Competitive Pressure through Anti-Gravity Behavior

Although they are a double-edge sword, firms-satellites are nevertheless crucial for the dynamics of a firm/market equivalency system. They structure the complexity and richness of the network of interactions, while being a potential threat when – and if – they are engaged in anti-gravity behaviours such as multi-homing and clusterization, which prompt inter-system competition and threaten the system stability. Their role depends on several elements: the type of industry, the architecture and design of the firm/market equivalency system, the type of governance of the system, the stage of development of the system, the existence of competing systems and so on. A more evolutionary study of these elements can give a clearer view of the role played by the platform owner and the firms-satellites in the structuring of the system.

Chapter 4

Evolutionary Process of Firm/Market Equivalency

Ideally, firm/market equivalency has two dimensions: innovation and business development. In this model, the platform is a central socio-technical artefact that supports openness strategies in both dimensions. It facilitates sharing and exchanges among participants. Such systems are not static. They co-evolve with the platform and its constituents: the platform owner and other participants. This chapter explores the dynamics involved in firm/market equivalency models. For each stage of development (birth, expansion, leadership, renewal), we study the architecture of the platform, the behaviour of participants and the strategic response of the platform owner.



Firms have entered into an era of inter-organizational collaboration and systemic innovation (Maula et al. (2006); Teece (1996)). They have made a radical change by opening their innovation process (Chesbrough (2006)), their business models (Chesbrough (2006), Chesbrough et al. (2014)) and their business development. Openness is based on three main principles:

Smart opening. Smart or strategic opening involves making available to third parties some assets of the firm, including resources such as skills, ideas, knowledge or patents. It may be embodied (knowledge embeddeness) in various artefacts, either tangible or intangible, such as objects, processes, context (e.g. social interactions) or capabilities. These features are important because they are likely to inhibit the sharing of knowledge and thus jeopardize the whole dynamic of collective innovation (Badaracco Jr. (1991); Lam (1997)).

Sharing. Openness means sharing as well as accessing, using, improving and monetizing the results of the innovation and economic activity of others. In terms of innovation, however, free revealing does not imply that the access to resources that is granted as a result of sharing is not subject to control over all the yields of the innovation (Henkel et al. (2013)). Sharing may imply specific contractual clauses or even a price tag.

Catalysis. Whether it is internal or external, catalysis is the means of stimulation and orchestration of collaboration of firms. Openness involves proactive management of external relationships. A necessary condition is to attract a third party to share some key resources and accelerate the pace of innovation and exchanges by facilitating the relationship between different communities of actors involved (Evans and Schmalensee (2007b)).

Firm/market equivalency models introduce an original approach of openness in which value creation is based on multiple processes sequentially and/or simultaneously involving a plurality of actors, activities and resources. They appear as a space of opportunities that firms and partners

can explore and/or exploit. They center on cultivating innovation, extending the value proposition, experimenting with new business models, that aim to impose new products and/or services on market spaces, which are likely to rapidly evolve (Burger-Helmchen et al. (2011)). Firm/market equivalency relies on an effective architecture of collaboration, designed to leverage the potential of systemic innovation and exchanges pursued by various participants or complementors. They implement a set of rules and governance mechanisms, designed to enrol independent actors in the pursuit of interactions and distributed, collaborative, and cumulative innovation.

It is evident that information and communication technologies (ICTs) play a crucial role in enabling collective activities. Many firms use ICTs to support openness strategies, to cooperate and to exchange information and resources with players that are holding specific technological know-hows, complementors or customers. The use of ICTs accelerates the pace of innovation and exchanges in an open context. In a platform-based context such as firm/market equivalency, the pace of innovation is constantly accelerating as it is driven by the numerous recombinations of resources and knowledge that flow through the platform: the number of possible recombinations grows exponentially as new participants enter the platform. Platforms are catalytic attractors and amplifiers of the openness strategy. Firms become more innovative as they get on board of a platform since the ideas, knowledge and resources can cross-fertilize more easily. This positive network effect drives a positive feedback loop: the more there are participants, the higher is the likelihood for innovations to emerge. The information and communication technology (ICT)-based platforms are the socio-technical artefacts used to support and facilitate openness: they ensure catalytic reactions between the various contributors (Hallerstede (2013); Lundstrom et al. (2013)).

In a platform-centred system, strategy and governance initiated by the platform owner shape the platform design, the knowledge management, the value creation and the value capture within the system. These insti-

tutional mechanisms are critical to the understanding of how firm/market equivalency models coordinate innovation efforts and interactions between participants. Several studies have investigated the role of platforms in the emergence and development of ecosystems (Attour and Peruta (2013); Isckia (2009); Isckia and Lescop (2013); Lescop and Lescop (2013); Loilier and Malherbe (2013)), but none propose a clear vision of the dynamics of firm/market equivalency within an evolutionary framework.

This chapter aims to explore the dynamics of firm/market equivalency models. Our conceptual framework relies on an ideal-type of firm-market equivalency through which we study the evolution of the architecture of the system. More specifically, our study focuses on the relationship between the platform owner's strategic intent, the platform design, the collaborative strategies of participants and the underlying value creation. The first section introduces our conceptual framework. We consider an adapted version of the evolutionary model of business ecosystems as defined by Moore (1993). In the subsequent sections, we analyze each stage of the system's life cycle paying particular attention to the strategies of all actors, knowledge management, value architecture and platform design. Our approach is conceptual-analytic (Järvinen (2000)): we build on the significant amount of research and experience reported in the literature. It integrates many strands of management and economic literature to provide an accurate framework of analysis. Our epistemological posture is close to critical realism (Bhaskar (1978, 1998)), since we seek to understand the mechanisms at work.

Following Smith (2006):

> ''The critical realism (CR) notion of generative mechanisms (or tendencies) provides the possibility for scientific explanation that allows for the causal impact of the artefact itself while stressing the importance of the local context and social diversity''.

Deconstructing such complex mechanisms is a step forward in the development of our understanding of the dynamics of firm/market equivalency.

I The Conceptual Framework

The framework relies on the concept of firm/market equivalency as described in chapter 2. After refining the concept, we elaborate a bi-dimensional ideal-type exhibiting the links between the two main elements of such a platform-based system: innovation or technology development and business development (Maula et al. (2006)). Lastly, we present the framework used to explore the alignment of governance, architecture and strategy throughout the life cycle.

Firm/Market Equivalency and Platforms

From chapter 2, firm/market equivalency refers to

> ''a platform-based cohort founded on mutually beneficial cooperative interactions between a platform leader and firms-satellites that gravitate towards the platform leader, given that the platform leader is the market creator who exercises control over its satellites and capitalizes on interactions that take place''.

This definition does not imply that firms and markets coincide. It means that the platform leader supports a part of a market, providing other members with resources, knowledge, knowledge objects, boundary objects and other artefacts, as well as interoperability and rules (Isckia and Lescop (2009)). The platform owner provides the whole architecture, i.e. the system and the associated governance mechanisms (control), coordination mechanisms and rules.

The platform architecture and governance directly influence the value that can be co-created within the system (Tiwana et al. (2010)). Technically,

the architecture is modular, that is, made of systems of modules connected through standardized interfaces (Baldwin and Woodard (2009))), scalable and able to evolve. Modularity ensures flows of incremental innovation and complements (Brusoni and Fontana (2005)). Interfaces play the key role, since they define how the modules interact. Interfaces are able to connect a wide variety of components and therefore they connect a wide variety of contributors. For these contributors modularity acts as a coordination device. Modularity implies interoperability, which guarantees diffusion, sharing and access to all improvements, innovation and knowledge contained within the system. Contributors access the shared resources (SDK, platform functionalities, software libraries, databases, computing power, storage capabilities, etc.) and create new complements, which in turn increase the platform's value both internally and externally (Gawer and Cusumano (2002)). The growth of the internal value improves the loyalty and the adherence of the current partners, whereas the gain of external (perceived) value may attract new contributors: modularity strengthens the gravity of the platform both internally and externally (see chapter 2).

According to Yoo et al. (2005):

> ''The innovation cycle allows for new features to be projected into the technological world and become, established as candidates [...] enabling actors to relate other actors and artefacts in new ways.''

Platform-based systems promote a collective maieutic that gives rise to new ideas and concepts that may be embodied in new artefacts. This limitless generativity is made possible by the very specific nature of these artefacts and by the architecture of collaboration that facilitates their creation i.e. the platform. Generativity means that certain technological artefacts (digital, in our case) can be combined in a chaotic or unexpected way into new artefacts to deliver a service that is radically different from what they were originally designed for (Yoo et al. (2010)). Digitalization

nurtures a transmogrification process that changes the nature of co-created artefacts. For instance, it can put together a pair of shoes with sensors and transmitters (Nike +). The intrinsic generativity of ICTs is an essential feature that helps explain the proliferation of new products or services (Yoo et al. (2010); Boland Jr. et al. (2007)). Yoo et al. (2010) make a fundamental distinction between modularity and generativity. For them, the goal of modularity is to control or contain complexity and flexibility, while the goal of generativity is to introduce or create variety.

Platforms should provide a certain level of thickness (Roth (2008)): to function well, they need to attract a sufficient proportion of participants to interact with one another. A critical mass of contributors/members is necessary to ensure a sufficient level of indirect network externality. Once the critical mass is gathered, snow ball effect may occur and the number of participants and interactions may grow exponentially. To adapt to the increasing number of participants, a platform must be scalable. Scalability protects the platform against congestion that may arise with the increasing thickness. Platforms need to be open to change and evolve such that to be able to adapt to new market conditions, new context or new technological conditions. Having the ability and the flexibility to evolve is the prerequisite for agility and staying power (Cusumano (2010)).

Platform creation is the strategic answer to market failures or markets dysfunctions (see chapter 2). Such dysfunctions can arise from information asymmetries, the inabilities of economic agents to interact efficiently, inadequate business models, lack of knowledge and information circulation, low speed of information circulation, strategic counter-productive behaviors of some firms (patents on the shelf, predation, etc.). These entail losses of mutually profitable interactions between economic agents: the market looses opportunities of development in terms of exchanges (business development), but also in terms of innovation (technology development). Successful platform leaders are able to identify opportunities of development and tackle these market failures by implementing a business

model founded on market functions.

The Two Dimensions of Firm/Market Equivalency

Firm/market equivalency usually exhibits two interrelated dimensions: innovation or technology development and business development or technology commercialization. This distinction is quite common in the field of innovation studies, from first generation innovation models up to current models of innovation, such as open innovation. Indeed, innovative new products or services will not yield value unless they are commercialized and this commercialization requires a close coupling of the developer of the new technology to the user (Teece (1992)). Commercially successful innovations require connecting scientific, engineering, entrepreneurial and managerial skills with an intimate understanding of consumer needs. These coupling and feedback mechanisms must operate quickly and efficiently to ensure commercial success of innovation. Figure 4.1 presents the ideal-type of structure of firm/market equivalency model.

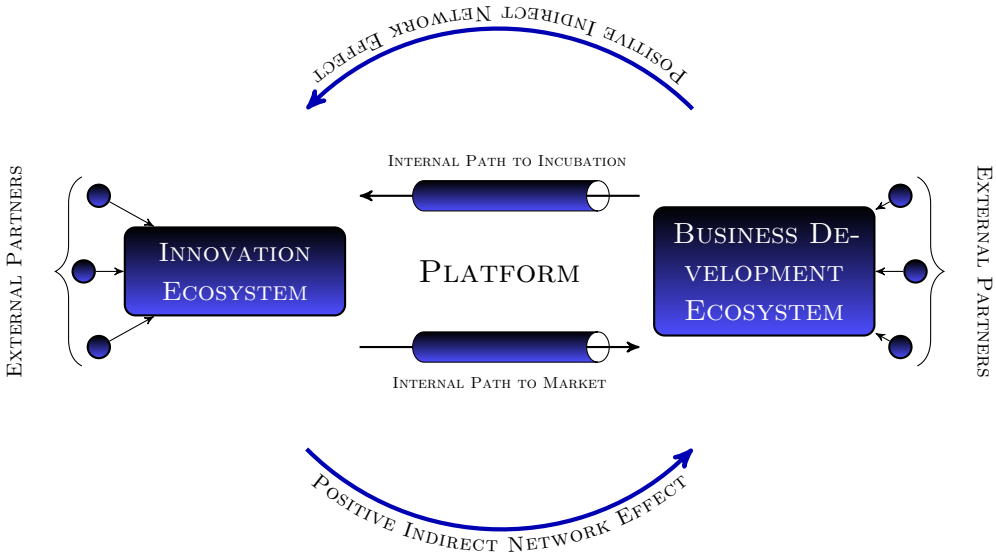


Figure 4.1: The Two Dimensions of Firm/Market Equivalency

The right-hand side of the diagram represents the business development

ecosystem (BDE). The BDE gives access to the final consumers and is the commercialization part of the whole system. It is the point of entry of the revenue flows. The BDE process relies on the platform. The platform provides members of the BDE with tools and functionalities to interact with the audience of the platform (consumers or other members). Typical members of the BDE are complementors who enter the system to propose their products and services via the platform (the affiliated merchants of Amazon, the developers selling their Apps through Apple App Store or Google Play). The platform owner, the complementors and the consumers interact on the platform and create indirect network effects: the more there are consumers, the more there are complementors; the more there are complementors, the more there are consumers.

The platform facilitates these interactions by implementing good market conditions: secured transactions, monitoring of products and services proposed, quality certification if necessary, easy access to the platform for complementors (with different level of commitment). The indirect externalities profit the platform owner by enhancing the value of the platform, externally by attracting new participants, and internally by reinforcing the loyalty of participants. Members of the BDE mainly come from outside the system, but they can also come from the other side of the platform: the innovation ecosystem (IE).

The left-hand side of the diagram (see figure 4.1) represents the IE. The IE can be implemented by a collective or an open innovation process (Chesbrough (2003)). On the IE side the platform owner opens part of its knowledge, resources, and skills to the participants. The IE side works like an incubator. The path to the market for innovations, ideas or concepts developed within the IE side is tunnelled through the platform. This tunnelling process can take different shapes:

Connect & Develop: new products or services are developed internally and brought to the BDE by the platform owner;

Connect & Support: the platform owner offers various tools to support innovators in testing and experimenting their novelties on the BDE

side;

Connect & Standardize: the platform owner develops the idea or the concept and creates a standardized functionality on the platform;

Connect & Externalize: if the concept or the idea does not fit with the whole system, the platform owner helps organize its outflow.

The members of the IE come either from outside the system or from the BDE. The members coming from the BDE are brought to the IE by the platform owner. Hence, the platform owner should also scout its BDE for potential ideas of development that can be incubated. The whole functioning creates a positive indirect effect between the BDE side and the IE side, which reinforces the robustness and the coherence of the whole system. If the BDE grows, then new ideas will benefit from a larger audience: this will attract more innovators on the IE side. Conversely, if the IE side grows and provides the system with lots of innovations, then this will attract more consumers on the BDE side and, in turn, more complementors. The platform is then a multi-dimensional artefact that creates positive externalities not only within the BDE and the IE, but also between these two ecosystems.

Platforms are a very complex architecture of collaboration. Both the BDE and the IE require the ability to manage interactions between numerous members of relatively small size. These small actors, also referred to as niche players (Iansiti and Levien (2004)), are the main drivers of the ecosystem, bringing agility, creativity and diversity. They are usually highly specialized to ensure their survival and their differentiation. They often use an avoidance strategy by creating new business opportunities. Their choice to join a particular platform depends on the nature and the availability of the resources hosted on it.

II The Business Ecosystem Life Cycle

The nature of the links between the platform owner and the members, the intensity of interactions, the attractiveness of the platform, the architecture of the platform and even the strategy of the members vary according to the stage of evolution of the system. Our analysis uses the four-stages business ecosystem life cycle developed by Moore (1993); it is depicted in figure 4.2.

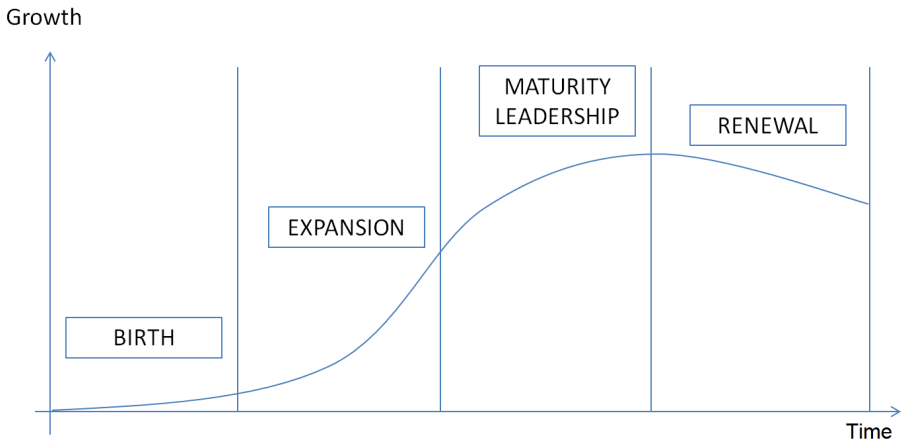


Figure 4.2: The Business Ecosystem Life Cycle (Moore (1993))

Stage 1 corresponds to the birth of the firm/market equivalency system. It is by nature an entrepreneurial stage. Everything has to be imagined and put in place. The entrepreneur can be either a small or a big company that wants to engage in side competition by projecting its system to another industry. Some of the prominent examples of so doing are Microsoft's side entry into the console manufacturing sector and Apple's invasion of the smartphone industry. It is without doubt that platform strategies are easier to implement for dominant actors who amassed huge market power, especially if these actors already operate platforms and have developed the associated capabilities. However, we believe that the main questions to be addressed do not necessarily depend on the entrepreneurs' identity or brand and their current position. The size and power of the entrepreneur are significant only in terms of easing and speeding up the process of

implementation of their system.

