Openness at Google: Perspectives from Theory and Practice

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ABSTRACT

Open innovation was defined by Chesbrough (2003) as a development process that allows ideas to flow through the boundaries of the firm. However, while open innovation has been the focus of extensive research and discussions since its definition by Chesbrough in 2003, no consensus has been reached on a single meaning of the term. Starting from a publication by Rosenberg (2009) that defines openness at Google as the combination of open technology and open information, this paper draws on works and discussions on open innovation to assess Google's openness. While openness is often considered as a binary measure and a single dimension, it needs to be defined as a multi-dimensional concept measured on continuous scales. In this respect, Google's openness significantly varies depending on products and dimensions of openness. For instance, while Google is open with respect to promoting open-source and open standards, the company does not open source the majority of its products. While Google's selective openness has received heavy criticisms, we conclude that openness should be recognized as a strategy that allows the firm to generate profits, rather than serve altruistic goals.

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1 Introduction

Contrary to popular belief, the principles behind open innovation are not modern day concepts but date back to well over a hundred years ago. Ulrich Lichtenthaler, an award winning innovation management scholar, reports that numerous accounts of open innovation existed in the U.S. industrial research system during the late 19th and early 20th centuries. Moreover, authors have published works describing open innovation as “old wine” in new bottles (Trott & Hartmann, 2009).

Interestingly enough, while the concept of open innovation bridges more than a century, it is only in the past few years that research on this subject has begun to appear. Henry Chesbrough, a leader in open innovation research, coined the term “open innovation” in his book OPEN INNOVATION: THE NEW IMPERATIVE FOR CREATING AND PROFITING; in doing so, Chesbrough paved the way for others to begin exploring the term and investigating methods for applying the concept to business practices.

However, “open innovation” means different things to different people. Lichtenthaler highlights that academic research of open innovation can be classified into five main areas: technology transactions (Chesbrough, 2003; Ahuja, 2000; etc.), user innovation (von Hippel, 1988; Piller & Walcher, 2006; etc.), the role of business models (Chesbrough, 2006; West, 2006; etc.), innovation markets (Chesbrough, 2007; Arora & Gambardella, 2010; Gans & Stern, 2009; etc.) and support of open innovation (Chesbrough et al., 2006; etc.)

In parallel, the web/software industry adopted the term “open innovation” when large platforms began to appear. In the sense of a platform, the term “open” shortly became part of everyday vocabulary for a significant number of technology companies. As Eric Schonfeld emphasized in an article written on Techcrunch.com, companies seem to be tripping over themselves more than ever before to claim the mantle of openness (Schonfeld, 2007). Indeed, the largest software platforms, Google (Rosenberg, 2009), Facebook (Recordon, 2010), and Microsoft (Microsoft Corp., 2008) have commented on their views of open innovation and have published their views on openness, often advocating its benefits for the company and the industry as a whole. In light of the new trend for large software companies to be “open”, a
significant amount of academic research, web discussions, and blogging has been published supporting, criticizing, clarifying or redefining the term “open”.

While the term openness includes several concepts of “open innovation”, the term “open”, which is often used to assess the openness of a platform, aligns differently. The highly debatable concept, “openness”, embraces the meanings of open innovation, but it also includes interconnected concepts such as platform accessibility, platform distribution, and people sharing behaviors. In the complex discussion on the meaning of openness, we observe a strong tendency for bloggers and critics to classify companies in a binary way: either “open” or not “open”. In this work, we however understand that such a radical classification is not possible, given the complexity of companies and the breadth of the definition of openness. We base our analysis on academic frameworks similar to those proposed by J. West & O'Mahony (2008), Thomas R. Eisenmann et al. (2009), and the VisionMobile’s “openness index” (2011), which suggest a more continuous approach to the degree of openness.

In this thesis, we attempt to assess the openness of Google’s “mega platform”, as it pertains to the opinions of critics and academic frameworks regarding openness of platforms or open innovation. In addition, we use the example of Android to assess the open source openness of one of Google’s open source products.

Google defines openness as a combination of two factors: Open Technology and Open Information (Rosenberg, 2009). Open technology comprises open source, which is Google’s dedication to release and support open source code, and open standards, which is Google’s dedication to work with accepted open standards when available, improve them when necessary, and create them when they don’t exist. On the other hand, open information means that Google accesses users’ data to provide them with valuable products while being transparent about the information the company holds and giving users ultimate control over their information.

In a first step of our analysis, we take Google’s definition of openness and compare it with the company’s practices. We observe that while Google diligently attempts to comply with its goal to be more open, several events may suggest otherwise. For instance, Google was recently
accused of bypassing default privacy settings in Safari in order to better track users (Halzack, 2012); this does not comply with their principle of open information and control. Similarly, Google recently announced their upcoming plan for improving the search engine. The aim is to provide direct answers for searches without directing the user to external websites and ultimately increasing the amount of time users spend on Google. However, this plan goes against their idea of interoperability and not locking users into Google.