In stage 2 the platform expands either through its BDE or IE. Basically, this stage is about attracting outsiders within the system and reaching a critical mass. The expansion phase is crucial: failure to reach the critical mass will inevitably result in the collapse of the entire system. The choice of whether to develop the BDE or the IE first depends on which of the two is the main driver/attractor on the market: innovations or transactions? At the end of stage 2, the chosen subsystem, whether it is IE or BDE, is developed and the interactions begin to grow exponentially.

In stage 3 the platform toils to reach maturity and full leadership by striving to fully develop its second dimension. External partners are also developing; during this stage they may wish to implement their own strategies. Some partners may have reached their critical size. The firm/market equivalency system may exhibit internal clusters built around particular partners. Some partners may start to multi-home: develop their business on other competing platforms; as the result, value flows out of the system.

In stage 4 the firm/market equivalency system begins to shrink, if no preventative measures are taken. Multi-homing may be a rule, creating huge outflows of value, skills, competences and capabilities. Some multi-homers may even quit the system.

Birth

At this early stage of evolution, the platform that will serve the potential business opportunities may not exist yet. The main objective of the platform owner is to identify conditions that may support the creation of a new value proposition that will profit multiple groups of partners. As described in chapter 2, platform strategies and firm market equivalency emerge in a context of market failures leading to losses of business or innovation opportunities. The value proposition should be designed in such a way that it will solve these market failures. Exploration capabilities

that enable firms to scout the environment and identify opportunities are essential. At this stage, the value proposition is not necessarily two-sided. Hence, firm/market equivalency does not automatically appear at this early stage of the system development. Table 4.1 shows some well-known examples.

Firms	Amazon	eBay	Lawson	Apple
Market Failures	The brick and mortar bookshops do not offer enough titles	Second-hand products are not easy to sell since the supply cannot reach a sufficient demand	People in Japan make an extensive use of cash instead of electronic payments. This entails huge costs for the payment of bills	The mobile Internet is locked by mobile network operators
Value Proposition	Offering a large amount of titles and helping the consumers to discover their preferences (long tail strategy)	Offering a market place where people can sell their items in a secured transaction environment, while being able to assess the quality of members one is interacting with	Offering to the customers the convenience of paying their bills in cash at the shop's counter. Offering to billers to collect the bill payments in cash and to wire it to billers electronically	Creating a device that is able to provide customers with ubiquitous Internet
Two-Sided Value Proposition	No	Yes	Yes	No

Table 4.1: Market Failures and Value Proposition

In a two-sided context, the platform supports a firm/market equivalency strategy. The platform owner should identify the community that will bring the biggest flows of externalities and consequently which subsystem to develop first: IE or BDE. This problem raises the chicken and egg dilemma. When indirect network externalities exist, the participation on one side depends upon the participation on the other side. As a result, some questions arise: how to attract one side without developing the other? Who should be embarked first? Buyers or sellers (eBay)? Customers or billers (Lawson)?

The case of Lawson is quite straightforward: the customers are already

on board since they use the convenience store for shopping purposes. Hence, billers should have had an incentive to participate. Lawson first identified new partners (electricity and gas companies) who may be interested by Lawson's customer base and its geographical presence all over Japan. Partners were attracted not only by the value proposition: the lower cost of billing, but by the reputation and by the number of daily active customers as well; the customer volume amounts to nearly nine million customers that shop at Lawson locations in a single day. Lawson clearly chose to first open and develop a collective space of exchanges and interactions in its BDE. Lawson proposed to its partners to first experiment and test the concept of paying bills through Lawson. Experimenting gave feedback on how to improve the system and how to properly scale it (Loilier and Malherbe (2013)). When experiments and tests were conclusive, Lawson launched the new partnerships. The possibility of experimenting and testing the system is a key factor of participation. As the Lawson case shows, projecting your existing system onto the unknown space of opportunities requires pivotal capabilities such as the ability to refocus/shift/reorient a part of your productive system into another strategic space without de-constructing the existing system. This presupposes the need for an existing agility or having the resources to acquire such a capability.

The platform owner should also find a way to motivate potential partners. Partners can be given incentives through proposition of free access to all of the platform's resources or to a subset of such resources. However, it is not as simple as it may sound: attracting an engine community[1] to the platform is not an easy task. The platform owner should find the strategic leverage that will motivate participation; that is, resources or combination of resources coveted by partners, or able to generate externalities and value for the whole system. Strategic leverage can consist of any tangible assets such as user base, functionalities, physical spaces, computing capacities, tool kits, geographical locations, etc., or

[1]The engine community is the community that will create the most externalities.

intangible assets such as patents, SDK, codified knowledge, reputation, trust, economic power, knowledge, etc. The pricing structure of the access to the platform can play an important role (see insert entitled *Elements of Pricing Structure in a Two-Sided Environment*). Subsidizing participation of some key partners may help launch the system: the installed base of partners can finance the entry of new partners.

Elements of Pricing Structure in a Two-Sided Environment

The pricing decision in the context of two-sided markets has been the subject of rigorous, highly mathematical research in economics (see Rysman (2009)). The main lesson of this literature is as follows; not only does the price level matter, but also does the price structure. Pricing decisions rely on underlying costs of serving participants as well as demand conditions on each side and indirect externalities. Correct pricing on different sides of the market can bring participation, stimulate externalities, balance profits and regulate interactions among the participants. Evans and Schmalensee (2007b) identify principles for setting correct prices in such context:

Set separate prices for access and usage. Fees for access and usage perform different functions. The former allows the platform leader to control who gains access to the platform, while the latter regulates triggering of platform usage and the usage volumes;

Set prices to balance the demand on all sides. To ensure thickness and robustness of the market-

place created, there should be enough participants on each side to provide externalities and value to the opposing side. Firm/market equivalency requires that there is a balanced number of participants on each side. The correct balance may facilitate emergence of a snow ball effect pertaining to the growth of the participant base, which in turn ensures the future development of the system;

Price to attract initial participants. To ignite the market, prices can be set to zero on one side. It is not unusual for this to be the case with the side that is bringing the most externalities. Attracting participants can also mean setting a negative price such that to pay new participants that get aboard the platform since they will help make up the initial mass of constituents. Hence, the installed base of partners (or the other side of the platform) can subsidize participation. The reason this kind of subsidy works is because it involves seeking membership of participants that are very valuable for the other side of the platform. Once the critical mass of each side is reached, pricing can change to induce payments from all the participating sides. This pricing strategy is often employed in ICT-related markets and is referred to as freemium pricing;

Price for long term profits. Profits in a firm/market equivalency context should not be evaluated on each side separately but should rather be assessed globally. In the least, one side should bring in sufficient profits to cover negative or zero prices elsewhere.

Maula et al. (2006) identify two distinct processes enabling firms to manage resource allocation in the context of systemic innovation or openness: the foresight process and the shaping process. The former allows companies to draw information about the evolution of technologies and markets. The foresight process also yields insights about the resource allocation decisions of other firms by linking various actors in their environment. It somewhat resembles a smart exploration process as it entails a deep understanding of links and interactions between participants within the system. These authors state:

> ''External contacts formed through research consortia, alliances, and other forms of cooperation provide a way for companies to gain information, to gain understanding and make sense of this new information, and ultimately to provide foresight into emerging new business opportunities''.

The latter process refers to the pro-active way in which the firms influence evolution of technologies (the IE side) and markets (the BDE side) as well as the resource allocation decisions of others within their environment. Shaping process can take place when the actors in the environment are provided with financial incentives:

> ''Focal firms frequently provide financial incentives to customers or suppliers to support a new technology or to develop complementary products or services''.

Such incentives can include sharing firm's proprietary resources, technologies, proving access to information, or participation in standardization processes run by industry associations or standardization organizations.

Key partners can be identified at the very early stage to collectively support the project of a platform. On November 6^{th} 2007, Google led a consortium called Open Handset Alliance (OHA) composed of 47 members. Among these members were HTC, Sony, Dell, Intel, Motorola, Qualcomm, Samsung, LG, T-Mobile and Nvidia. The aim of OHA was to develop an

open source mobile phone operating system based on the Linux kernel; today we know this operating system as *Android*. OHA was established to create a new mobile platform that will compete with the dominant ones: Symbian (Nokia), iOS (Apple), Windows Mobile (Microsoft), Blackberry OS (RIM)). OHA members are contractually forbidden to produce devices that are incompatible with Android. Google used its reputation and position of the industry outsider to create a new IE. In this case, indirect capabilities such as coordination capabilities, relational capabilities like trust, reputation, communication skills, and influence are of great importance.

The platform owner has to identify the resources and capabilities required to build collaboration and to attract participants. This step is crucial since it will guide the firm in its choice of partners, platform structure and platform governance. On one hand, the platform owner should be able to identify its distinctive/core resources and capabilities that will play an essential role in the construction of the platform, and, on the other hand, it should be able to identify the core resources and capabilities it will need to acquire to be able to build the platform. The latter can be implemented by acquisitions (hiring engineers, buying patents or licenses) or through partnership.

In a firm/market equivalency context, the platform is the expression of its owner's distinctive capabilities (especially relational capabilities). Firms create platforms in order to access new resources, but also in order to learn and to be able to take advantage of new knowledge that will aid in development of their own system. Moreover, in a fast-paced environment knowledge is complex and competences are largely dispersed and fragmented, thus the source of competitive advantage and growth relies on a community of partners rather than on a single firm (Fine (1999)). Platforms support all of the following: the coordination, the discovery (exploration and experimentation) and the learning processes (exploitation).

Dynamic capabilities are essential. As per Teece et al. (1997), dynamic

capabilities refer to *''the ability of a firm to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments''*. Dynamic capabilities are also understood as stable collective action models or organizational routines (Eisenhardt and Martin (2000); Zollo and Winter (2002)). They are characterized by the various processes that affect the resources and expertise of the organization including reconfiguration, learning, integration and coordination. Based on the work of Teece (2007), Ridder (2013) has proposed three main types of external dynamic capabilities:

External sensing, also referred to as exploration, is the capability to scan the external environment and strategically select resource renewal paths;

External seizing is the capability to coordinate resource transfer, to integrate external resources within the organization and to apply systematic knowledge management processes;

External reconfiguring is the capability to develop resource cognition and to recombine internal and external resources in order to achieve novel configurations.

In a firm/market equivalency context, to build a robust platform the platform owner needs these three capabilities.

During the birth stage, the platform is a technological support that has to be built. Its main function is the coordination of participants in order to strengthen and develop the value proposition of the whole system. The platform can be seen as a tool of implementation, guidance, governance and control of interactions. The platform owner needs to consider how partners will interact with and within the platform. This involves interface design that will act as a bridge or exchange/trading zone (Kellogg et al. (2006)) between what is done internally and what is entrusted to partners; it will also take part in helping to orchestrate the contributions of these partners. These exchange zones are very important in the emergence stage of inter-organizational innovation ecosystem as they provide a space

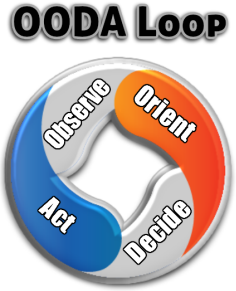
of collaboration between partners (Attour and Peruta (2013)). They are developed through an iterative process of exploration/observation, experimentation, feedback, decisions and reactions. As pointed out by Tiwana (2014), the competitive advantage relies on the speed of the system's evolution: platforms should be able to find continuous flows of temporary competitive advantages. This means that the iterative process (see the insert on *OODA Loop*) implemented on the platform should be fast; ideally, faster than the one of the potential competitors.

The OODA Loop

Colonel John Richard Boyd (1927-1997), a US Air Force fighter pilot and Pentagon consultant conceptualized a decision cycle to achieve success in air-to-air combat. Its main idea is that the key to victory is to make appropriate decisions quicker than your opponent. He assumed that any intelligent entity (individuals or organization) continually interacts with its environment by feedback loops. Boyd divides each loop in four interrelated processes:

Observation: collection of data by means of the senses;

Orientation: the analysis and synthesis of data to develop a mental model of the environment. This phase is the intelligence part of observation and uses the capabilities of the entity in question. It is critical since it will give shape and sense to what is observed. This phase influences the whole process of observation, decision and action. The filtering and analysis processes of information rely heavily on experience, ability to analyse, ability to synthesize information and even culture;



Decision: determination of a course of action based on the previous elements of the loop;

Action: implementation of the decision.
This decision cycle is known as the OODA loop. For Boyd, this is a central mechanism for adaptation and survival. He argues that faster OODA loops provide a competitive advantage over competitors.The concept has been applied to many other contexts such as litigation, business and learning processes.

In a firm/market equivalency context, the platform owner, hence, has to constantly explore and analyse its environment, gather information and take decisions as to whether or not to modify the design of the platform, to improve the level and the quality of interactions, to embark new participants. Any decision will have a feedback effect on the environment of the platform, the behavior of existing participants, and the level of externalities, which in turn will have impact decisions, and so on. The OODA loop concept is applicable in this context. The platform owner iterates such a loop during decision-making process. Table 4.2 shows the links between dynamic capabilities and different phases of the OODA loop.

The construction phase of the platform is of tremendous importance. As Tiwana (2014) pointed out:

> ‘‘A platform’s architecture serves as its DNA - largely irreversible and enduring - that provides a blueprint for the evolutionary trajectories that a platform can and cannot pursue, the types of innovations that do and do not emerge around it, and the vibrancy of its ecosystem.’’

The way the platform is built imposes choices and hence elimination of some opportunities. Said differently, the elaboration of the platform

OODA Process	Capabilities
Observation	External Sensing, Exploration
Orientation	Learning, Analysis, Synthesis
Decision	Foresight, Leadership, Vision, External Seizing
Action	Relational Capability, Experimentation, Exploitation, Coordination, External Reconfiguring
Loop Pace	Agility, Adaptability, Pivotal Capability

Table 4.2: OODA Loop and Dynamic Capabilities in Firm/Market Equivalency Context

entails a particular path for future development (path dependence). The technical design of the platform is obviously a key element. However, the spirit of the platform also plays a role. Platform architecture and governance are deeply interrelated. The governance is the expression of the spirit (intent or mindset) of the platform owner in designing its leadership and its attitude towards members. Architecture, in turn, allows for the implementation of a particular form of governance: a fully open architecture will not work well with tough governance aimed at capturing all of the value in the system. The very same architecture under a different form of governance will yield different results. Conversely, any given architecture is not versatile enough to be able to enable and support all types of governance. Architecture and governance can either work hand-in-hand to reinforce each other, or not. Hence, governance and architecture must be aligned (Tiwana (2014)) and be in resonance to ensure well-functioning of a system. The platform owner must co-design its platform's architecture and governance to ensure their smooth and efficient operation and co-evolution.

To summarize, during the birth stage, the firm/market equivalency system bears the structure of a closed club, open only to certain partners that are hand-picked by the platform owner. Therefore, the system appears to be intentionally closed: entry is discriminatory and under the sole discretion of the owner. This stage of enclosure is inevitable and necessary

as it ensures secrecy of the project and prevents, or at least limits, early imitation. Value creation is the central strategy of the platform owner: it is implemented through a series of explorations, experimentations and tests with the early partners and users.

Expansion

At the beginning of the expansion stage, the platform begins to be acquainted by a happy few: early partners, early adopters, core customers. Technically, the platform is already in place and operates as it normally would. The very objective of the expansion stage is to increase thickness and to reach and maintain a critical mass of participants on one of the subsystems of the platform (IE or BDE). The first key challenge is to identify and to focus on the main driver of the whole system, be it innovation (IE) or exchanges (BDE). Table 4.3 exhibits four examples that illustrate the link between the expansion strategy, value proposition and the main driver of expansion for each of these cases.

To identify which of the subsystems to develop, the firm must first explore the market, analyse the way it functions and come to correct conclusions. All this needs to be done early in the life cycle of the business ecosystem: more specifically, during its birth stage. For Amazon, eBay and Google, developing the BDE side of their respective ecosystems to increase the number of exchanges and transactions that take place was the key success factor in their expansion strategy for at least two reasons. These reasons are as follows:

First, it allowed for economies of scale as it contributed to the increase in the number of interactions. Improving the depth of the platform, that is improving the functionalities and the services provided to existing participants, may also help reinforce economies of scale. In case of eBay, an example of improvement of platform depth was the acquisition of PayPal. Depth strategy attracts new members and at the same time saturates the current needs expressed on the

Firms	Amazon	eBay	Lawson	Apple
Expansion Strategy	Reinforcing economies of scope by finding new partners			Some developers create a system (Cydia) to crack the iPhone and to install new apps. This expresses a need for innovation to allow customization of the phone
Value Proposition	Offering to partners the access to the audience of the Amazon web site and the possibility to sell their own products using the Amazon system	Authorizing the sale and the visibility of new products and brands through eBay	Offering to the customers of the convenience stores a large array of services; offering to patterns to deliver their products or services at Lawson shops	Creating a virtual place (App Store) where developers can develop and propose their apps to the iPhone owners
Main Driver	BDE	BDE	BDE	IE

Table 4.3: The Main Drivers in the Expansion Stage

platform by all of the participants. Hence, depth also entails higher switching costs on participants, which results in platform having the participants that are more loyal. Switching costs are reinforced by the effects of learning and experience: the participants learn to use the platform, familiarize themselves with it, seize it and get accustomed to it. The platform owner can develop functionalities that aim to deepen the effects of learning and experience. Some examples of such functionalities are: enabling customers to write recommendations and read recommendations of others, creating a system to rate interactions that take place among the platform participants, controlling the quality in a centralized manner, providing search engines, facilitating a user friendly access to the platform, etc.;

Second, it triggered the economies of scope as it brought new partners on board. Naturally, new partners brought along new products and services. This strategic move is often referred to as breadth strategy:

> attracting more sides and groups of participants to join the platform. Breadth also entails switching costs. It does so by creating new needs or exchange opportunities and fulfilling them. Underlying economies of scope and breadth are meant to make the platform multi-sided or to further improve on its existing multi-sidedness.

Hence, during the expansion stage all platforms become two- or multi-sided.

Depth and breadth increase platform's thickness. Moreover, if strategically developed, well-developed depth and breadth of a platform can dissuade or even impede the competing platforms to enter the market. Depth coupled with breadth locks most of the economic space that may be available to competitors. They raise barriers to entry through switching costs, technological lock-in of the members, heavy investments in infrastructure, second-mover disadvantage, and make the strategic space created on the platform nearly entirely non-contestable. This may eventually push the competitors to go with head-to-head competition or to make a side-entry into the system.

Today, Apple's App Store looks like a hybrid system that blends the two paths to market: innovation and business development. However, at its launch in 2008, the App Store was created to allow the developers to propose new software (innovation) for the iPhone. Hence, it was conceived as an IE with an interface to iPhone users. This allowed the developers to launch new applications quickly, to test early versions of their developments on end users, to get feedback from early adopters, and to improve, update, modify and remove any software bugs in a timely fashion. Such mechanisms benefited the entire system, thus strengthening innovation flows. Moreover, it was quick to attract new developers, who, in turn, attracted more users, and so on, igniting network effects. The App Store generates positive feedback (indirect network externalities) between developers (innovators) and users.

Expansion of the platform translates into the need to manage a complex network of partners, who differ in size, business models, level of commit-

ment to the platform, measure of loyalty to the platform, their activity on the platform, etc. From this point of view, this kind of network cannot be centrally managed. Hence, expansion of a platform requires a form of *laissez faire*. To reiterate, it raises the question of the degree of openness of the system. The platform owner has to exercise less control with respect to the identity of members such that to facilitate speed and fluidity of entry. Contracts with members should be standardized and follow a *take it or leave it* rule: potential participants can either accept the terms of the contract or not. Since the contract terms are non-negotiable[1], only those who agree with the terms and conditions are welcomed aboard. Contracts are automated and most of the time are online. Contracts can be created in such a way as to provide potential participants with different level of commitment or involvement in the system. This menu of contracts provides different levels of access, which are often associated with the usage of the specific resources that are available on the platform. Participants can choose any given level of contract to start with and either upgrade or downgrade it as they feel the need for so doing. Affiliated merchants program of Amazon is one example of such customizable contracts between members and the platform. Every potential participant is given equal opportunity to either participate the platform or to decline participation: hence, access to the platform becomes non-discriminatory. These contracts also include clauses on pricing and billing and hence establish the legal foundations for value capture in a standardized non-discriminatory way.

For the firm/market equivalency model to be able to expand, the platform design and architecture should evolve. Entry on the platform should be fast, easy, and quasi-automatic. All knowledge on the platform, whether shared or new, has to be fully explicit (API, SDK) so that to ensure a high level of circulation and diffusion of information and knowledge sharing within the system: the faster the circulation, the better and the more fruitful are the interactions among participants. The design of

[1]At this stage, it is probably beyond the scope of possibilities to be able to manage contract negotiations on individual basis.

the innovation process (IE) must integrate the changing characteristics of innovation activities. Knowledge and external actors now play an important role in the process. In this context, boundary objects such as SDKs or APIs (Carlile (2002, 2004)) play an important role.

However, as the thickness improves, it may trigger congestion. The platform then must maintain the fluidity and quality of exchanges, transactions, and information and knowledge sharing. The underlying infrastructure should then be highly scalable in order to adapt quickly and efficiently to the growing number of interactions (traffic). For the platform owner, being able to anticipate the level of traffic is an essential capability for being able to properly and cost-efficiently scale the platform. An underestimation of the traffic volume may create congestion and decrease the customer experience; this may happen since the quality of interactions would appear to diminish, thus jeopardizing platform's further expansion. Conversely, overestimation of the traffic volume may the costs up for the platform, hence putting financial pressure on the owner or focal organization. Moreover, it would waste financial resources that may have been allocated towards other uses: for instance, to improve advertising, communication or control.

To facilitate the entry and to ensure a minimal level of depth, the platform owner must enrich the platform with standardized secondary functions. This can be done via two different approaches: either the platform owner creates these functions by itself (i.e. one-click payment on Amazon), ot it acquires them through the BDE (PayPal on eBay, Alexia on Amazon). The latter has to be done with caution, since it may induce uncontrolled effects that can neutralize indirect positive externalities and value creation in the BDE.

During the expansion stage, hence, the platform becomes open, encouraging niche players to enter the system (Iansiti and Levien (2004)). Niche players are small, specialized players, aiming to complement the products and services provided by the platform. They are very agile players who are able to quickly reallocate resources from one project to another. As

strategic players fighting for their survival, they may affect the shape and the functioning of the platform, whether intentionally or not. They actively participate in the expansion of the platform by enlarging the pool of participants, and hence improving the number of possible interactions within the platform. Their ability to explore new business models nurtures the development of the system (Doz and Kosonen (2010)). They push the frontier of the firm/market equivalency system outwards. Niche players are diverse: they can be individuals, start-ups, communities of developers, established firms from adjacent markets (side-players), competitors, spin-offs, etc. Some of them join the platform in order to explore business opportunities and experiment. For instance, these participants can try to create new distribution channels for their products, experiment with new services and test new business models. Others enter the platform to gain knowledge about how the platform functions in order to develop one of their own.

Based on the above, the platform owner should not think of niche players as of passive elements of its platform. Neither are they parts of a huge productive system. Niche players are strategic players. Most of them act cooperatively and participate in ensuring survival and improving the resilience of the system. However, some of them may behave opportunistically to quickly gather huge profits thus jeopardizing the functioning of the platform (e.g. crash of the video game industry in 1984). Therefore, the platform owner has to develop monitoring capabilities to closely scrutinize the participants and to be able to react appropriately to any misconduct within the platform. A system of control and governance is hence required to support and to secure the leadership of the platform owner. Nevertheless, perfect control is not achievable, especially in an exponentially-growing system. Platforms need to be resilient; quoting Tiwana (2014):

> ‘‘The resilience of the platform is its capacity to function acceptably in the event of a failure elsewhere within or outside the ecosystem.’’

Resilience gives the platform the capacity to overcome crisis due to external or internal shocks (from such events as a shut down of some of the servers to opportunistic behaviors). Obviously, resilience is driven by governance and control mechanisms and the way these processes are implemented through the platform architecture.

As Evans et al. (2006) pointed out, when a platform-based ecosystem grows, the platform relies more and more on other subsystems created or controlled by the participants. Such interdependencies decrease the platform flexibility and the control of the owner. This induces lower resilience of the whole system. Ensuring resilience is challenging in the expansion stage. The growth of the system implies a greater complexity of the network of interdependencies between participants and the platform. The effect of a failure in the system is highly unpredictable and hardly assessable: a small failure can entail complete collapse of the system (butterfly effect).

To summarize, during the expansion stage the firm/market equivalency system has a structure of an open club with non-discriminatory membership. Therefore, the system appears to be intentionally open. This opening increases the number of participants and deepens the complexity of the networks of interactions. Governance and control play a crucial role in the monitoring of the system. Value creation is still central to ensure the thickness of the platform. Value capture becomes primordial notably to maintain the level of investments in the infrastructure. The role of the platform owner shifts from project manager, as it was during the birth stage, to conductor of a complex network of interactions and interdependencies. Dynamic and relational capabilities are still important, but are not distinctive any more: any platform owner, who is in the expansion stage, possesses these capacities. The firm/market equivalency system will need guidance and direction of development to survive and last long. This implies capacities of leadership in a complex environment and the ability to correctly assess the impacts of central decisions on the system. The platform owner really becomes the central player of its

system: more than just the owner, it transforms into a leader.

Leadership

By the time the platform has reached the leadership stage, it has already amassed the critical number of participants and is supporting a wide, complex network of interactions among its members. The growth eventually starts to decelerate. As the number of participants increases, the influence of the platform owner on its system withers. The platform owner's main objectives becomes maintaining leadership and sustaining growth. There are several different paths for implementing these objectives. These paths are elaborated on in table 4.4.

Firms	Amazon	eBay	Lawson	Apple
Leadership Goals	Sustaining growth and leadership through the creation of an IE and new services		Sustaining growth by fully developing depth and breadth of the BDE	Sustaining growth through technological and functional evolution of the platform
Leadership Strategy	Developing IE (open source platform) by introducing API and SDK; Developing ubiquity (M-Commerce); Developing new services to other firms: (e-commerce technologies, cloud computing, etc.)	(e-commerce technologies, CRM, Marketing solutions, etc.)	Increasing the number of shops; Leveraging the platform to better understand customer mindset; Creating new products in line with customers mindset	Implementing evolution of iOS to allow for more developments; Implementing evolution of the devices; Transforming App Store (IE) into a IE-BDE
Firm/market Equivalency System	BDE+IE	BDE+IE	BDE	BDE+IE

Table 4.4: Leadership Strategy

Lawson pursues a rather traditional growth strategy by fully developing depth and breadth of its BDE. The innovation is kept internally with a mere Connect and Develop strategy that relies on a deep understanding of the customers' mindset, habits and culture. Lawson operates a system that is able to conduct a sophisticated analysis of its customers. The interactions with customers are evaluated from the standpoint of sales,

location, number of contacts, age, etc. Such analysis helps Lawson to come up with new products, services, partnerships and new ways to improve its reputation. The entire strategy is summarized by their motto: *''Creating happiness and harmony in our community''*. To overcome their competition, Lawson focuses on geographical competition opening more than 500 new shops annually, commitment to the community in the form of sustainable development, green projects, health conscious food products, home convenience services, etc., and partnerships to reinforce platform's value. It maintains its leadership thanks to a strategy that goes hand-in-hand with the customers' needs and vision.

Amazon and eBay have followed similar strategies that involved enhancing their systems through creation of an IE. An IE is understood here as an open source platform that provides developers and partners an access to tools like APIs and SDKs. These tools are then used to develop software and solutions for e-commerce the purpose of which is to improve the operations on the platform. eBay focused on the development of the mobile app market (m-commerce). As of 2013, there are more than $1,8$ million active users of its API and SDK in the IE of eBay. Once the BDE is created, development of the IE during the leadership stage helps maintain the flow of innovations and ensures value creation, diversity and agility of the system. It also attracts new players with new ideas and new business models. By supporting an IE and a BDE, the platform is reinforced and fully establishes its central role in the system. As shown in the figure 4.1, there is a positive ripple effect between IE and BDE: innovations on the IE side induce more products, services and functionalities on the platform, which attracts more members to the BDE side. As a result, the increase of the audience in the BDE attracts more innovators to the IE. To benefit from this effect, the platform owner has to create bridges between the IE and BDE, such that interchange occurs in both directions. This ensures a path to the market for innovators in the IE (or even innovators from outside of the system) and a path to incubation for participants in the BDE. In other words, by creating bridges between the two sides of the ecosystem, i.e. between the IE and BDE, the platform ensures

the cross-flow between the two sides: the innovators are able to enter the BDE, while the participants of the BDE are able to cross over to IE if they need to incubate their ideas. The path from the IE to the BDE allows for experimentation and tests via the platform. Innovators may also come from the BDE. The platform owner must be able to identify these innovators by building exchange zones with the IE. It can take the form of boundary objects (API, SDK), innovation contests, business model competitions, App challenges, and so on. Communicating on such tools is essential.

In the case of Apple, the IE evolved progressively in its functions towards operating as a BDE. The IE and the BDE overlap: the App Store is a place for innovators but also a place for merchants (e.g. to sell games), who can work and exchange with the developers. Today, these two sides are difficult to distinguish at a first glance. By coupling a BDE and an IE through strategic tunnelling, the platform owner reinforces its control over the system and its main flows: innovations and revenue. By doing so, the platform owner acquires the ability to accurately assess the state of both: the financial and creative health of the participants as well as their evolution. This translates into a strategic advantage for the platform owner over the participants and competing systems.

Needless to emphasise that a firm/market equivalency system is evolving in an environment, which is nowhere near static: both the insiders and outsiders are strategic players. It is likely that the competitors may become attracted by the success of a platform. They would then enter the market and seek business opportunities they can exploit. Some leaders from the adjacent markets can leverage their own platforms such that they can make a swift and fierce entry into an attractive side-market. One recent, yet prominent example of such is Microsoft's side entry into the game console market, another example is the entry of Apple into the mobile device market. Entry of powerful players from adjacent markets may cause the shift in routines, change in the dominant logic (Bettis and Prahalad (1995)), relationships, architecture and even the leadership in

the market (see chapter 2). Hence, side-competition is one of the greatest threats to a platform which is in the leadership stage of its life cycle. Again, dynamic capabilities - and especially scouting of adjacent markets - are essential and irreplaceable if a platform leader was to anticipate movements of potential competitors.

Participants in a firm/market equivalency system evolve. They strive for their survival and fight for their success. Some of them are able to attract other participants and to create subsystems of innovation or business development around their own products, services, developments or even around their own platforms. These subsystems rely on the resources of the central platform. They can develop their own resources to subsequently share within their own subsystem. The firm/market equivalency system starts to cluster on both sides: IE and BDE. The proverbial *grapes* of interdependent innovations, developments, interactions, services and products grow here and there within the system. The resulting clusters no longer appear to be networks that are centred on the platform of the founding firm. Constellations (nodes and conglomerates) of innovation, services and products are now structuring it.

Clustering does not pose a problem per se. Clusters may occur in any growing complex system of interactions. Clustering implies that a part of the system's survival relies not only on the founder's platform, but also on other relatively important participants. Such players share the fate of the whole system. Hence, most of them will not attempt to exert an adverse effect on the parent system. Just like the platform founder, they too fight for the development and survival of the whole system: they act cooperatively by supporting a part of the system on their own. The platform owner cannot act against clustering. Doing so will put in jeopardy the dynamics of the entire system. Clustering is the consequence of expansion. Clusters support many *grapes* of innovation and business development; the platform owner may be unable to support them on its own. Impeding the cluster development leads to a slower expansion of the system and weakens it as a result. Instead, the platform owner should

use the clusters strategically and integrate them in the governance and control system. These institutional mechanisms should be adapted to take into account the clusters as units of control and governance. From this point of view, clusters impose decentralization and delegation of power within the system.

However, some players may wish to go further than clustering. They may develop their own system beyond the boundary of the current firm/market equivalency system: they may multi-home. Multi-homing refers to the situation in which some members of the system participate in competing systems. They do so to secure a larger audience for their products and services. For instance, in the Apps industry developers often use freemium business models in order to gain numerous audience. Thus, multi-homing is a prerequisite for development. Multi-homing has several negative consequences on the system. If a participant choses to multi-home, its economic activity (products, developments, services) on the original platform is no longer distinctive for this platform. As a result, commoditization occurs and the relationship between the platform owner and such player change drastically. Commodities that are created in this fashion are not of benefit to any one system; rather they tend to benefit solely their owner. A commodity is not distinctive; it is rather a *must have*, that is needed to remain competitive. Can one imagine an App Store without social games like *Clash of Clans* or *Candy Crush*, while these games are available elsewhere? When possible (for instance, when a commodity is a functionality of a platform), the platform owner can envelop the commodity and standardize it (Isckia (2009)).

This envelopment strategy (Eisenmann et al. (2011)) appears possible only when the commodity is economically and strategically sufficiently closed to the platform and when it will not imply the collapse of a significant part of the system. Again, no one can envision a situation in which all games are enveloped on the main platform. Whatever the strategy of the platform owner, multi-homing means outflows and destruction of value and innovation in its system. Multi-homing helps participants to

appropriate the value they create and gain economic power both inside and outside the system. In a sense, multi-homing induces contestability of control and governance by the platform owner. Doing so, multi-homers increase the competitive pressure between platforms. As a vector of competition, they appear to be a threat.

In summary, during the leadership stage, the firm/market equivalency system is still structured as an open club with non-discriminatory membership. However, as clusters appear, they may privatise part of the knowledge, making it dedicated to the clusters. Some parts of the system can even become fully closed. Along with the emergence of clusters there also emerge multi-homing strategies and competitive pressure. Multi-homing implies frictions within the system as multi-homers no longer act cooperatively: the platform is just one of their delivery channels and their fate no longer relies on any one platform. At this stage, attracting and retaining participants is crucial in order to maintain the platform's competitiveness. The platform owner should fully embrace its role as a leader; it needs to provide the participants with vision and guidance for future developments.