In the second step, we assess Google’s openness according to definitions from academics including Eisenmann et al. (2009) and West & O’Mahony (2008). We acknowledge the difficulty in assessing Google’s openness in its entirety because of Google’s mega-platform structure constituted of nested platforms. We use the role-based openness framework of Eisenmann et al. to assess the company’s openness on the demand-side user, supply-side user, platform provider, and sponsor roles. We conclude that the Web Giant is mainly open on the demand-side user role (i.e., anyone can use the platform) and the supply side-user role (i.e., third parties can easily complement the products through numerous API’s and application markets). However, since Google directly distributes the majority of its products, we conclude that the firm is mostly closed on the platform provider role.

Furthermore, we observe that Google has a closed sponsorship model on the majority of its products, yet we acknowledge the existence of major open source products including Android and Chromium. Using West & O’Mahony’s framework for assessing the open-source openness of Android, we observe that Android’s governance has a low level of transparency and accessibility limiting the product’s “platform sponsor” openness. Moreover, we observe that Google uses trademark control mechanisms and tightly controlled production processes to retain the maximum control over the product development life; we conclude that those mechanisms tend to reduce both the “platform provider” openness and the “platform sponsor” openness.

While investigating the meaning of openness, we observed numerous publications criticizing the firm’s views on openness for their attempt to profit from the concept. Some believe the term “open” carries a public connotation of generosity and altruism. However, while firms tend to
believe that openness benefits the industry, we emphasize that firms admit to use openness as a strategy for maximizing profits rather than acting in a purely altruistic way. The need for firms to profit from their openness strategy is further supported in Chesbrough’s work on the importance of adapting business models to innovation (Chesbrough, 2006).

Recognizing that openness is a strategy rather than altruism, we attempt to demonstrate how Google’s openness strategy benefits the company. Starting with the assessment of open source strategy, we suggest that Google may find open sourcing its products unattractive when 1) the product significantly contributes to the generation of advertising revenues, 2) the value of the product comes from the superiority of its technology, 3) there are no network effects that increase the value of the product to the user, and 4) the costs of users switching to an equivalent product are low. These scenarios could explain why the majority of Google’s products are not open source, yet we highlight that some products greatly benefit from being open source because open source strategy helps companies leverage external knowledge and creates innovative products. Nevertheless, we recognize that open source might imply some loss of control and fragmentation (West & O’Mahony, 2008; Helft, 2010), and consequently justifies Google’s tight control over Android.

Following with the assessment of interoperability strategy, we recognize Rosenberg’s argument that open standards that benefit the growth of the industry in turn benefit Google. Beyond this argument, we highlight Google’s interest in spurring the adoption of its products; working on defining open standards that best fit with Google’s technologies is therefore a strategy that fosters the development of an entire ecosystem of products that use Google technologies.

Recognizing the benefits of Google’s controlled openness strategy, we highlight the negative effects of openness and the chaotic innovation process at Google. While the latter led to the company’s exponential growth and ownership of successful products, the chaotic trial and error innovation process was potentially responsible for the company’s loss of focus and its misunderstanding of key trends such as social.

We finalize our discussion with an assessment of the impact of large companies’ openness strategies on the industry. While we support Rosenberg in recognizing the benefits that open
standards and open source can bring to the industry, we argue that large corporations can use open strategies as weapons to disrupt industries and enter new markets. In addition, we acknowledge the work of Clemons & Madhani(2010) and recognize that when combined with third party models, openness strategies can create monopolies and new forms of winner-take-all.

2 Open innovation means different things to different people

In this chapter, we use examples of academic publications, combined with examples of how several companies view open innovation, to illustrate the subjectivity of the term “open innovation”. We do not pretend to do a comprehensive literature review on the subject, nor do we identify all possible means for applying those principles in the industry.

2.1 The origins of open innovation

Open innovation was recently described as “old wine” in new bottles (Trott & Hartmann, 2009). Indeed, the practices of open innovation, as described by Henry Chesbrough and other open innovation thinkers, have occurred for centuries before the term “open innovation” was officially coined. Lichtenthaler (2011) uses the work of Mowery (2009) to highlight that numerous elements of the open innovation approach were observable in the late 19th and early 20th centuries.

H. Chesbrough is considered to have coined the term “open innovation” in his book titled OPEN INNOVATION THE NEW IMPERATIVE FOR CREATING AND PROFITING FROM TECHNOLOGY (Chesbrough, 2003). By doing so, Chesbrough broadly embraces the concept of open innovation defined as innovations that transit through the boundaries of the firm, inbound, and outbound.

Figure 1 uses Google NGram Viewer1 to highlight the relationship between Chesbrough’s publication in 2003 and the explosion of the occurrence of the “open innovation” term.

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1 Google NGram Viewer is a free web tool developed by Google. The NGram viewer gives the number of occurrences of a given word or expression as a percentage of the total number of similar length expressions within a chosen corpus. While the corpus is not exhaustive, the millions of books indexed in the corpus make the NGram viewer a powerful statistical tool. The NGram viewer can be accessed at http://books.google.com/ngrams
However, while H. Chesbrough is recognized for coining and promoting the term there is some evidence suggesting its usage dates back to the early 19th century. Figure 1 shows the term open innovation cited in 1837 by Richard Alfred Davenport.