Renewal

During the renewal stage the platform owner must take preventative action to preserve and renew the firm/market equivalency system. If nothing is done, the firm/market equivalency system will slowly decay. Some players, including the ones that participated in building clusters, will stop investing in the system, leave it, or develop their own system by separating their cluster from the rest of the system. Some other players may simply disappear. It may be tempting for the platform owner to use a value dominator strategy (Iansiti and Levien (2004)) and to drain the entire value that is remaining in the system, hence accelerating the process of decay. To avoid this, the platform has to embrace a new cycle of development. The renewal stage is the premises of this cycle and much resembles the *rebirth* stage. However, in contrast with the

birth stage of the business ecosystem life cycle, during the renewal stage the platform owner can rely on its fully functional system. Table 4.5 illustrates some examples of renewal strategies as exhibited by the four renowned platforms we have addressed earlier.

Firms	Amazon	eBay	Lawson	Apple
Renewal Strategies	Finding new ways to deliver products (drone); Creating new devices (FireTV)	Becoming a *ubiquitous digital wallet* for consumers and merchants	Creating Lawson Mart (next-generation convenience store)	Working on new devices, new screen and new design
With Partners	Yes	Yes	No	Yes

Table 4.5: Renewal Strategies

The main challenge at this stage is to avoid the disintegration of the interactions forged during the previous stages: renewal is essential to ensure survival of the system. In the renewal stage, the ecosystem becomes mature. Large parts of it are now stabilized (for instance, Amazon as an online store) delivering comfortable flows of revenue and profits. Renewal stage relies on the leader's capabilities to leverage its own platform to find new paths of development and to project its platform into new markets (pivotal capabilities).

The process of leveraging a platform can manifest itself in a number of ways. Amazon chooses to enter the entertainment market by creating a new line of products and services, among which are the Fire TV and Amazon Game Studios. Fire TV is a small box that connects to HDTV; it allows the user to access a massive selection of TV series and shows, songs and games. The Fire TV has been built around partners like Netflix, Hulu Plus, VEVO and WatchESPN, that specialize in content diffusion. In addition, Amazon entered the game development market by launching Amazon Game Studios and its first game, Sev Zero, running on Fire tablets and Fire TV. These two moves prepare for the release of a 3D smartphone in the summer of 2014 and the entry of Amazon into the mobile device market. eBay follows a more classical renewal strategy by focusing its efforts on one part of its system: payment

services. eBay is working on developing PayPal into a ubiquitous digital portfolio for all consumers and merchants in partnership with financial institutions around the world. PayPal expands way beyond eBay system's boundaries. In parallel, eBay improves the PayPal payments network by providing a credit product called *Bill Me Later*. When a consumer uses *Bill Me Later*, a chartered financial institution extends credit to the consumer and advances funds to the merchant. The service relies on a bank or any licensed lender to issue the credit. eBay retains most of the receivables and is responsible for servicing functions related to the customer account. Lawson decides to renew its system by creating a new concept of shops that combine the functions of a convenience store and of a supermarket: Lawson Mart. These new shops will offer the services of a convenience store (embarking the whole original system), but will also offer wider product variety. Apple follows its usual strategy of embarking its whole system in the renewal of the hardware: new screen, new devices, new design and functionalities. In the renewal stage, platform owner's dynamic capabilities are essential to identify and create new opportunities for development. The renewal stage also depends on the vision provided by the leader during the leadership stage.

The renewal stage is in essence a phase of ideation and exploration. The first challenge is to retain the participants, especially the innovators, in the system by motivating them with new ideas and challenges. The platform owner should capitalize on existing knowledge and relationships to foster the emergence of new ideas around its vision. The platform owner should break the strategic rigidities created in the expansion stage and gain agility during this process to be able to pivot easily.

As in the birth stage, the platform owner needs to identify and gather the key partners, whether from within or from outside the ecosystem, who will support new projects. This relational strategy can be used to maintain important clusters in the system: the cluster holder can become a first-tier partner. Exclusivity contracts can help to seal the relationships. Then, the leader can implement the new structure in the

system: platform of platform (PoP). The original platform can run as a host for other platforms supporting a constellation of clusters or smallest platforms: clusters will then be able to develop on their own. Being independent entities, these clusters can be used to explore new business opportunities without jeopardizing the stability of the whole system. In this critical phase of renewal, clusters may reinforce the resilience of the system. However, this means rethinking the role of the original platform as well as its the governance and control mechanisms that are in place. Not all ideas and projects may lead to major developments. As a leader, the platform owner has to choose the best options to develop in the system and reallocate the resources accordingly.

To summarize, during the renewal stage, the leader leverages its platform to enter new development paths. The firm/market equivalency system changes its structure and becomes mainly an open club with non-discriminatory access, but it now contains within it some private clubs, or clusters of development, that are managed by the platform leader. The platform's future development is embedded in these innovative clusters.

III Conclusion

This chapter described an ideal-type of firm/market equivalency dynamics, relying on the evolutionary view of the platform development. As such, it does not perfectly match the reality. This evolutionary model is in line with the literature and is in its essence theoretical. Hence, it is a theoretical artefact. In the real world platforms support multiple economic activities, each of which grows and develops at its own pace. Therefore, at any given time, different segments of the firm/market equivalency system are - or may be - in different stages of the business ecosystem life cycle. That is, whenever one part of a firm/market equivalency system is in the expansion phase, another may be in the birth phase and so on. Moreover, stages of development may overlap. For instance, the renewal stage can start as early as the expansion stage since some projects may

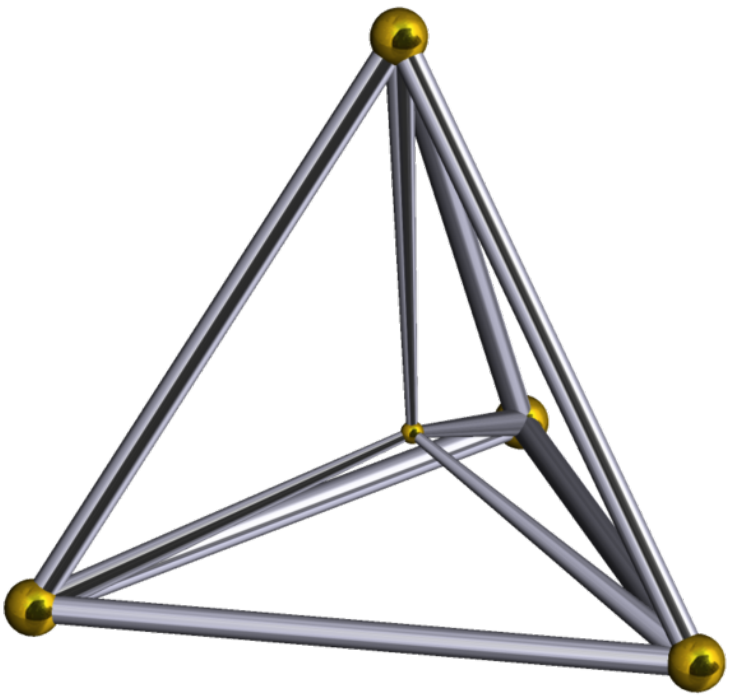
take years to emerge. This is a consequence of the continuous flow of innovation that nurtures the ecosystem. All this reinforces the complexity of such systems and their analysis, hence calling for modeling.

Our model provides clear insights about the dynamics of firm/market equivalency and offers a useful grid of analysis of the different stages of development that link platform strategy, platform design (including the mechanisms of governance) and knowledge management. Managing these various dimensions coherently is tricky, since the scope of strategy in these cases is much wider than for traditional firms such as merchants. Platform owners have to shape their platform's architecture, control mechanisms, value creation mechanisms and the associated knowledge management processes in a coherent and dynamic fashion throughout the span of the platform's development in order to nurture systemic innovation and interactions. Strategizing in such a context means that these mechanisms are designed so that they can handle the tensions between the various ago-antagonistic dimensions of firm/market equivalency systems: control/generativity, open/closed, individual/collective. This orchestration process is the cornerstone of platform leadership in network-centric innovation. Ago-antagonist systems rely both on antagonism, that is the opposition of two forces acting on a common receptor (the platform), and agonism, that is their cooperation. The platform owner has to balance these forces and manage this delicate balance that emerges. This process of balancing is central, since it influences the flexibility and the evolution of the system.

The key element of our analysis is the study of all players: both the leader and its partners. It gives an interactive view of the dynamics of co-evolution in firm/market equivalency system. Everything starts with a wannabe leader who creates an adaptable system, which, with the strategic intent of its leader, is able to evolve, whereas part of this evolution is also attributed to the reaction to strategic moves of other players. Taking into account the second level of interactions, that is the influence of partners on the architecture of the system, is an essential capacity. At

every stage of development the leader has to think strategically and to consider the implications of its decision on the system as a whole, as well as the counter-effects created by the strategic moves of other players. The leader should simultaneously be a conductor, guiding the development of its system, and a chess player, considering the reactions of others in its decision process. As the system develops, its complexity increases. This pushes the system to evolve from a centred network into a decentralized structure of platform of platforms (PoP).

Conclusions: Some Antitrust Issues Pertaining to Firm/Market Equivalency



Introduction

Platform-based systems and, more specifically, firm/market equivalency, received growing attention in the economics and management literature throughout the past decade. The academic work on this subject is still at its dawn and many important questions remain unanswered. The literature shows that most of the results of the one-sided models of industrial economics do not apply to platform-based systems. As pointed out earlier, the best example involves price.

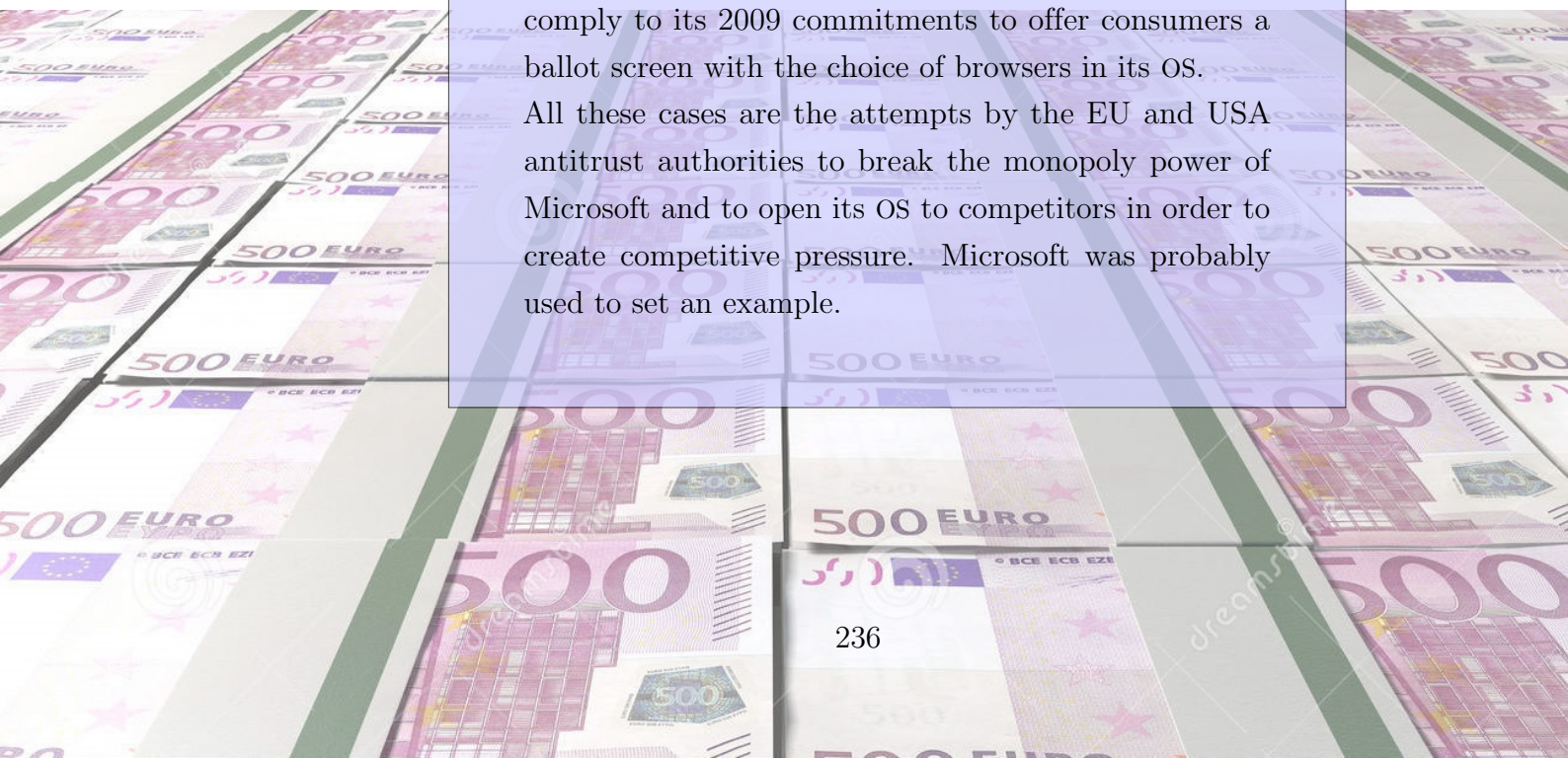
The researchers in the fields of economics and management sciences have recently identified the new kind of businesses. Today, platform-based architecture of firms plays the central role in many important industries: payment systems, Internet-based sectors, media, retail, etc. This strategy has always existed, although it may have had a different appearance. In antiquity it had the form of the fora, and more recently it was seen in form of estate agents, clubs and so on. All these are the low-tech examples of this phenomenon. However, today it has created worldwide giants that are able to control huge segments of industries. Such a supremacy is worrisome for consumers, competitors and, of course, antitrust authorities. Even if dominance or transitory monopolization is not forbidden per se, the economic power and the influence of these giants (such as Google, Microsoft, Apple, Amazon, etc.) create tensions and distrust. Therefore, antitrust authorities in USA and in Europe have paid considerable attention to some of these large firms (in particular, Google, Apple and Microsoft) and even severely fined them (see the insert entitled *The Microsoft Case: Opening Up the System*).

The main specificity of firm/market equivalency is the intermediary/ market function that solves market failures: the core of the business model relies on the effectiveness of transactions/exchanges between different groups of economic agents as well as on the network externalities that are created as a result. This specificity adds complexity at all levels of observation of the phenomenon from case study to economic models, from

The Microsoft Case: Opening Up the System

The U.S. antitrust agency became interested in Microsoft in 1991 with an inquiry by the Federal Trade Commission over whether or not Microsoft was abusing its monopoly on the personal computer (PC) OS market. In 1993, Novell claimed that Microsoft was blocking its competitors through anti-competitive practices. At the time, Microsoft's standard agreements for licensing software to PC manufacturers required payment of royalties based on the number of computers shipped, regardless of whether or not the computers had Microsoft's OS pre-installed to them. The inquiry and the claim created a series of investigations in USA and in Europe. On the 15^{th} of July, 1994, Microsoft agreed to a consent decree in which the company committed not to tie other Microsoft products to the sale of Windows. In the late 1990s, Microsoft bundled Internet Explorer to its OS. On May 18^{th}, 1998, the US Department of Justice (DOJ) sued Microsoft for anti-competitive conduct aiming to protect and extend its monopoly to Internet browser as well as for violation of the 1994 consent decree. On June 7^{th}, 2000, the Court stated that Microsoft has committed monopolization, attempt monopolization and tying and ordered the breakup of Microsoft as a remedy. The remedy was overturned on appeal. On November 2^{nd}, 2001, the DOJ reached an agreement with Microsoft to settle the case. In 2003-2004, the European Commission started an investigation on the bundling of Microsoft OS with the Windows Media Player (WMP), and on potential abuse on the server market.

In 2004, the European Commission imposed a fine of €497 million to Microsoft for abuse of dominant position by anti-competitive tying of WMP with its OS and for restricting the interoperability between Windows PCs and non-Windows work group servers. In 2006, the European Commission fined Microsoft €280,5 million for non-compliance to its 2004 decision. In 2007, Opera Software System addressed a complaint to the European Commission considering that Microsoft was abusively tying its OS to its web browser, Internet Explorer. In 2008, the European Commission fined Microsoft €899 million for failure to supply interoperability information on reasonable and non-discriminatory terms. The EU General Court decreased the fine to €860 million in June 2012. In 2009, the European Commission formalized in its decision of December 16^{th} commitments taken by Microsoft in the browser case. Most notably, Microsoft committed to display a ballot screen with several browser choices until 2014. This screen would enable Windows users in the EU to easily select their Internet browser. In 2013, the European Commission imposed a €563 million fine to Microsoft after learning that Microsoft did not comply to its 2009 commitments to offer consumers a ballot screen with the choice of browsers in its OS.
All these cases are the attempts by the EU and USA antitrust authorities to break the monopoly power of Microsoft and to open its OS to competitors in order to create competitive pressure. Microsoft was probably used to set an example.



static to dynamic. This inherent complexity makes the study of firm/market equivalency challenging, yet interesting. Antitrust analysis will hence be more difficult (see Evans and Schmalensee (2013)) and traditional tools cannot be applied directly. Indeed, applying such tools may lead to the worse kind of legal type-1 error: sentencing an innocent firm for a non-existing infringement of antitrust law, or impeding a welfare-enhancing merger.

During the recent years, firm/market equivalency developed rapidly thanks to the emergence of ICTs and to the ongoing technological revolution around Internet, mobile devices, cloud computing and other derivatives from the advances in information technology. Undeniably, ICTs facilitate and improve the implementation of firm/market equivalency architecture. As stated by Crandall and Winston (2003) in their controversial paper, the apparent ineffectiveness of antitrust policy comes in part from:

> [...] the substantial and growing challenges of formulating and implementing effective antitrust policies in a new economy characterized by dynamic competition, rapid technological change and important intellectual property; [...] the power of the market as an effective force for spurring competition and curbing anticompetitive abuses, which leaves antitrust policy with relatively little to do.

In such high velocity environment, dominance and anti-competitive behavior are hard to assess and can lead to the inefficient application of the antitrust laws as well as to a higher probability of type-1 error.

This conclusion is intended to shed some light on the antitrust issues in the context of firm/market equivalency. Our work is in line and complementary to the recent paper of Evans and Schmalensee (2013). The first section highlights the main characteristics of competition when firms implement firm/market equivalency strategies. We also stress the importance of dynamics in the model. The second section enters the de-

bate on the implications of firm/market equivalency in terms of antitrust. We focus on the main elements of an antitrust investigation (market definition and power; anti-competitive conduct (abuse of dominance and cartels); mergers and acquisitions) and discuss the difficulty of analysis pertaining to firm/market equivalency. We conclude with afterthoughts concerning future work and possible extension of our framework.

Competition in the Context of Firm/Market Equivalency

Competition is a process of rivalry between firms for the access to customers and resources. Firms are striving to meet the needs of customers or to anticipate their future needs in such a way so as to beat the competitors to it. With the help of their business models they try to gain and sustain a competitive advantage through a variety of means: cutting prices, improving their productive systems (cutting costs, enhancing advertising, rearranging distribution channels), proposing different quality of products or services (differentiation strategies), introducing new products or services, innovating, etc. Firms try to attain higher profits or higher market share to ensure their continued survival. Innovation can be introduced either by an incumbent or by new entrants through the proposition of innovative products and business models. When competition works well and is free of any anti-competitive behaviour, the least efficient firms exit the market one way or another: they may either redirect their efforts some place else or simply go bankrupt. Hence, a selection mechanism takes place: it leaves the market to the most efficient and the most adapted firms. This is the most traditional kind of competition: *competition in the market*.

In this context, competition can be threatened by:

Barriers to entry, exit or expansion: these give a large competitive advantage to the incumbent firms. Such barriers can be natural

or intentional. The latter most certainly pertain to and are the consequence of the behavior of the incumbent firms. The former barriers include bottlenecks in networks industries, economies of scale, and fixed cost-based markets. These barriers are sometimes what firms are fighting for, such as to gain a first-mover advantage and some monopoly power. For instance, firms can do so by registering a patent, by controlling essential facilities (e.g. roll-out of 4G or optical fiber networks), or by releasing new products or services. Intentional barriers encompass a wide array of circumstances that may be considered illegal by antitrust law. These include customer lock-in, limit pricing, predation, and margin squeeze. Barriers to expansion affect the ability of the competitors in the market to grow their business. These barriers can be implemented by the incumbent either through limiting or blocking the access to certain resources, information, or customers, by bundling or tying, etc.

Coordinated foreclosure/collusion: firms adopt a coordinated behavior to tacitly or explicitly foreclose a market. Coordination can rely on vertical relationships (vertical restraints, exclusivities) or horizontal relationships (price agreements, coordinated customer lock-in, standardization, strategic alliances).

Mergers and acquisitions: they alter competition mechanically by diminishing the number of competitors. Mergers and acquisitions can be used to acquire new capabilities, expertise, knowledge, resources, access to new markets or customers.

These threats diminish the competitive pressure. However, they are not necessarily sustained by anti-competitive behaviors (abuse of dominant position or cartels). They are the main fruits of the competition process itself: beating competitors means weakening competition at least during a transitory period. Hence, these threats create incentives for firms to be creative, innovative and more efficient than others: they motivate behaviors that in turn increase potential profits. Such rivalry between firms fosters the market efficiency and increases consumer welfare. The

main role of competition policy is to assess the anti-competitive nature of such behaviors in a reliable fashion. Further on, competition policy is to recommend and apply the relevant remedies: corrective, in case of anti-competitive behaviors (such as fines or commitments to correct behavior), or preventive, in case of mergers and acquisitions to impede the emergence of future illegal conduct (commitment, refusal of merger).

As any firm facing actual or potential competitors, companies that choose firm/market equivalency model also strive for profits and market power. However, competition in the context of firm/market equivalency is somewhat different from *competition in the market*. Firms compete by increasing the number of interactions/exchanges on their platform by leveraging different sides of a market. Attracting the right side, that is the side that is the most valuable, is at the core of the competition process. To do so, firms often set price below marginal cost, at zero, or even below zero. They do so, for instance, by giving away some functionalities on the platform. That is why we observe the predominance of free-to-play business model in the mobile gaming sector: zero price is often the routine in markets structured around a firm/market equivalency model. These negative prices do not imply losses: negative prices on one side of the market emerge to attract other sides, who will be charged prices above marginal cost. The difficulty for the firms relies on finding the right balance between prices to earn profits. Economies of scale and scope are rather common features in a firm/market equivalency context, since pricing in the early stage of development tends to be very aggressive. It is so because firms need to bring on board the sides that will create positive externalities and network effects, as well as to reach the critical mass; as a result, prices may be very low. Presence and monetization of externalities and network effects are often paired with the existence of economies of scale and scope. They are also common features in a firm/market equivalency context, especially in high-tech sectors, where the platform represents an enormous fixed cost.

In the context of firm/market equivalency, firms operate market functions

in reaction to observed market failures. They transform these failures into market opportunities by becoming – and supporting – the market. This ambivalence is crucial to understand firm/market equivalency. As a consequence, firms developing firm/market equivalency model are not really competing in the market since they are literally below it: they are a singular example of competition for the market. Traditionally, the term *competition for the market* refers to a situation in which a public institution creates and rules an ephemeral market to distribute in a competitive manner (i.e. auctions) the rights of usage of publicly-owned resources (e.g. spectrum bandwidths for mobile phone), public procurement contracts, or delegation to supply a public service. In the case of firm/market equivalency, the role of the public institution is assumed by a firm or a group of firms, and the market is built to last. In this sense, firm/market equivalency positively affects social welfare by helping and encouraging supply and demand to interact more effectively and by creating exchanges and interactions as well as value, neither of which pre-existed a given firm/market equivalency.

The success of firm/market equivalency relies heavily on the ability of the platform owner to sustain a high level of innovation and value creation in order to renew the value proposition of the whole system and to ensure its survival. As seen in chapter 4, firm/market equivalency follows a dynamic process of development, yielding different architecture, governance and organization of the system. Each stage of development implies different threat to competition related to the behavior of the platform owner. Table 4.6 displays the potential threats to entry at each stage of development of a firm/market equivalency system.

The most common threat appears to be the barrier to exit. This is inherent to the design of the system. The platform owner designs the mechanisms of innovation, knowledge, idea and resource circulation so that they cannot flow out of the system. This ensures that the value created stays within the system. Mergers and acquisitions are used either in a very

	Birth	Expansion	Maturity	Renewal
Platform Owner's Strategy	Find early partners (exclusive contracts); Build or acquire strategic resources or capabilities; Structure the information and knowledge flows so that nothing outflows	Open up the system to generate interactions and exchanges	Open up the system; React to clusters and multi-homing to maintain control and governance of the system	Find new path of development
System Architecture	Closed club	Open club	Open club with clusters and multi-homing	Open club with private clusters under the control of the platform owner
Threats to Competition	Barriers to entry; Mergers & acquisitions	Barriers to exit;	Barriers to exit; Barriers to expansion; Mergers & acquisitions	Barriers to entry; Barriers to exit; Barriers to expansion; Mergers & acquisitions

Table 4.6: Potential Threats to Competition in Firm/Market Equivalency

traditional way to acquire competences, customer base, resources, patents that appear strategic to the development of the platform, or to standardize functionalities, products or services that may increase the perceived value of the platform. Barriers to expansion may be used to limit the power of some participants who try to cluster, or to balance the development of certain parts of the system.

At each stage of development interactions, relationships between firms, flows of innovation and resources, financial flows, value movements, roles and functions of participants, and even market hierarchy are co-evolving and shaping the design of the system. These forces are defining the competitive pressure and the sharing of economic power within the system: they have to be scrutinized to understand the very functioning of such systems. Hence, this is an example of what Teece (2009) refers to as *dynamic competition*:

> Dynamic competition is a style of competition which relies on innovation to bring forth new products and new processes and concomitant price reductions. [...] Dynamic competition is driven by innovation, but not exclusively. The term dynamic is a shorthand for a variety of rigorously competitive activities such as significant product differentiation and rapid response to change, whether from innovation or simply new market opportunities ensuing from changing in taste or other forces of disequilibrium. Dynamic competition is in fact more intuitive and much closer to today's everyday language than is the (textbook) notion of static competition.

This notion of dynamic competition is, of course, Schumpeterian in essence. The underlying idea is that competition is not an equilibrium static state; it is the ever-lasting dynamic process that relies on three main components:

Entrepreneurs: large or small firms that ensure the emergence of new ideas, new technologies, new products, new services, new business

models, new market organization that will redesign the supply of goods and services;

Selection mechanisms: processes by which the market forces drive out the least efficient participants and practices;

Learning and imitation: mechanisms for spreading ideas, innovation and knowledge, as well as for enabling potential participants to adopt, improve or even implement these novelties in a better way.

Indeed, firm/market equivalency requires that these components work properly. It needs a sufficiently large set of entrepreneurs that will provide the system with novelties, hence allowing it to renew, by recombining resources that are available within the system. It also requires a system of governance and control that will ensure fair and useful application of these resources, as well as eventual exclusion of participants that abuse or jeopardize the system. And lastly, it needs to have the ability to learn and imitate, which in turn relies on opening up some necessary resources and on the rapid circulation of information and knowledge. However, two characteristics distinguish firm/market equivalency from traditional markets. First, the three components of dynamic competition remain almost exclusively under the control of a single firm: the platform owner. It is the platform owner who shapes these components so that they serve its strategic intent, hence conferring on the platform owner significant market power over its system. Second, the platform owner aims to develop its system and not the entire market[1]. From this standpoint, as is the case with any other firm, maximizing social welfare is not among the platform owner's objectives.

Even though the platform owner possesses a lot of power over its system, its dominance is constrained by external and internal elements. A firm/market equivalency system rarely holds a non-transitory monopoly. This exceptional case would require specific analysis to understand the reason of the persistence of monopoly position and, perhaps, even some

[1]Unless, in exceptional cases, where the firm/market equivalency system encompasses the whole market.

public intervention. Under ordinary circumstances, a firm/market equivalency system is likely to face outside competitive pressure on some, if not all, sides that it serves at some point of its development. As shown in the table 4.7, competition may be asymmetric (Evans and Schmalensee (2013)) and come from a number of sources. These sources include 1) single-sided firms on any side; 2) firm/market equivalency systems that compete on some but not all sides (lower-breadth competitors); 3) firm/market equivalency systems that compete for the same sides as well as for the additional ones (higher or equal-breadth competitors).

	Competitors		
Firm/Market Equivalency System	Single-Sided	Lower-Breadth	Equal or Higher-Breadth
eBay	Wall Mart	Craigslist	Amazon, Tencent
Amazon	Barnes and Nobles, Wall Mart, etc.	eBay, Craigslist, FNAC, Apple, etc.	None
Apple iPhone	BlackBerry	Nokia/Microsoft	Google

Table 4.7: Outside Competitive Pressure on Firm/Market Equivalency

The existence of lower-breadth and higher-breadth competitors is associated with differentiation. Firm/market equivalency systems differentiate themselves by proposing different combinations of interactions/exchanges with different sides, different bundles of functionalities, different approaches to exchanges and transactions. They may also choose to specialize in a very particular type of interactions. Strategies of differentiation or specialization create asymmetric competitive pressure between firm/market equivalency systems on all or part of their activities. For instance, Amazon may not have higher breadth competitors, but it faces

the competition of a myriad of lower-breadth firms on each of its sides, ranging from Barnes & Noble book shop to CDW, a Fortune 500 company, provider of integrated information technology solutions in the USA and Canada. In such context, competition strategies are more complex, since the array of competitors is wide and diversified. Hence, the magnitude of market power of a firm/market equivalency is diminished.

The threat of potential competition is also very important in a firm/market equivalency context, especially when a potential competitor operates a platform-based system in an adjacent market (e.g. Microsoft in the game console market, Apple in the mobile device market, Amazon in the tablet market and in the gaming sector). Entry of this kind of players is very quick, violent, and can have a profound effect on the architecture, routines and hierarchy of the market. Contestability of this sort can weaken the market power of any platform owner.

The dominance of the platform owner is also counterbalanced or contested internally by anti-gravity strategies of some participants. As seen in chapters 3 and 4, sometimes participants form clusters or resort to multi-homing in order to develop their business. These anti-gravity strategies produce downward pressure on the level of control and governance of the platform owner hence decreasing the platform owner's dominance over the system. Clustering and multi-homing create competitive tensions that force the platform owner to transfer part of its power and part of the value of the system to the participants that engage in anti-gravity behaviors. When the same participant engages in both: clustering and multi-homing, the resulting effect is more intense, since clusters are likely to form sub-systems, which then detach from the firm/market equivalency system of the platform owner (e.g. as was the case with Microsoft versus IBM).

The model itself imposes endogenous constraints on the behavior and the power of the platform owner (Evans and Schmalensee (2013)). In a firm/market equivalency, prices are balancing the interactions between sides. Any modification of prices on one side affects the behavior of the

participants on the other side. Suppose a firm I is serving two sides, B and S, through a firm/market equivalency system. In such a context, if it were to increase the price on side B, then the number of participants on side B would decrease. In turn, since the demand on side S depends on the number of participants on side B, then, as a consequence, the number of participants on side S would decrease. Moreover, since the participation on side B depends on the participation on side S, if the number of participants on side S decreases, then the number of participants on side B will decrease even further. This process carries on up to the point where supply and demand balance again. If the network effects are sufficiently strong, the whole system may collapse. The magnitude of these effects depends on the strength of the positive indirect network effects between sides: the stronger the effect, the lower the profitability of a price increase. The same reasoning applies to acquisitions, mergers or exclusionary strategies. Consider again firm I. If the firm I were to acquire a participant from the side S, it would mechanically decrease the number of participants on side S and destroy interactions between the acquired target and participants on side B. In turn, this may decrease participation on side B, and so on. The magnitude of the effect depends on the network externalities generated by the level of independence of the acquired target: the higher these externalities are, the lower is the profitability of the acquisition.

Implications on Antitrust

The main objective of the antitrust policy is to protect the competitive process per se. The practice varies from one country to another. Competition law may also aim to enhance the consumer welfare or to protect small firms from anti-competitive conduct (see, for instance, Motta (2004)). Nevertheless, competition policy always encompasses two chief elements:

Ex post/corrective control: this requires identification of illegal conduct or behavior (e.g. cartels and agreements, abuse of dominance

and monopolization). Without the evidence of such behaviors, the market is deemed presumably competitive. The burden of proof of the contrary is borne by the competition authority. Fines, injunctions or even breakup of the firm are the main enforcement tools;

Ex ante/preventive control: the underlying idea is to prevent or to lower the probability of illegal conduct in the future in the context of mergers and acquisitions. The competition authority has to assess the probability of such behavior, the expected magnitude of damage created and the potential inefficiencies that a merger or an acquisition can trigger. The control relies on remedies imposed ex ante on the merger or acquisition.

The competition law practice has been built by the evolution of law and by the case law. Inspired by the economic theory, the latter of the two has created and refined the tools and procedures of investigation and analysis. Demonstrating anti-competitive conduct requires a lot of data, information and a good capacity to synthesize and analyse it in a timely fashion. It is also imperative to understand the behavior and the strategy of the accused firm in its context. Sometimes judgement delays can be very long. This motivated the argument of Crandall and Winston (2003) who argue that competition policy is inefficient. After over a century of competition policy[1], the case law has built a complex and a rather complete procedure from its experience. However, the method used to investigate was implemented in very traditional single-sided markets. When faced with the diverse Microsoft cases, the judges seem to struggle with deciding on a judgement; this shows that standard antitrust analysis is not easily applicable in the context of firm/market equivalency, and more generally in the presence of multi-sided markets (Evans (2003, 2008), Evans and Schmalensee (2007a, 2013)).

[1]In 1889, the *Act for the Prevention and Suppression of Combinations* was passed in Canada in restraint of trade; the following year, in 1890, the *Sherman Antitrust Act* was passed by the US Congress.

On Market Definition and Market Power

Market definition plays a crucial role in the standard antitrust analysis. It helps to define market boundaries, establish the identity and the number of competitors as well as the characteristics of consumers. Market definition offers a snapshot of the market forces at the time of the investigation. In turn, this enables the calculation of market share in terms of volume, revenue and profit.

As stated in OECD (2009),

> In competition analysis, a market is a collection of products and geographic locations, delineated as part of an investigation whose purpose is to make inferences about market power and anticompetitive effect. [...] For abuse of dominance cases, market definition helps to determine whether a firm has enough market power to engage in anticompetitive behavior, and whether that behavior increases or maintains its market power. For merger cases, market definition helps to identify the firms that could constrain possible price increases by the merging parties, and thereby helps to determine whether the merging parties will increase their market power.

Market definition is hence the main point of debate in an antitrust case. Any miscalculations or incorrect approach to the context of the market being considered may lead to fallacies: either the market is defined too broadly, or it is defined too narrowly. The approach used to define a market relies on demand-side substitution (i.e. products or services, which are fairly substitutable) and supply-side substitution (potential competitors that may enter the market quickly if relevant opportunities emerge). Antitrust investigators use the Small but Significant Non-Transitory Increase in Prices (SSNIP) test, also known as the *hypothetical monopolist test* (see the insert entitled *The SSNIP Test*).