![Figure 1 - Occurrences of term "open innovation" in the English corpus between 1800 and 2011. Source: Google NGram viewer. Accessed 15 February 2012](image)

In his book titled *Sketches of Imposture: Deception and Credulity*, Davenport (1837) describes how a doctor performs open innovation on a patient’s wound, and how he heals remedies because of his heightened understanding of the human body.

*The fact was the sympathetical physician understood the cure of wounds by adhesion more perfectly than others but it was necessary to cheat the world into this safe method of cure [...]. The public opinion would have been so strong against any open innovation that the sympathetic doctors got credit for something like witchcraft and condescended. (Davenport, 1837)*

The meaning of open innovation in this passage is close to Eric von Hippel’s later description of user innovation principles, but is to a larger extent embraced by Chesbrough’s broader definition of open innovation.
2.2 Examples of academic research on open innovation

2.2.1 Chesbrough – a corner stone in the field

As highlighted in the previous section, we can consider Henry Chesbrough to be at the origin of the term open innovation. Nevertheless, Lichtenthaler noted that studies prior to Chesbrough’s work, in the field of interorganizational innovation (e.g., absorptive capacity (Cohen & Levinthal, 1990)), have been the foundation of our understanding of open innovation, although they do not use the specific term “open innovation” (Lichtenhaler, 2011).

Chesbrough defined open innovation as the process during which innovations flow through porous firm boundaries (Chesbrough, 2003). Firms interact with their surroundings to create an ecosystem within which innovations are more liquid. External knowledge exploration is defined as the process of how companies acquire open innovation or acquire the right to use innovations that are developed outside the firm (Chesbrough, 2003; Lichtenhaler, 2011). External knowledge exploitation is defined as the process by which companies sell or license innovations that were developed inside the firm (Chesbrough, 2003; Lichtenhaler, 2011). Open innovation is the combination of external knowledge exploration and exploitations.

Following the above definition, Chesbrough argues that the difference between open and closed innovation lies in the screening of ideas - In closed innovation bad ideas are discarded, but Open innovation also incorporates the ability to rescue “false negative” (Chesbrough, 2003).
Beyond defining open innovation, Chesbrough advocates that companies should open up if they want to remain competitive. Costs of technology developments are rising, and the life cycles of products are shortening; opening up the innovation process would generate cost and time saving from leveraging external development (Chesbrough, 2006).

In addition, Chesbrough argues companies that do not open up their innovation processes waist resources; 75% to 95% of patents are dormant/unused within the enterprises. This is “Closed IP Management” making IP only accessible from within the enterprise, which is a social loss because it prevents individuals from using or building on this technology. Opening the firm boundaries to allow innovations flowing outside would then generate new revenues from licenses, spin-off, and sales divestiture. Furthermore, giving a use to dormant ideas would have several other advantages (Chesbrough, 2006):

1. They would otherwise be a waste of corporate resources
2. The staff who worked hard to produce them could be demoralized if their work turns out to be useless
3. They generate congestion in the innovation system
4. Releasing any unused ideas could generate knowledge about market technical opportunity
5. Unused ideas may leak or may be invented by someone else

With increased complexity of innovation and shorter product cycles, Chesbrough makes the observation that the world’s smartest people can’t all work for one single company (Chesbrough, 2003). Opening the innovation process allows firms to tap into a broader knowledge they wouldn’t have been able to access otherwise.

The underlying assumptions behind closed and open innovation are well summarized in the table below extracted from the MIT Sloan Management Review (Chesbrough, 2003).
Closed innovation principles | Open innovation principles
--- | ---
The smart people in our field work for us. | Not all of the smart people work for us* so we must find and tap into the knowledge and expertise of bright individuals outside our company.
To profit from R&D, we must discover, develop and ship it ourselves. | External R&D can create significant value; internal R&D is needed claim some portion of that value.
If we discover it ourselves, we will get it to market first. | We don’t have to originate the research in order to profit from it.
If we are the first to commercialize an innovation, we will win. | Building a better business model is better than getting to market first.
If we create the most and best ideas in the industry, we will win. | If we make the best use of internal and external ideas, we will win.
We should control our intellectual property (IP) so that our competitors don’t profit from our ideas. | We should profit from others’ use of our IP, and we should buy others’ IP whenever it advances our own business model.


Table 1 - Chesbrough’s principles of open and closed innovation extracted from the MIT Sloan Management Review (Chersbrough, 2003)

While Chesbrough highlights the importance of companies opening their innovation processes and adapting their business models accordingly, he also emphasizes that opening the innovation process is not always easy. In particular, the attitude of the employees towards this concept ("not invented here" or "not sold here" syndromes) (Chesbrough, 2006) can constitute significant barriers for change. Moreover, Chesbrough’s belief that companies need to become more open ultimately relies on the possible existence of markets for ideas; nevertheless, efficient market for ideas can be difficult to create. Gans & Stern highlight the inherent properties of ideas, idea complementarity, user reproducibility, and value rivalry, which make it difficult for efficient market for ideas to exist (Gans & Stern, 2010).

2.2.2 Lichtenthaler: 4 main fields of research
The academic literature on open innovation is incredibly wide. Since our goal is not to provide a comprehensive review of the open innovation subject, but rather to give an idea of important
and diverging concepts while highlighting the subjectivity of the term, we use the work of Lichtenthaler who identified four main streams of research (Lichtenthaler, 2011).

Lichtenthaler identified Technology transactions as the first line of research for which Chesbrough is an important contributor; it includes the work on inward technology transfers (the acquisition of technology), outward technology transfers (selling technology), external technology retention (the maintenance and retention of knowledge by a third party), and interorganizational innovation (firms collaboration to jointly innovate). Lichtenthaler identifies other influential authors: Fosfuri, Dittrich & Duysters; Zaheer, Gözübüyük, & Milanov and Ahuja.

Lichtenthaler identifies the second line of research as user innovation for which the work done by von Hippel is an important cornerstone. User innovation focuses on innovations performed by product users rather than product manufacturers. User innovation studies how firms collaborate with users, how firms profit from user innovation and how the role of toolkits accelerates the competition of ideas. Influential authors in this area include von Hippel, Bogers, Afuah & Bastian.

The third line of research is the role of the business models, which studies the importance of the business model in the context of open innovation. Lichtenthaler identifies Chesbrough; Van der Meer; West; Helfat and Alexy et al. as the most influential authors in this area.

Finally, Lichtenthaler depicts a fourth line of research focusing on innovation markets, the possibility to market ideas and technologies, the role of intellectual property, and the role of intermediary brokers. Lichtenthaler highlights Chesbrough; Arora & Gambardella and Howells in this line of research to which we would like to add the previously mentioned works of Gans & Stern.

While Lichtenthaler identifies four main disciplines of open innovation, there is a plethora of other fields of research linked to open innovation. For instance, there is a significant amount of work on the concept of open source, of which we will use some ideas for assessing Google's openness. Furthermore, a significant amount of work was completed on the concept of "openness" of a platform. However, while "openness" and "open innovation" share common
concepts, they are not identical. Openness seems broader than open innovation as it includes innovation processes, but also openness of access, openness of distribution, etc. Trying to map the works on open innovation and openness of platforms would surmount to the level of a PhD thesis, which we do not pretend to be here. Nevertheless, we attempt to structure the concepts of openness mentioned in this work at the end of section 3, page 51

2.3 Companies like to be open, however, openness means different things to different companies

We showed in the previous sections that the study of openness in academia is very broad. In an article published on TechCrunch, Eric Schonfeld (Editor in Chief of TechCrunch) observed an increasing number of companies claiming to be open - *If there is one thing I noticed this past year, it is that companies seem to be tripping over themselves more than ever before to claim the mantle of openness* (Schonfeld, 2007).

In the corporate world too, it seems that open innovation means different things to different people. For instance, Chesbrough gives the example of P&G who opened its innovation process in 2000 and decided that 50% of its innovations were to be acquired externally (Chesbrough, 2003). On the other hand, Facebook claims to be open because its platform allows external developers to create applications and distribute them through the Facebook platform, but also retrieve maps of human interactions through the social graph (Recordon, 2010). While, openness at Google means something different – in the words of Jonathan Rosenberg (former Senior Vice President of Product Management at Google) openness is about open technology in the form of open source and open standards, and about open information in the form of transparency and control that users have over their own personal information. (Rosenberg, 2009)

This section focuses on examples of how three major internet/software firms, Facebook, Microsoft and Google, define openness.

2.3.1 Microsoft

Microsoft has historically been protective of its innovations, and believed in the benefits of intellectual property rights granted by patents, trade secrets, and copyright laws. On June 1,
2001, Microsoft’s CEO Steve Ballmer said during an interview with the Chicago Sun-Times that Linux is a cancer that attaches itself in an intellectual property sense to everything it touches – Reported in the register.co.uk (Greene, 2001)

However, in a white paper published in 2008: OPEN INNOVATION: THE EVOLUTION OF THE MICROSOFT APPROACH TO INTELLECTUAL PROPERTY, Microsoft acknowledges the need to adapt its approach to intellectual property rights.