THE SSNIP TEST

This test is composed of several iterations. It starts with the firm under consideration and treats it as a hypothetical monopoly. Then it looks at the demand reaction if this hypothetical monopoly imposes a small but significant non-transitory increase in its price (in general, 5%). If demand in that case goes to some competitors, the next iteration includes those firms in the hypothetical monopolist. The process stops when consumers can no longer escape the increase in price or, said differently, when the price increase becomes profitable. The market is then defined by the set of firms that compose the hypothetical monopolist. In theory, the test requires a lot of data, information and econometrics on the demand as well as the competitors.

The SSNIP test and its derivatives are highly controversial even if the standard approach is taken, since the test is often used in its qualitative form (that is without the use of econometrics). In the context of firm/market equivalency, there exist demand interdependencies between the different sides, which are served by the platform. As discussed earlier, even a small increase in price on one side (especially the side for which the price is set at zero) can have dramatic consequences through the feedback effect on other sides and will surely become unprofitable. An overly broad definition of the market may entail this. Evans and Schmalensee (2013) pointed out another situation. Suppose the price increase is profitable on one side, then the SSNIP test concludes that this side (more precisely, the services or products used to serve this side) is the relevant market on which the platform owner holds a monopoly position. However, such a price increase may decrease the number of participants on this side and provoke a mechanical decrease of demand

and profits on other sides. Taking into consideration the magnitude of this feedback effect may prompt to conclude that the price increase is not profitable and the market is too broad. Therefore, the results of the SSNIP test and its derivatives may be inconclusive or very difficult to manipulate in the context of firm/market equivalency (OECD (2009)): it may be too difficult, time-consuming and expensive to gather the data required to conduct such a test in this context.

As we have seen throughout this thesis, firm/market equivalency systems are able to reshape the market and to create links between the markets that used to be independent from one another: such firms operate through their original business models on a set of markets. This is where their complexity stands. Firms developing such strategies are not multi-product firms. The products and services developed to serve and to attract the different sides are highly interconnected artefacts that are used to enhance the emergence of interactions, transactions and exchanges between the different sides. Firm/market equivalency systems should not be considered through these artefacts; instead, they should be considered through their main function: intermediary/market support. This suggests that we need to rethink the concept of the *relevant market*. A relevant market should be, in fact, relevant not for the competition authority, not for all the firms, but it must be relevant for the firm in question (the accused). This raises other questions: Is market definition relevant at all for the investigation of antitrust cases? Is the market definition really imperative for the antitrust investigation to assess market power? Or to assess the effect of anti-competitive conduct[1]?

Market power is usually assessed following the definition of the relevant market. It is now recognized by the literature that market share and its derivatives (concentration indexes) are poor tools for examining the market power: a monopoly can be contestable, whereas the firms with 40% market share can be dominant. Moreover, not only can a large market share indicate better performance, it can also point at better adaptation

[1]Collusions and cartels do not require the assessment of market definition. Instead, such cases require only the proof of anti-competitive agreements or cooperative behavior.

capabilities, given that a strong selection process (competition) takes place in a particular industry. Evaluating the market power of a firm is a complicated and delicate task, whatever the market conditions: whether multi-sided or not. In the context of firm/equivalency, market power can be assessed without having to refer to the market definition and the calculation of market share. In the preceding section we have discussed the constraints to the market power of the platform owner within a firm/market equivalency system. The discussion suggested that whenever a firm/market equivalency strategy is deployed, the market power is better appreciated through an in-depth exploration of the system and its environment, rather than reliance for its estimation on a hypothetical share of the market. More specifically, the framework of analysis includes scrutinization of the following elements such that to appreciate the extent of the market power of the platform owner:

Stage of development: the power of the platform owner evolves with the expansion of the system and may trigger either competitive or anti-competitive behavior. At the earliest stage of development, anti-competitive behavior should be rather non-existent. The likelihood of anti-competitive behavior increases with the contestability of the platform owner's control over its system; it decreases as the other participants gain power;

Dynamics of the system: In the firm/market equivalency system, its health and performance are linked with the system's capacity to sustain continuous flow of ideas, innovation, interactions and value. An intense, vivid activity of the participants and the platform owner indicates a good system health[1]. A healthy system brings profits to the platform owner. This reduces the probability of anti-competitive conduct inside the system: as a rational agent, the platform owner will not make actions that will jeopardize the performance of its system;

Internal constraints: The study of interactions among the participants

[1]Expansion of the system is also an indicator of good health.

and between participants and the platform owner sheds light on the hierarchical relationships in the system and provides insights on the internal limit to the platform owner's power. Existence of frictions and tensions within the system, clusters, and multi-homing - all constrain the control of the platform owner.

Endogenous constraints: more particularly, the magnitude of the network effects. These can be hard to assess, since such assessment may require collection of vast data. The impact of network effects is ambiguous. On one hand, they can internally limit the behavior of the platform owner and its power. On the over hand, once the system is mature (and stabilized), a new entrant will hardly be able to propose the same level of network effect to participants. Participants will then be less willing to switch. Network effect may induce barriers to entry;

External constraints: a firm/market equivalency system should be understood within its environment. When analysing external competitive pressure, all sides served by the platform should be taken into account so as to appreciate the level of asymmetric competition and also to assess the importance of contestability (potential adjacent competitors). A firm deploying such a system is not strategizing each of its sides separately, it considers its business model as a single entity. Analysing one, – or even several, – sides in lieu of all sides will yield a misrepresentation of the platform owner's strategy and a misleading idea of the competitive pressure that is affecting the system.

This framework takes into account the dynamics of competition by focussing on potential competitors (adjacent players, clusters, multi-homers) that may have the capabilities to contest the market power of the platform owner. Studying the stages of development can also be coupled with a study of the platform owner's capabilities. Teece (2009) argued that:

> Subsequent research has established that firms exhibit more stability in their capability than in their products. In this sense, capabilities are easier to analyse than products. Capabilities are proxy for those interrelated and interdependent aspects of the enterprise that govern its competitive significance. They are arguably a better proxy for competitive position than (downstream) market share.

Chapter 4 presents the main and the most relevant capabilities of the platform owner during different stages of development. When a platform owner possesses the relevant capacities to lead and govern its system, the platform owner may be less willing to engage in anti-competitive conduct. This sort of conduct can be seen as the only resort in reaction to the loss of control over the system, given that the platform owner does not possess relevant capabilities. For instance, at the leadership/maturity stage of development, multi-homers and clusters fiercely contest the power of the platform owner. If the platform owner has the capabilities (leadership, agility, relational capability) to react, it will use them to adapt its governance and control system so as to subdue clusters and multi-homers. This will benefit the system since it will help it to expand better and create more value. If, on the contrary, the platform owner possesses no such capabilities, it is likely to try and maintain its control over the system by impeding the clusters and multi-homers to develop. It may further use its central position in the system to raise barriers to expansion, or impose higher barriers to exit in response to clustering and multi-homing. It is possible that such actions on behalf of the platform owner can take place in the form of anti-competitive behaviors: this may eventually constitute an antitrust case. Therefore, identification of absence of relevant capabilities may serve as indicator of possible anti-competitive behavior.

Moreover, the range of the proposed framework is wider than the standard one, since not only does it include the study of the external environment, but it also includes the analysis from within the system. The latter is

essential in a firm/market equivalency context, since the market power can express itself within the boundary of the system: this implies that anti-competitive behavior can take place inside the system.

On Anti-Competitive Conduct

Firm/market equivalency systems imply neither the existence of anti-competitive behavior per se, nor a higher probability of occurrence of illegal conduct. This does not mean that such systems would not deploy or support illegal practices; as is the case with any other firm architecture, such system will compare the potential profit that can be derived through anti-competitive conduct (net of expected fines and damages) with the profit earned through non-infringing behavior. However, in a firm/market equivalency context, those calculations may be rather complicated, since the feedback and network effects should be taken into account. We do not intend to review here all possible scenarios, rather we highlight the specificity of firm/market equivalency in the context of certain anti-competitive conduct.

Abuse of Dominance/Monopolization

Competition law makes a distinction between exploitative abuse and exclusionary abuse. Exploitative abuse occurs when a dominant firm, or a firm with significant market power, takes excessive advantage of its market power or its monopoly position. Most common practices are: excessive pricing, unfair trading conditions, unfair purchase or selling prices, adding abusive clauses or conditions in contracts to impose supplementary conditions detrimental to the other parties. Exclusionary abuse is a kind of conduct that restricts competitors or impedes effective competition by excluding actual or potential competitors: refusal to supply, refusal to sell, predation, rebates, unjustified discrimination, exclusivity clauses. Conduct can be both exclusionary and exploitative: in theory, predation in its first phase is exclusionary (elimination of competitors through

price cutting), while in its second phase it is exploitative (recouping the losses by increasing prices, once the competitor is eliminated). A more useful distinction is to consider pricing practices and non-pricing practices. The former relies on anti-competitive manipulation of prices: predation, selective price cuts, margin squeeze, discounts, rebates. The latter is supported by non-price manipulations: tying, bundling, exclusive dealing, refusal to supply, strategic investments, incompatibilities of norms and standards, loyalty programs.

A firm deploying a firm/market equivalency system can commit an anti-competitive conduct on two levels: internal or external. Internally, abuse can occur in order to install or maintain control and governance over the system, or to dictate and enforce the internal rules of operations (this can be done, for instance, to establish information and knowledge sharing). The platform owner may behave in this way to discipline the participants or to orient their economic activity, most notably if it lacks the capabilities to do so: abuse can be the sign of the loss of grasp over the system. The study of interactions and capabilities can prove very useful in this situation. Moreover, the risk is higher the closer the participants are to the edge of the platform. In this case, their activities are closer to those of the platform owner, who may be less willing to tolerate any challenge to its authority, or any bypass to its own system that can induce competitive pressure onto its platform. Externally, the platform behaves as any other firm and may be tempted to use its market power illegally in order to drive a rival out of the market, to expand its business, or to protect its system from external competition.

Pricing abuse, most notably predation, is less likely to occur because of the presence of significant network externalities and feedback effect (Evans and Schmalensee (2013)), and the complexity to assess the results in terms of profitability of such action. Pricing practices are demonstrated through an economic test by comparing prices to underlying costs. These tests are already the subject of a vast literature (see Motta (2004)) and are evolving from one case to the next. The main issues are: finding

the relevant concept of costs as well as selecting the relevant time frame for calculations. Tests appear to be already quite complex in traditional circumstances and the complexity increases in the context of firm/market equivalency for at least three reasons. These reasons are as follows: presence of feedback effects, presence of fixed costs, complexity of the revenue model (see chapter 3). Indeed, a price of zero on one side can attract participants, which are valuable for the participants on another side; as a result, the latter would be willing to pay a positive price to access the platform. Taken in isolation, the zero price generates losses and can be interpreted as predatory, while the higher price can be viewed as excessive. However, if we were to consider the whole revenue model, it would show that losses from low price on one side are compensated by the higher price on other side: all in all the price structure is profitable and inherent to the chosen business model. Low prices can also be justified in the early stage of development since in the early stage there is a need to reach the critical mass on one or on multiple sides.

Zero or negative pricing can appear as routine. However, it can be used to conceal illegal conduct. In the context of firm/market equivalency zero price is not destroying the value of the service rendered to one particular side; instead, it displaces the value somewhere else within the system and most surely towards the platform access. Zero price of a service increases the value of the platform by attracting more participants and by generating feedback effect. It can be used both: as a defensive or as an offensive artefact. Consider a firm/market equivalency system, which is under tough competitive pressure (actual or potential) on one part of its activities (i.e. on one of the sides). This competition may even threaten the firm/market equivalency system's core activity: the platform. By cutting price on the sides with such competitive pressure to zero, the platform owner is destroying the value for its competitors on the attacked sides. This can result in weakening, disciplining or driving out the rivals. Thanks to the feedback effect, the value destruction can create more value on other sides and maintain or even increase the value of the system as a whole. Such defensive move resembles the scorched

earth strategy aiming at weakening the rivals before they reach the core of the firm/market equivalency system: it is very likely that this is what Microsoft did in the cases pertaining to the Internet browser and the media player. Moreover, zero price can be used more offensively with the aim to expand the breadth of the system and to attract new sides: in this case, given the particular circumstances, such move can be interpreted as an attempt of monopolization or abuse of dominance in an adjacent market.

Non-pricing conduct raises a dilemma: in some contexts it may be pro-competitive, while in other it may be anti-competitive. To reiterate, if a non-pricing conduct is a routine in an industry (for instance, game exclusivity or tying in the game console industry), then it should not be considered as anti-competitive. Hence, such cases require a specific investigation that will try to assess either the presence the absence of an anti-competitive intent (strategy), as well as the effect on social welfare. Similarly, in the firm/market equivalency context bundling and tying techniques can be used to expand the breadth of the platform, to compete against a rival system, or to incorporate some activities or functionalities into the platform. These three goals can be either anti-competitive (aiming to suppress existing or potential competition) or pro-competitive (fostering an increase in competitive pressure). They all require an in-depth analysis of the given system such as to better understand its routine and trace any deviations in behavior.

Evaluating the impact of any practice on social welfare (e.g. the damage) is a challenging task, especially in the context of firm/market equivalency, where the theoretical conditions of welfare maximization are not yet clear-cut. In a traditional single-sided market social welfare and prices are negatively correlated: when the prices increase, welfare decreases. In a firm/market equivalency context, where the demand on multiple sides is interdependent and where the network externalities exist, the correlation between price and welfare can non-negative: an increase in price can potentially cause the welfare to increase. For instance, consider a firm

I serving sides B and S. Suppose that a price increase on side B can exclude participants that adopt bad behavior, which negatively affects the value of participation on side S. By eliminating the bad behavior, this increase in price can improve the value of side S participants, which in return can increase welfare. Price increases can also aid in overcoming congestion problem. An increase in price can be intended to diminish the number of participants on the congested side and as a result improve the fluidity of the market. This, in turn, would enhance the quality of interactions as well as welfare. Consider that firm I is a night club; it can be seen as firm/market equivalency system the multi-sidedness of which is based on the interactions between men and women. Suppose men value a possible interaction with a woman at 2€ while women value the same interaction at 0,5€: hence, in the firm/market equivalency context, the latter side, women, is the side that the club needs to attract first, since it is the side that creates the highest level of externalities. Suppose that the firm I can host 100 persons and chooses a zero price on the side with women and a price of 10€ on the side with men. Let's also suppose that women enter the club first. This can lead to a situation in which women will occupy most – if not all – of the available space. Let's now assume that the chosen price structure attracts 70 women and 30 men. Then the profit of the firm will be 300€[1]. The welfare of men and women is supposed to be linear and represented by the total value of potential interactions minus the price they pay to access the night club. Hence, in this example, the total welfare of women is: 70 (total number of women) × (0,5€ (value per interaction) × 30 (total number of men)) = 1 050. The total welfare of men is: 30 (total number of men) × (2€ (value per interaction) × 70 (total number of women) - 10 (access price)) = 3 900. The total welfare associated to the price mounts to: 300 (profit of firm I) + 1 050 (welfare of women) + 3 900 (welfare of men) = 5 250. Firm I considers to solve its congestion problem by raising the price of access for women to 2€. We suppose that the increase in price will mechanically decrease the number of women to 50 and induce the entry of 50 men.

[1]For the purposes of clarity and illustration, we assume that costs are zero.

Table 4.8 compares the two price structures. Clearly, in this example the price increase has improved the welfare at both: the social and individual level. Hence, evolution of welfare cannot be inferred by simply looking at evolution of prices.

Price Structure		
Women	0€	2€
Men	10€	10€
Profits/Welfare		
Firm I	300	600
Women	1 050	1 150
Men	3 900	4 500
Social Welfare	5 250	6 250

Table 4.8: Welfare and Price Increase

OECD (2009) recognizes that *"in two-sided markets one ought to measure welfare variations directly, which is more demanding than measuring price variations"*. This requires the collection and the analysis of large amount of data and information about the participants on all sides.

At its origin, during the birth stage, firm/market equivalency is a model developed in response to the presence of market failures. The fact that the model creates market opportunities from market failures implies that it is welfare-enhancing: firm/market equivalency improves market efficiency by supporting exchanges and transactions that would not occur otherwise. This is probably still true at the expansion stage. Afterwards, when the system matures and stabilizes, the effects on welfare are much more ambiguous and cannot be inferred from any other proxy. The presence of clusters and multi-homers may be an indicator of welfare improvement, since they participate in increasing competitive pressure between systems. However, more research is required on this subject to clarify the impact of multi-homing on welfare.

Agreements and Cartels

Competition law considers cartels and anti-competitive agreements as the most serious offences when in comes to competition. Some forms of concerted practices, like price fixing or market sharing, are illegal per se and severely punished. However, competition law recognizes that some agreements may not be illegal if they contribute to improvement of the productive system, promotion of technological development, and if they benefit the consumers, whether directly or indirectly, or the society as a whole. In other words, agreements are allowed if they are welfare-enhancing.

Most of the agreements are legal. Only a few infringe the competition law. As shown in this thesis, the very essence of firm/market equivalency is cooperation and coordination. In a sense, a firm/market equivalency system is a complex nexus of agreements that tie participants to the platform owner. The function of a market that is attached to the firm/market equivalency confers the role of coordination of the activity of multitude of the participants to the platform owner. However, this function is not about fixing price or sharing market: it aims at improving the process of carrying out exchanges and interactions between different sides. This does not mean that a particular firm would not use this role to suggest or impose prices; such cases will be subjected to allegations of abuse of dominance.