In this paper, Microsoft describes the intellectual property to be The Engine for Innovation and Technological Progress:

At Microsoft, we believe intellectual property protection is a critical step along the path from idea to innovation to the marketplace. Intellectual property protection—in the form of trade secrets, trademarks, copyrights, and patents—provides the legal framework for assigning economic value to new ideas, enabling people to be rewarded for their inspiration and their work. The incentive this framework offers to develop ideas and bring them to market is the engine that drives progress. (Microsoft Corp., 2008)

Acknowledging Chesbrough’s work, Microsoft recognizes the importance of opening up its innovation process, and describes the intellectual property protection as a way to enable companies to bring smart people together from across organizations to collaborate on innovation (Microsoft Corp., 2008)

Microsoft distinguishes two essential aspects of open innovation. First, Microsoft walks in Chesbrough’s steps when it argues for the necessity to collaborate with its ecosystem - this kind of cross-organization cooperation is becoming increasingly central to the way companies develop new products and services, and compete in today’s global economy. (Microsoft Corp., 2008). In this regard, Microsoft considers the intellectual property protection as a means to safely collaborate with partners and competition, pulling together innovations from a broad range of disciplines. [P]atents can play two seemingly contradictory roles at the same time. They can serve as a legal fence that protects a company’s new ideas and as the legal framework that
enables companies to share those same innovations in a very open manner (Microsoft Corp., 2008).

In line with those principles, Microsoft takes action to evolve its approach to intellectual property. For instance, in April 2004 Microsoft announced a cooperation agreement with Sun Microsystems to improve interoperability of their products. At the same time, Microsoft and Sun Microsystems decided to stop all ongoing antitrust litigations. Other efforts including Microsoft IP Ventures and the November 2006 agreement with Novell aimed at reinforcing collaborative innovation. In particular, the agreement with Novell (open source) was a major step in Microsoft's reconciliation with the open source community.

Secondly, behind Microsoft's idea of openness is the imperative need of interoperability. In the whitepaper published in 2008, it identifies the portability of devices and the endlessly growing communication networks as the two factors driving the need for interoperability - new levels of openness will need to become the norm across the industry to provide the kind of technical framework required to enable a seamless information flow in this new era of Web services and portable computing (Microsoft Corp., 2008)

In light of this perceived necessity for interoperability, Microsoft announced in February 2008 it would improve accessibility of its high volume enterprise products through public communication protocols, promote data interoperability, and develop industry standards. Following this announcement, the company released 50,000 pages of open access documentation for its main enterprise products including Microsoft office 2007 and SharePoint Server - The February 2008 interoperability announcement is an important strategic step by Microsoft in its efforts to continue to deliver the platform on which IT innovations for business are created and deployed while providing an intellectual property framework that fosters competition and progress. (Microsoft Corp., 2008)

Overall, Microsoft's views on open innovation are the result of an evolving, competitive environment. In the last decade, Microsoft realized that it could not be the only innovator of the industry, and hence needed to leverage other's work in order to remain competitive.
2.3.2 Google

In December 2009, Jonathan Rosenberg (Senior Vice President of Product Management at the time) posted a long memo on Google’s official blog about the meaning of open. This post was disclosed to the public after being sent via email to Google’s employees in the aim to give directions on how products should be developed.

Jonathan Rosenberg partitions the definition of open at Google into two main components: open technology and open information. Open technology embraces the technical aspects of open innovation and consists of open source and open standards. On the other hand, open information embraces openness towards Google’s users in terms of transparency, value of product and users’ control over their personal information. Figure 3 illustrates Google’s conception of openness into its main components.

![Diagram of Google's conception of openness](image)

**Open Technology**

**Open standards** – Google strongly believes that developing open standards helps the internet industry to grow, and that they serve as a key factor for promoting interoperability, a critical element of user choice (Rosenberg, 2009). Rosenberg highlights Google’s efforts in this sense for defining the Google Data Protocol – a standard Application Programming Interface (API) based on open standards (XML/Atom). In addition, Rosenberg mentions Google’s work with the W3C foundation to develop a standard geolocation API.
Open source – Open source is at the core of Google’s open strategy. Google is built on open source (Apache, Linux, etc.), creates open source software (Chrome, Android, Chrome OS, and Google Web Toolkit) and contributes to open source projects (Mozilla, Apache, and open source hosting service).

Open source is a way for Google to utilize basic building blocks in order to develop new products. In addition, Google hopes to improve its products and harvest public knowledge though opening some of its source code. Furthermore, Rosenberg argues that opening up the code is one way to maintain competition and make sure that Google stays innovative: *These activities not only ensure that others can help us build the best products, they also mean that others can use our software as a base for their own products if we fail to innovate adequately* (Rosenberg, 2009). Finally, Rosenberg believes that open source promotes the open internet, spurs greater choice for users, advertisers and partners, and prevents users and developers from becoming locked-in.

Rosenberg goes against the traditional wisdom that companies should lock-in their users in order to profit as he believes that that Google will eventually benefit from a more prosperous internet industry.

Open information

Open information is an important part of how Google defines the term open. Open information is a way for Google to gain the trust of users, advertisers, and partners. Open information comprises three components: value, transparency and control.

Value – The principles behind values are quite simple. Rosenberg believes that users can be reluctant towards companies that retain their personal information. This is especially true when the users do not understand the value of exchanging this information. Hence Rosenberg argues that the default approach should be to *tell people, in obvious, plain language, what we know about them and why it's valuable to them that we know it* (Rosenberg, 2009).

Transparency – Google believes that being open should include that users are easily able to find what personal information is retained about them.
Control – Google believes that users should be able to easily retrieve their information, delete it and opt-out from automatic information collection as easily as possible, and for free. In addition, Rosenberg argues that they need to do whatever [they] can to make leaving Google as easy as possible (Rosenberg, 2009)

2.3.3 Facebook

Facebook’s definition of open is somewhat different than Google’s because it focuses on people. In this respect, Chris Saad said in a blog post: When Mark Zuckerberg talks about open, he is not talking about Technology. He is talking about human interactions. Ever since the popularity of Data Portability (via the Data Portability project) Facebook has gone to great lengths to redefine the word Open to mean the way people interact with each other. (Saad, 2009). David Recordon, Senior Open Programs Manager at Facebook, shares his views on openness in a post made on O’Reilly’s Radar (Recordon, 2010). Recordon emphasizes that openness means more than just open technology.

At Facebook openness is considered to be all of the following:

Open Technology – making technology accessible to others so that they can build using the same tools that you do (Recordon, 2010). For instance we can imagine that Facebook considers open standards and open source as open technology.

Open Data – developers can build innovative products based on APIs that weren’t previously possible (Recordon, 2010). Facebook allows developers and external entities to retrieve user data from the Facebook platform. In particular, the Graph API and the Open Graph Protocol allow external parties to retrieve connections between users, photos, and, tags².

Facebook believes that it should constantly exchange information and data with the rest of the web. According to Recordon, open data goes in both directions; external applications can retrieve data from the platform but should also write data into the platform. The “Like” button that is located on websites throughout the web is a solid example of open data philosophy.

² Source: (Wikimedia Foundation Inc, 2012)
In order to promote this openness of data, Facebook improved its API to include real time data (i.e., data updates are pushed in real time to the application). Furthermore, Facebook allows external parties to keep user data as long as they keep it up to date and agree to remove it upon user request.

**Open People** – result of *what happens when all of these things [Open Technology & Open Data] come together to give people better ways to share information.* (Recordon, 2010).

Openness between people is a “big thing” for Facebook and is at the core of their definition of openness. Facebook understands that its success depends on the amount of information people share, and specifically how many photos they post, status updates they write, and “like” recommendations they give. Facebook understands that it cannot be an isolated website; instead of being a web inside The Web, Facebook realizes the need to be a web on top of The Web (hence not replicating AOL’s mistakes). Bridges connecting Facebook and the rest of the world are needed to facilitate and ease the distribution of information amongst users. In Recordon’s words: *it [the Open Graph Protocol] is designed to increase openness between people based on being able to connect with things all around the web. Within Facebook this means that people can like any web page anywhere, not just those on facebook.com.* (Recordon, 2010)

Chris Saad concludes on Facebook’s view: *Facebook deserves a lot of credit for introducing social networking to the masses. Their definition of open, however important, is not the kind I’m talking about either.* (Saad, 2009)

### 2.4 Conclusion on section 2

While open innovation means different thing to different people, the central idea is always the same; open innovation is innovation that transits through the boundaries of the firm, and that can take different forms including user innovation (von Hippel, Democratizing innovation, 2005), cross licensing mechanisms, and market for ideas (Chesbrough, 2003; Lichtenhaler, 2011; Gans & Stern, 2010), and collaboration of firms in conjoint development project. Openness of a platform includes the concepts of open innovation, but is not limited to it. Other dimensions,
such as the openness of information mentioned by Google and the openness of people mentioned by Facebook, are constituents of openness definition.

3 Assessing Google’s openness

It is difficult to assess the openness of Google as a whole. Google can be considered as a “mega-platform” that contains smaller nested platforms (e.g. Android, Gmail, Google +, etc.). In addition, as discussed earlier, many variables of openness can be assessed for each product/platform. However, we can identify the main lines along which Google is open and the ones along which it is relatively closed, hence giving an overall understanding of Google’s openness while highlighting the strategic reasons behind it. We base our discussion on the comparison of Jonathan Rosenberg’s blog post THE MEANING OF OPEN (Rosenberg, 2009), academic literature, and general discussions/critiques written on the topic. We use the example of Android to dive deeper in our specific analysis of the open source strategy.

In a first step, we take Google’s definition of openness and identify how well it complies with its own guidelines of openness. We observe that while Google strictly follows its published ambitions in some cases, there are also examples where the firm decided not to follow them.

In a second step we attempt to assess Google’s openness based on other definitions from academic literature, public discussions and web articles. We observe that the products described as closed, according to some measures of openness, turn out to be more open when using other measures to assess openness. Conversely, we also observe that some products Google advertises to be open turn out to be less open when certain frameworks are used to assess openness.