The platform owner also possesses a lot of information concerning the economic activity of its participants such as revenues on the platform, number of items sold, and sometimes even the identity of customers. This information is highly strategic. Diffusion or exchange with others of this kind of information beyond what is required to coordinate the system or to obtain a competitive advantage can be considered either as abuse of dominance or a case of illicit exchanges that falls under the cartels prohibition. The use of a firm/market equivalency model hence seems to put the firm and the participants in an ambiguous position, since the boundary between what is legal (i.e. what is necessary to ensure the

expansion and the survival of the system) and what is illegal is paper thin.

Mergers and Acquisitions

The main issue in control of mergers and acquisitions is whether or not the proposed project will decrease consumer welfare (by modifying the price structure), and whether or not it will create, enhance or facilitate the exercise of market power. The control is carried out ex ante, i.e. before the merger or the acquisition is completed.

Every year the giants like Google, Apple, Microsoft, and Amazon acquire many different firms. In most cases those acquisitions are used to increase the breath of their respective systems (expansion stage), to acquire new knowledge, resources or capabilities (renewal stage), or to incorporate new functionalities (increasing the depth of the platform). Quite often the target firm that is acquired is largely smaller than the purchaser; sometimes it is so small that the acquisition falls below the threshold of control and does not require any notification to be sent to the authorities by the acquiring firm[1]. Hence, those firms have a motivation to buy their target firms at an early stage of development to avoid any reporting and control. These giants have deep pockets and hence they can easily sustain such buying strategies. Moreover, their position as platform owners helps them identify the potential targets quickly. Research should be made on this subject in order to better understand the impact of such acquisitions on competition and consumer welfare.

Beyond the thresholds imposed by the mergers and acquisitions control, the project has to be reported to the competition authority. Again, the basic characteristics of firm/market equivalency complicate the analysis. First, the assessment of the impact on price of the project should take into account and model the complete complex structure of interrelated demand

[1]In the USA, merger control includes transaction thresholds of $75,9 million below which the project does not need to be reported.

and feedback effects. This may require vast amount of information and a complex econometric model. Moreover, as noted earlier, the effect on the price structure would yield no clues as to its impact on welfare. Therefore, the impact on welfare should be calculated by including all sides, actual or potential. The case could be convoluted further if the project concerns two firm/market equivalency systems.

Second, the competition authority should appreciate the evolution of the market power of the new entity created by the merger or acquisition as well as the likelihood of future potential anti-competitive conduct. The analysis of market power in a firm/market equivalency context cannot go through traditional tools like concentration ratio (see subsection on *Market Definition and Market Power*). Moreover, this assessment is forward-looking: the competition authority has to build credible and relevant scenarios of development of the new entities, test for their likelihood, and evaluate the probability of anti-competitive conduct. Most of time firm/market equivalency systems are implemented in high-tech industries that show high velocity. Since this kind of environment is hard to predict, there is a higher risk of making erroneous or in some way misleading evaluation of the scenario.

The difficulties go beyond the project analysis. If some competitive issues are detected, the competition authority may have to formulate remedies that take into account the specific structure of the firm/market equivalency system. Again, the assessment of the effect of such remedies and their verification *ex post* may be rather problematic.

Afterthoughts

Although exploratory, the present work contributes to a better understanding of the dynamics of firm/market equivalency as a special subset of platform-based systems. From our case studies we have drawn several frameworks that may help in carrying out in-depth analysis of such systems. Our approach is heavily reliant on the study of interactions,

hierarchical structure and capabilities of the platform owner as the fundamental elements of such systems. This thesis is a first step towards the creation of analytical tools that may help managers and policy makers to fully comprehend the functioning and the implications of existence of firm/market equivalency.

Our approach needs to be confronted with other cases, with the antitrust cases in particular, and consequently refined to ensure robustness. Most notably, work remains to be done on the method of proper assessment of the quality and implications of interactions that take place between participants, as well as the capabilities that the platform owner requires in this specific environment. The qualitative scale we used is but a brick in paving the way towards a more complex tool that may include a measure of intensity of the links. Such a measure may be used to assess the extent to which a participant is linked to the system, as well as to look for the existence of strati of equal intensity. The analysis of such strati will help to better evaluate the different levels of control the platform owner is applying in the system: a high-intensity stratum is probably an indicator of high level of control, whereas in a low-intensity stratum links are more loose, indicating a lower level of control or market power.

The work exhibited throughout this thesis concerns the participants within the matchmaking context. In this context the firm/market equivalency system aims to draw to itself a critical mass of matchable participants. The firm/market equivalency system gently guides these participants to gravitate onto two or more of its sides by providing beacons and incentives. As a general principal, the more participants gravitate to one side, the more participants will gravitate to the matching side; this carries on until the critical mass is accumulated, provided that the platform owner is not engaging itself in physical or value domination. In the matchmaking context the platform owner is governing and regulating its system, facilitating interactions and exchanges, and capitalizing on the interactions that are successfully carried out. Through creating and facilitating the market, the firm/market equivalency system is ensuring

its continued viability and survival. The cases that we considered in this thesis such as eBay, Apple, Amazon, etc. vividly illustrate this. However, there are other contexts beyond the context of matchmaking. For instance, Google's search engine, YouTube, or free newspapers constitute a breed of platform-based systems, where no matchmaking, per se, takes place; instead, the business models of such systems involve amassing an audience on one side, which is then exposed to advertisers on the other side. Similarly, as with matchmaking context, critical mass needs to be reached on one side for the other side to be interested in participating. Furthermore, the firm/market equivalency system appears to go through the same exercise of governance - regulation - capitalization, replacing the interactions facility with exposure. More research should be done to test our framework on other platform-based systems, for instance in the context of audience.

Our framework can also be adapted to be used in assessing the tendencies towards the prospective industry structure as well as organizational architecture. In high-velocity environments the ability to forecast future trends in a timely fashion may prove to be integral in ensuring survival and viability of an organization. This raises a question: is the phenomenon that we observe today a permanent or a transitory one? In other words, is this form of firms just a state of transition in the course of evolution of the industries, a state that is meant to evolve into a more permanent - and more robust - method to organize industries? Is the firm/market equivalency simply an organizational prelude, beaconing at the dawn of the era of convergence towards an industrial architecture with a unified market? Furthermore, as a transitory phenomenon, how profoundly will it redefine the frontiers of the industries and what will be its ultimate impact on the society in terms of welfare enhancement and forms of prospective development? All these questions trigger the need for further exciting research on the subject.

References

A.A. Alchian. Uncertainty, Evolution, and Economic Theory. *Journal of Political Economy*, 58:211--221, 1950. 50, 53, 56, 62, 85

A.A. Alchian and H. Demsetz. The Property Right Paradigm. *The Journal of Economic History*, 33(1):16--27, 1973. 53

R.C. Allen. Collective Invention. *Journal of Economic Behavior and Organization*, 1(4):1--24, 1983. 14

R. Amit and P.J.H. Schoemaker. Strategic Assets and Organizational Rent. *Strategic Management Journal*, 14:33--46, 1993. 54

R. Amit and C. Zoot. Value Creation in e-Business. *Strategic Management Journal*, 22:493--520, 2001. 170

C. Anderson. *Free: The Future of a Radical Price*. Hyperion, 2009. 157

J. Anderson and B. Williams. Unbundling the Mobile Value Chain. *Business Strategy Review*, 15(3):51--60, 2004. 122

L. Araujo, A. Dubois, and L.-E. Gadde. The Multiple Boundaries of the Firm. *Journal of Management Studies*, 40(5):1255--1277, 2003. 61, 63

M. Armstrong. Competition in Two-Sided Markets. *RAND Journal of Economics*, 37(3):668--691, 2006. 37, 104

A. Attour and M. Della Peruta. Le rôle des connaissances architecturales dans l'élaboration de la plateforme technologique d'un écosystème en

émergence: le cas des plateformes NFC. GREDEG Working Papers 2013-15, Groupe de Recherche en Droit, Économie, Gestion (GREDEG CNRS), University of Nice Sophia Antipolis, April 2013. URL `http://ideas.repec.org/p/gre/wpaper/2013-15.html`. 196, 212

M. Augier and J.G. March. A Retrospective Look at a Behavioral Theory of the Firm. *Journal of Economic Behavior & Organization*, 66:1--6, 2008. 54, 56, 64, 85

J.L. Badaracco Jr. *The Knowledge Link: How Firms Compete Through Strategic Alliances*. Harvard Business School Press, 1991. 54, 194

C. Baden-Fuller and S. Haefliger. Business Models and Technological Innovation. *Long Range Planning*, 46:419--426, 2013. 170

C. Baden-Fuller and M.S. Morgan. Business Models as Models. *Long Range Planning*, 43:156--171, 2010. 170, 172

C.Y. Baldwin and C.J. Woodard. The Architecture of Platforms: a Unified View. In A. Gawer, editor, *Platforms, Markets and Innovation*. Edward Elgar Publishing Ltd., Cheltenham, UK and Northampton, MA, US, 2009. 34, 198

P. Ballon and N. Walravens. Competing Platform Models for Mobile Device Service Delivery: the Importance of Gatekeeper Roles. 2008. 122, 123

J.B. Barney. How a Firm's Capabilities Affect Boundary Decisions. *Sloan Management Review*, 40(3):137--147, 1999. 61

R.C. Basole. Visualization of Interfirm Relations in a Converging Mobile Ecosystem. *Journal of Information Technology*, 24(2):144--159, 2009. 122

R.C. Basole and W.B. Rouse. Complexity of Service Value Networks: Conceptualization and Empirical Investigation. *IBM Systems Journal*, 47(1):53--70, 2009. 122

F.M. Bator. The Anatomy of Market Failure. *Quarterly Journal of Economics*, 72(3):351--379, 1958. 99

W.J. Baumol. *Economic Dynamics: an Introduction*. Macmillan, New York, 1951. 53

W.J. Baumol. *Economic Dynamics: an Introduction*. Macmillan, New York, 1959. 53

W.J. Baumol. On the Theory of Expansion of the Firm. *The American Economic Review*, 52(5):1078--1087, 1962. 53

W.J. Baumol, J. Panzar, and R. Willig. *Contestable Markets and the Theory of Industrial Structure*. Harcourt, Brace, Jovanovich, New York, 1982. 117

W. Baxter. Bank Exchange of Transactional Paper: Legal and Economic Perspective. *Journal of Law and Economics*, 26(3):541--588, 1983. 37

R.A. Bettis and C.K. Prahalad. The Dominant Logic: Retrospective and Extension. *Strategic Management Journal*, 16(1):5--14, 1995. 224

R. Bhaskar. *A Realist Theory of Science*. The Harvester Press Limited, Sussex, second ed. edition, 1978. 196

R. Bhaskar. Philosophy and Scientific Realism. In M. Archer, R. Bhaskar, A. Collier, T. Lawson, and A. Norrie, editors, *Critical Realism: Essential Readings*, pages 16--47. Routledge, London, 1998. 196

T. Blecker and R. Neumann. Inter-organizational Knowledge Management: Some Perspectives for Knowledge Oriented Strategic Management. In *Knowledge Management and Virtual Organizations*, page 350. 2000.

R.J. Boland Jr., K. Lyytinen, and Y. Yoo. Wakes of Innovation in Project Networks: The Case of Digital 3-D Representations in Architecture, Engineering, and Construction. *Organization Science*, 18(4):631--647, 2007. 199

L.J. Bourgeois and K.M. Eisenhardt. Strategic Decision Processes in High Velocity Environments: Four Cases in the Microcomputer Industry. *Management Science*, 34(7):816--835, 1988. 159

T. Bresnahan and S. Greenstein. Technological Competition and the Structure of the Computer Industry. *Journal of Industrial Economics*, (47):1--40, 1999. 35

S. Brusoni. The Limits to Specialization: Problem Solving and Coordination in Modular Networks. *Organization Studies*, 26(12):1885--1907, 2005. 34

S. Brusoni and R. Fontana. Modularity as an Entry Strategy: The Invasion of New Niches in the LAN Equipment Industry. *CESPRI Working Papers 171*, 2005. 198

T. Burger-Helmchen, C. Hussler, and J. Pènin. General Presentation. Rethinking Boundaries for Innovation: Exploring the Shapes and Stakes of the Open Innovation Phenomenon. *Journal of Innovation Economics*, (1):3--10, 2011. 195

B. Caillaud and B. Jullien. Chicken & Egg: Competition among Intermediation Service Providers. *The RAND Journal of Economics*, 34(2): 309--328, 2003. 38

P.R. Carlile. A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development. *Organization Science*, 13(4): 442--455, 2002. 219

P.R. Carlile. Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries. *Organization Science*, 15(5):555--568, 2004. 219

R. Cassady. *Auctions and Auctioneering*. University of California Press, Berkley and Los Angeles, California, 1967. 102

A.D. Chandler. What is a Firm - a Historical Perspective. *European Economic Review*, 36(2-3):483--492, 1992a. 55, 63, 84

A.D. Chandler. Organizational Capabilities, and the Economic History of the Industrial Enterprise. *Journal of Economic Perspectives*, 6:79--100, 1992b. 54, 55, 56, 84, 85

H. Chesbrough. *Open Business Models*. Harvard Business Press, 2006. 194

H. Chesbrough, A. Di Minin, and A. Piccaluga. *New Business Models and Value Creation: A Service Science Perspective*, chapter Business Model Innovation Paths, pages 45--46. Springer, Milan, 2014. 194

H. W. Chesbrough. *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Harvard Business School Press, Boston, 2003. 9, 201

H. W. Chesbrough. *Open Services Innovation: Rethinking your Business to Grow and Compete in a New Era*. Jossey-Bass, 2011. 18

R.H. Coase. The Nature of the Firm. *Economica*, 4(16):386--405, 1937. 50, 52, 56, 62, 85

R.H. Coase. The Problem of Social Cost. *Journal of Law and Economics*, 3:1--44, 1960. 53

R.H. Coase. The Nature of the Firm: Influence. *Journal of Law, Economics, and Organization*, 1988. 52

L.R. Cohen. The Firm: A Revised Definition. *Southern Economic Journal*, 46(2):580--590, 1979. 57, 85

A. Cournot. *Research into the Mathematical Principles of the Theory of Wealth*. MacMillan, New York, 1897. 58

R.W. Crandall and C. Winston. Does Antitrust Policy Improve Consumer Welfare? Assessing the Evidence. *Journal of Economic Perspective*, 17 (4):3--26, 2003. 237, 248

M.A. Cusumano. *Staying Power: Six Enduring Principles for Managing Strategy and Innovation in an Uncertain World*. Oxford University Press, USA, 2010. 199

M.A. Cusumano and A. Gawer. The Elements of Platform Leadership. *MIT Sloan Review*, 43(3):51--58, 2002. 35, 37

R.M. Cyert and J.G. March. *A Behavioral Theory of the Firm*. Prentice Hall: Engelwood Cliffs, New Jersey, 1963. 50, 53, 54, 56, 85

L. Dahlander and D.M. Gann. How Open is Innovation? *Research Policy*, 39(6):699--709, 2010. 14

E. De Vogeleer and D. Lescop. Plateformes, Coordination et Incitations. *Revue Management et Avenir*, (46):200--218, 2011. 43

H. Demsetz. Toward a Theory of Property Rights. *American Economic Review*, 57(2):347--359, 1967. 50, 53

K. Dittrich and G. Duysters. Networking as a means to strategy change: The case of open innovation in mobile telephony. *The Journal of Product Innovation Management*, 24:510--521, 2007. 5

G. Dosi and L. Marengo. *Competence, Governance and Entrepreneurship*, chapter On the Tangled Discourse Between Transaction Cost Economics and Competence-Based Views of the Firm, pages 80--92. Oxford University Press, Oxford, 2000. 56, 57, 85

Nelson R.R. Dosi, G. and S.G. Winter. *The Nature and Dynamics of Organizational Capabilities*, chapter Introduction. The Nature and Dynamics of Organizational Capabilities, pages 1--22. Oxford University Press, Oxford, 2000. 54, 56, 85

Y.L. Doz and M. Kosonen. Embedding Strategic Agility: A Leadership Agenda for Accelerating Business Model Renewal. *Long Range Planning*, 43(2):370--382, 2010. 220

K.N.M. Dundas and P. Richardson. Corporate Strategy and the Concept of Market Failure. *The Strategic Management Journal*, 1(2):177--188, 1980. 100

K.M. Eisenhardt and J.A. Martin. Dynamic Capabilities: What are They? *Strategic Management Journal*, 21(10-11):1105--1121, 2000. 211

T. Eisenmann, G. Parker, and M. Van Alstyne. Platform Envelopment. *Strategic Management Journal*, 32(12):1270--1285, 2011. 226

D. Evans and R. Schmalensee. The Industrial Organization of Markets with Two-Sided Platforms. *Competition Policy International*, 3(1): 151--179, 2007a. 248

D.S. Evans. The Antitrust Economics of Multi-Sided Platform Markets. *Yale Journal on Regulation*, 20(2):325--281, 2003. 248

D.S. Evans. Antitrust Issues Raised by the Emerging Global Internet Economy. *Northwestern University Law Review Colloquy*, 102:285--306, 2008. 248