3.1 Assessing Google’s openness according Rosenberg’s definition

We recall that Google defines the meaning of open as the combination of Open Technology (including open standards and open source) and Open Information (including value, transparency and control). Openness at Google aims to spur innovation, promote competition, user and partner choice, and avoid locking-in users.
3.1.1 Open source

Google is involved in the development of open source software in many ways. First, as Jonathan Rosenberg mentions, Google is probably the world’s largest open source contributor. Indeed, Google has contributed over 20 million lines of code and 900 open source projects. Some of Google’s main open source projects are: Android (Google’s mobile operating system for smartphones and tablets), Chromium (the open source version of Chrome Google’s web browser), Chromium OS (the open source version of Chrome OS, Google’s operating system – an adapted version of the famous web browser that runs on a machine as an operating system), Google Web Toolkit (a development toolkit for building and optimizing complex browser-based applications), Closure Tools (tools designed to help developers developing complex web applications), Go (A programming language designed to make programmers more productive), and Tesseract OCR (an optical character recognition software).

Secondly, Google supports numerous open source organizations (either financially or by dedicating engineer’s time to the organization). For instance Google finances the majority of the Mozilla Foundation – Google spends about $300 million annually to support the foundation, which represents approximately 85% of the foundation’s revenues. In exchange for this, Mozilla agrees to set Google as the default search engine of the browser both in the search engine bar and the URL bar (i.e., if an URL is not exact, Mozilla will use Google’s search engine to correct it). In addition, Google supports other open source organizations including Apache Software Foundation (Web server), The Eclipse Foundation (an open source platform designed to manage open source software developments across the lifecycle), The GNOME Foundation (developing free and user friendly desktop environments), The Linux Foundation (developing Linux operating system), and many more.

Google annually holds “the summer of code”, a program offering stipends to student developers to write code for various open source projects over the summer months (May - August). The

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3 Source: Google Code, The Google Open Source Programs Office (Google Inc)
4 Definition from Google Developers website (Google Inc.)
5 Source: Google Code, Open Source Organizations that Google Supports (Google Inc.)
program was created in 2005 aiming to promote open source development with an initial funding of 400 student projects. In 2011, the summer code program funded 1115 student projects.

Finally, Google hosts 250,000 open source projects. To do so, Google provides the necessary infrastructure and tools to develop projects (e.g. version control, issue tracking, forums and wikis, file download feature, etc.)

However, while Google supports open source, there are multiple examples of the firm not being supportive of open source. While supporting open source, Google does not actually open source the majority of its products. For instance, products including the search engine, Gmail, Maps, docs, AdWords, DoubleClick, Google+, Picasa and YouTube are not open source. Several articles were published criticizing the web giant for advertising its openness while keeping the large majority of its algorithms secret. In a very engaged blog post, Chris Dixon (a web startup entrepreneur, investor and influential blogger) commented: until Google open sources what really matters – their search ranking algorithm – you should dismiss all their other open-source talk as empty posturing (Dixon, Google should open source what actually matters: their search ranking algorithm, 2009). Similarly, Erick Schonfeld, former Editor in Chief at Techcrunch.com, criticized the Mountain View firm for not open sourcing its search algorithm and advertising system:

Google is only open when it is convenient for them. Google will never open up the source code to its search algorithms or its advertising system, or share the core data which gives it a competitive advantage in those areas because that is where it makes all of its money (Schonfeld, 2009)

We can argue that Google’s level of openness is reduced (on the open source scale) because some of its products are closed. If Google were to open source the entirety of its proprietary codes, the firm would undoubtedly become more open (measured on the scale of open source openness). However, it is not because a large portion of Google’s products remain proprietary that the company is not open to some extent. In the comments made by Erick Schonfeld and Chris Dixon, Google is described as “closed” because it does not open source the core of its
competitive advantage and the source of its profits. This raises a point that we will discuss later in this thesis; the term “open” seems to carry a public connotation of generosity, altruism and gratuity. However, companies think of openness as a business strategy and not pure altruism.

When Rosenberg explains the meaning of open, he recognizes that Google does not (and is probably not likely to) open source its search engine and advertising algorithms. If Google cannot arguably be criticized for protecting its core, the reasons given by Rosenberg for not open sourcing search and advertising (opening source would not promote open the internet, user choice, competition and would not avoid users from becoming locked-in but would rather hurt users and allow people to cheat the game) are nonetheless arguable.

On the promoting user choice argument, the US search market is dominated by a few key actors with Google accounting for 66.4%, Microsoft 15.3%, and Yahoo 13.8%\(^7\). One could think that open sourcing Google’s search algorithm would lower barriers to entry and spur innovations in this area, generating more competition and promoting user choice.

On the cheating the game argument, Google advocates that open sourcing the code of search and advertising would allow people to cheat the game and find means to artificially increase the rank of their webpage/ad. Chris Dixon compares this strategy with Microsoft in what he calls Security through obscurity (Dixon, 2009). Dixon argues that software products, like Linux, provide additional security because they provide information to protect software against disruptive individuals. However, the case of an operating system, where the majority of users do not gain any advantage in cheating the system, may be different from a search engine or advertising system in which people directly benefit from cheating the system (i.e., they improve in rank and generate more traffic to their websites). Clay Shirky highlights this problem with the example of the game Quake. When the company developing the game decided to open source the engine of the game, the code governing the physics of the game (how object move, weapon shoot, players get hurt) drastically changed; the players began using their new knowledge of the

\(^7\) Source: ComScore reported by forbes.com (Savitz, 2012)
games inner workings to cheat (Shirky, 2000). We could therefore imagine that open sourcing the code of the search engine would also lead to equivalent behaviors amongst individuals.