D.S. Evans and R. Schmalensee. *Catalyst Code: The Strategies Behind the World's Most Dynamic Companies*. Harvard Business School Press, Boston, Massachusetts, 2007b. 39, 40, 42, 45, 194, 207

D.S. Evans and R. Schmalensee. The Antitrust Analysis of Multi-Sided Platform Businesses. In Blair R. and D. Sokal, editors, *Owford Handbook on International Antitrust Economics*. Oxford University Press, 2013. 237, 245, 246, 248, 250, 256

D.S. Evans, A. Hagiu, and R. Schmalensee. *Invisible Engines: How Software Platforms Drive Innovation and Transform Industries*. MIT Press, Cambridge, MA, 1st edition, 2006. 28, 36, 40, 41, 42, 105, 221

C. H. Fine. *Industry Clockspeed and Competency Chain Design: an Introductory Essay*. Springer, Berlin Heidelberg, 1999. 210

N.J. Foss. Capabilities and the Theory of the Firm. *Revue d'Economie Industrielle*, (77):7--28, 1996. 56, 85

N.J. Foss. *Theories of the Firm. Critical Perspectives on Business and Management*, chapter The Theory of the Firm: an Introduction to Themes and Contributions. Routledge, London, 2000. 50

A. Gawer. Platform Dynamics and Strategies: From Products to Services. In A. Gawer, editor, *Platforms, Markets and Innovation*. Edward Elgar Publishing Ltd., Cheltenham, UK and Northampton, MA, US, 2009. 34, 35, 37

A. Gawer and M.A. Cusumano. *Platform Leadership*. Harvard Business School Press, Boston, MA, 2002. 198

A. Gawer and M.A. Cusumano. How Firms Become Platform Leaders. *MIT Sloan Management Review*, 69(2):28--35, 2008. 37

R. Gibbons. Four formal(izable) Theories of the Firm? *Journal of Economic Behavior & Organization*, 58(2):200--245, October 2005. 50, 52, 53

R.M. Grant. Porter's 'Competitive Advantage of Nations': An Assessment. *Strategic Management Journal*, 12(7):535--548, 1991. 54

R.M. Grant. Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal*, 17:109--122, 1996. 54

S.J. Grossman and O.D. Hart. The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy*, 94(4):691--719, August 1986. 53

A. Hagiu. Multi-Sided Platforms: From Microfoundations to Design and Expansion Strategies. *Working Paper Journal*, 2009. Working Paper 09-115. 40, 41

A. Hagiu and J. Wright. Multi-sided Platforms. *Working Paper Journal*, 2011. Working Paper 12-024. 40

S. H. Hallerstede. *Managing the Lifecycle of Open Innovation Platforms*. Springer Fachmedien Wiesbaden, 2013. 195

F.V. Hayek. The Use of Knowledge in Society. *American Economic Review*, 35(4):519--530, 1945. 58

Z.-L. He, K. Lim, and P.-K. Wong. Entry and Competitive Dynamics in the Mobile Telecommunications Market. *Research Policy*, 35(2006): 1147--1165, 2006. 126, 135

C.E. Helfat and D.J. Teece. Vertical Integration and Risk Reduction. *Journal of Law, Economics and Organization*, 3(1):47--67, 1987. 60

J. Henkel, S. Schöberl, and O. Alexy. The Emergence of Openness: How and Why Firms Adopt Selective Revealing in Open Innovation. *Research Policy*, 2013. 194

G. Hodgson. *Economics and Institutions — a Manifesto for a Modern Institutional Economics*. Polity Press, Cambridge, 1988. 59

B. Holmstrom and P. Milgrom. Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design. *Journal of Law, Economics, & Organization*, 7(Special Issue: Papers from the Conference on the New Science of Organization):24--52, January 1991. 50, 53

M. Iansiti and R. Levien. *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*. Harvard Business School Press, Boston, 2004. 36, 37, 45, 104, 118, 120, 124, 149, 202, 219, 227

T. Isckia. Amazon's Evolving Ecosystem: A Cyber-Bookstore and Application Service Provider. *Canadian Journal of Administrative Sciences*, 26(4):332--343, 2009. 196, 226

T. Isckia and D. Lescop. Open Innovation within Business Ecosystems: a Tale from Amazon.com. *Communications & Strategies*, (74):37--54, 2nd quarter 2009. 22, 197

T. Isckia and D. Lescop. Platform-based Ecosystems: Leveraging Network Centric Innovation. In S. Ben Letaïfa, A. Gratacap, and T. Isckia, editors, *Understanding Business Ecosystems: How Firms Succeed in the New World of Convergence*, pages 97--117. De Boeck, 2013. ISBN 2804176762. 196

B. Iyer and T.H. Davenport. Reverse Engineering Google's Innovation Machine. *Harvard Business Review*, pages 59--68, April 2008. 17

M.G. Jacobides and S. Billinger. Designing the Boundaries of the Firm: From 'Make, Buy, or Ally' to the Dynamic Benefits of Vertical Architecture. *Organization Science*, 17(2):249--261, 2006. 122

P. Järvinen. Research Questions Guiding Selection of an Appropriate Research Method. In *ECIS*, pages 124--131, 2000. 196

M.C. Jensen and W.H. Meckling. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3(4):305--360, 1976. 53, 55, 62, 84

W.S. Jevons. *The Theory of Political Economy.* MacMillan, London, 1871. 58

D. Kantarelis. *Theories of the Firm.* Inderscience, 2nd edition, 2007. 50, 52

K. Kellogg, W. Orlikowski, and J. Yates. Life in the trading zone: structuring coordination across boundaries in postbureaucratic organizations. *Organization Science*, 17(1):22--44, 2006. 211

F.H. Knight. *Risk, Uncertainty and Profit.* Harper, New York, 1921. 52, 62

A. Lam. Embedded Firms, Embedded Knowledge: Problems of Collaboration and Knowledge Transfer in Global Cooperative Ventures. *Organization Studies*, 18(6):973--996, 1997. 194

J. Laugesen and Y. Yuan. What Factors Contributed to the Success of Apple's iPhone? Athenes, Greece, June 2010. 132

D. Lescop and T. Isckia. (Re)shaping the Mobile Sector: the Breaker, the Trojan and... the Shopping Malls. *Communication & Strategies*, 78:161--169, 2010. 122

D. Lescop and E. Lescop. Platform Ecosystem and Firm/Market Equivalency: the Case of Apple iPhone. In S. Ben Letaïfa, A. Gratacap, and T. Isckia, editors, *Understanding Business Ecosystems: How Firms Succeed in the New World of Convergence*, pages 119--132. De Boeck, 2013. 196

T. Loilier and M. Malherbe. Experimentation and the Development of Eco-Systemic Competencies in the Field of Contactless Mobile Services. In S. Ben Letaïfa, A. Gratacap, and T. Isckia, editors, *Understanding Business Ecosystems: How Firms Succeed in the New World of Convergence*, pages 193--209. De Boeck, 2013. ISBN 2804176762. 196, 206

J.S.E. Lundstrom, M. Wiberg, S. Hrastinski, M. Edenius, and P.J. Ågerfalk, editors. *Managing Open Innovation Technologies*. Springer, 2013. 195

F. Machlup. Theories of the Firm: Marginalist, Behavioral, Managerial. *The American Economic Review*, 57(1):1--33, 1967. 50, 57

V. Mahnke. Why Theories of Firm Boundaries Need an Evolutionary Process Dimension? DRUID-Conference, 2001. 53, 54, 63

J. March and H.A. Simon. *Organizations*. Wiley, New York, 1958. 56, 62, 85

R.L. Marris. *The Economic Theory of Managerial Capitalism*. The Free Press, Illinois, 1964. 53

S. Masten. A Legal Basis for the Firm. *Journal of Law, Economics, and Organization*, 4:181--198, 1988. 56, 62, 84

M.V. Maula, T. Keil, and J.P. Salmenkaita. Open Innovation in Systemic Innovation Contexts. In H. Chesbrough, W. Vanhaverbeke, and J. West, editors, *Open innovation: Researching a New Paradigm*, pages 241--257. Oxford University Press, 2006. 194, 197, 209

R.P. McAfee, H.M. Mialon, and M.A. Williams. When are Sunk Costs Barriers to Entry? Entry Barriers in Economic and Antitrust Analysis. *American Economic Review*, 94(2):461--465, May 2004. 117

J.F. Moore. Predators and Prey: A New Ecology of Competition. *Harvard Business Review*, pages 75--86, May-June 1993. 35, 68, 104, 196, 203

J.F. Moore. *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*. Harper Business, New York, 1996. 35

J.F. Moore. *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*. Harper Paperbacks, 1997. 35, 104

J.F. Moore. Business Ecosystems and the View from the Firm. *Antitrust Bulletin*, 51(1):31--75, Spring 2006. 36, 104

M. Motta. *Competition Policy - Theory and Practice*. Cambridge University Press, New York, 2004. 247, 256

R.R. Nelson and S.G. Winter. *An Evolutionary Theory of Economic Change*. Belknap Press of Harvard University Press, Cambridge, 1982. 53

OECD. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. Paris, 3^{rd} edition edition, 2005. 8

OECD. *Open Innovation in Global Networks*. Paris, November 2008. 10

OECD. *Two-sided Markets, Policy Roundtable, Competition Law and Policy*. Daf/comp(2009)20 edition, December 2009. 249, 251, 260

A. Osterwalder and Y. Pigneur. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. Wiley, 2009. 22

A. Parmigiani and W. Mitchell. Complementarity, Capabilities, and the Boundaries of the Firm: the Impact of Within-Firm and Interfirm Expertise on Concurrent Sourcing of Complementary Components. *Strategic Management Journal*, (30):1065--1091, 2009. 61, 64

M. Peltoniemi. Preliminary Theoretical Framework for the Study of Business Ecosystems. *Emergence: Complexity & Organization*, 8(1): 10--19, 2006. 113

J. Pénin. Are you Open? An Investigation of the Concept of Openness for Knowledge and Innovation. *Revue Economique*, 64(1):133--148, 2013. 10

E.T. Penrose. *The Theory of the Growth of the Firm*. Oxford University Press, New York, 1st edition, 1959. 54, 55, 62

E.T. Penrose. *The Theory of the Growth of the Firm*. Oxford University Press, New York, 3rd edition, 1995. 52, 54, 55, 56, 60, 84

G.P. Pisano. The R&D Boundaries of the Firm: An Empirical Analysis. *Administrative Science Quarterly*, 35(1):153--176, 1990. 66

J. Potts. Knowledge and Markets. *Journal of Evolutionary Economics*, 11(4):413--431, 2001. 61, 63

G.B. Richardson. The Organisation of Industry. *The Economic Journal*, 82(327):883--896, 1972. 60

G.B. Richardson. *Economic Organization, Capabilities and Co-ordination*, chapter Some Principles of Economic organization, pages 44--62. Routledge, London, 1998. 55, 63, 84

A.K. Ridder. External Dynamic Capabilities: Competitive Advantage in Innovation via External Resource Renewal. In *Academy of Management Proceedings*, volume 2013, page 10356. Academy of Management, 2013. 211

J.C. Rochet and J. Tirole. Platform Competition in Two-Sided Markets. *Journal of the European Economic Association*, 1(4):990--1029, 2003. 37, 104

J.C. Rochet and J. Tirole. Two-Sided Markets: A Progress Report. *RAND Journal of Economics*, 37(3):645--667, 2006. 37, 104

F.E. Rosenbaum. What is a Market? On the Methodology of a Contested Concept. *Review of Social Economy*, 58(4):455--482, 2000. 58

A.E. Roth. What Have We Learned from Market Design? *The Economic Journal*, 118(527):285--310, 2008. 59, 199

M. Rysman. The Economics of Two-Sided Markets. *Journal of Economic Perspectives*, 23(3):125--143, 2009. 37, 38, 104, 207

C. Shapiro and H.R. Varian. *Information Rules*. Harvard Business School Press, 1999. 38

J.P. Shen. Interview with John Paul Shen, Palo Alto Nokia Research Center, USA. *Communication & Strategies*, (74):117--123, 2009. 16

H. Simon. A Formal Theory of the Employment Relationship. *Econometrica*, 19(3):293--305, July 1951. 50, 54, 56, 85

J.Z. Sissors. What is a Market? *Journal of Marketing*, 30(3):17--21, 1966. 58

M.L. Smith. Overcoming Theory-Practice Inconsistencies: Critical Realism and Information Systems Research. *Information and Organization*, 16(3):191--211, 2006. 196

C. Steven. *Appillionaires: Secrets from Developers Who Struck It Rich on the App Store*. John Wiley and Son, Ltd., 2011.

R. Tee and A. Gawer. Industry Architecture as a Determinant of Successful Platform Strategies: a Case Study of the i-Mode Mobile Internet Service. *European Management Review*, 6:217--232, 2009. 122, 127

D. Teece. Business Models, Business Strategy and Innovation. *Long Range Planning*, 43:172--194, 2010. 170

D.J. Teece. Towards an economic theory of the multiproduct firm. *Journal of Economic Behavior & Organization*, 3(1):39--63, 1982. 60

D.J. Teece. Competition, Cooperation, and Innovation: Organizational Arrangements for Regimes of Rapid Technological Progress. *Journal of Economic Behavior & Organization*, 18(1):1--25, 1992. 200

D.J. Teece. Firm Organization, Industrial Structure, and Technological Innovation. *Journal of Economic Behavior & Organization*, 31(2): 193--224, 1996. 194

D.J. Teece. Explicating Dynamic Capabilities: the Nature and Micro-Foundations of (Sustainable) Enterprise Performance. *Strategic Management Journal*, 28(13):1319--1350, 2007. 211

D.J. Teece. *Dynamic Capabilities and Strategic Management*. Oxford University Press, New York, 2009. 243, 253

D.J. Teece, G. Pisano, and A. Shuen. Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 1997. 210

A. Tiwana. *Platform Ecosystems: Aligning Architecture, Governance, and Strategy*. Elsevier, Morgan Kaufman, Waltam, USA, 2014. 212, 213, 214, 220

A. Tiwana, B. Konsynski, and A.A. Bush. Research Commentary-Platform Evolution: Coevolution of Platform Architecture, Governance, and Environmental Dynamics. *Information Systems Research*, 21(4):675--687, 2010. 197

F. Volgenstein. The Untold Story: How the iPhone Blew Up the Wireless Industry. *Wired Magazine*, September 2008. 132

E. von Hippel. *Democratizing Innovation*. The MIT Press, New York, USA, 2005. 7

B. Wernerfelt. A Resource-Based View of the Firm. *Strategic Management Journal*, 5(2):171--180, 1984. 54

J. West. How Open is Open Enough? Melding Proprietary and Open Source Platform Strategies. *Research Policy*, (32):1259--1285, 2003. 35

J. West and M. Mace. Browsing as the Killer App: Explaining the Rapid Success of Apple's iPhone. *Telecommunications Policy*, 34:270--286, 2010. 122

E.G. Weyl. A Price Theory of Multi-sided Platforms. *American Economic Review*, 100(4):1642--1672, 2010. 37

S.C. Wheelwright and K.B. Clark. Creating Project Plans to Focus Product Development. *Harvard Business Review*, 70(2):67--83, 1992. 34, 41

O.E. Williamson. Peak-Load Pricing and Optimal Capacity Under Invisibility Constraints. *American Economic Review*, 56(4):810--827, 1966. 53

O.E. Williamson. *Corporate Control and Business Behavior: An Inquiry Into the Effects of Organization Form on Enterprise Behavior*. Prentice-Hall, Englewood Cliffs, USA, 1970. 52

O.E. Williamson. The Vertical Integration of Production: Market Failure Considerations. *American Economic Review*, 61(2):112--123, 1971. 50, 54

O.E. Williamson. *Markets and Hierarchies: Analysis and Antitrust Implications*. The Free Press, New York, 1975. 53, 99, 100

O.E. Williamson. *The Economic Institutions of Capitalism*. The Free Press, New York, 1985. 54, 56, 85

S.G. Winter. On Coase, Competence, and the Corporation. *Journal of Law, Economics, and Organization*, 4(1):163--180, 1988. 54, 56, 61, 62, 85

O. Wirtz, A. Matthiew, and O. Schilke. Strategy in High Velocity Environments. *Long Range Planning*, 40(3):295--313, 2007. 159

O. Wirtz, O. Schilke, and S. Ullrich. Strategic Development of Business Models. Implications for the Web 2.0 for Creating Value on the Internet. *Long Range Planning*, 43:272--290, 2010. 170

R. Yin. *Case Study Research: Design and Method*. Sage Publishing, Beverly Hills, CA, 2 edition, 1994. 121, 170

Y. Yoo, K. Lyytinen, and H. Yang. The Role of Standards in Innovation and Diffusion of Broadband Mobile Services: the Case of South Korea. *The Journal of Strategic Information Systems*, 14(3):323--353, 2005. 198

Y. Yoo, K. Lyytinen, V. Thummadi, and A. Weiss. Unbounded Innovation with Digitalization: A Case of Digital Camera. In *Annual Meeting of the Academy of Management*, 2010. 198, 199

F. Zirpoli and M. Caputo. The Nature of Buyer-Supplier Relationships in Co-Design Activities: the Italian Auto Industry Case. *International Journal of Operations and Production Management*, 22(12):1389--1410, 2002. 34

M. Zollo and S.G. Winter. Deliberate Learning and the Evolution of Dynamic Capabilities. *Organization Science*, 13(3):339--351, 2002. 211

C. Zoot and R. Amit. Business Model Design: An Activity System Perspective. *Long Range Planning*, 43:216--226, 2010. 170