Google is also criticized for keeping tight control over its open source products. For instance, even though Google open sources its famous Android mobile operating system, the Web Giant has received heavy criticism for keeping some of its essential components closed (cf. section 3.2. for more details). Rosenberg states, others can take our open source code, modify it, close it up and ship it as their own. Android is a classic example of this, as several OEMs have already taken the code and done great things with it (Rosenberg, 2009), yet the controversy around the late release of the Honeycomb version proves otherwise. Businessweek.com reports on Google’s willingness to control Android. Rubin says that if Google were to open-source the Honeycomb code now, as it has with other versions of Android at similar periods in their development, it couldn’t prevent developers from putting the software on phones (Vance & Stone, 2011). We will discuss Android’s open source openness more extensively in section 3.2.4, but this example allows us to comfortably argue that Google’s tight control on the development of the Android software reduces its open-source openness.

Finally, Google is criticized for adapting the open source software without releasing modifications to the open source community. Indeed, Google uses a large amount of open source software including Linux, Apache, and SSH as building blocks for its proprietary products. For instance, Android is based on Linux kernel. Chris DiBona, Google’s open source and public sector manager, said:

We use the Linux kernel. We’ve got the GNU tools, we use a lot of the compiler collection from the Free Software Foundation. We use some Apache libraries—we don’t use the Apache Web servers so often, but we do use a lot of their libraries. We use a lot of OpenSSL and OpenSSH. We use languages like Python and C. We use a fair amount of MySQL, all kinds of things. (Evers, 2006)

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8 OEM: Original Equipment Manufacturer. In this case, OEMs are mobile handsets manufacturers creating devices for the Android platform (Samsung, HTC, LG, Motorola, etc.)
However, as Ashlee Vance and Brad Stone argue in an article posted on businessweek.com, 

Google improves these products to meet its needs yet doesn't turn the changes over to the broader open-source community, preferring to keep its secret sauce secret (Vance & Stone, 2011). Nevertheless, Vance & Stone moderate their criticism and note how Google released Hadoop, a new type of widely adopted data analytics software, to the open source community.

In conclusion, we have shown that Google is significantly involved in open source – developing open source software, supporting projects and foundations, and hosting code. However, we have also shown that Google is not 100% open in this dimension because most of its products are not open and the openness of several open source products is reduced from the tight control the firm strives to maintain. Saying that Google is closed or open (regarding open source dimension) would be overly simplistic. Instead, we acknowledge that Google strongly supports open source, but carefully selects which products to open source and which ones to keep closed.

3.1.2 Open standards

In sharing his view on openness, Rosenberg strongly emphasizes the importance of open standards, and asks his developers to use open standards when they are available, work on improving them if they are not sufficient and create them when they don’t exist. Rosenberg highlights Google’s work on the Google Data Protocol, the firms’ standard API protocol (an improved version of the XML/Atom standards). Rosenberg also points at Google’s collaboration with the W3C (World Wide Web Consortium) for creating an open standard geolocation API, and facilitating the ability for developers to create location sensitive web-applications.

Google’s efforts to work with open standards were illustrated in an article posted in the French newspaper, Le Monde. In this article, the author attempts to spend a day without any of Google’s services, but utilizes alternative solutions to navigate the Internet and read emails. The following quotes\(^9\) show how Google’s usage of open standards facilitated the task:

\(^9\) Original quotes cited in French:
[...]

• Transferring my emails and contacts from Gmail was relatively easy since Google uses standard methods.

• The Mountain View company uses open protocols for its services on which it adds a proprietary layer. At the heart of Google Talk, is the discussion protocol XMPP, for which Gmail.com is only the server. It is therefore easy to join another server, the best known being Jabber.org, download a free client like Pidgin and then chat with my Gmail friends.

(Pépin, 2012)

Gmail users find it extremely convenient to have open standards for both retrieving and forwarding mails. For instance, Gmail is able to retrieve and send mail from a non-Google account using POP and SMTP open protocols, and can automatically forward emails to other email addresses. Moreover, a user who prefers a different client to the Google web interface such as Microsoft Outlook can seamlessly access their email.

Google’s commitment to open standards extends to authentication. The company enables third party websites and applications to allow their users to authenticate using a Google account. This feature is made possible with a combination of OpenID and OAuth protocols, which are standard protocols developed in part by David Recordon (now Senior Open Programs Manager at Facebook).

Google’s willingness to use and develop open standards is a means to promote interoperability. For instance, platforms like YouTube are well integrated within the web; YouTube videos can be viewed on any website using HTML include codes. Moreover, Justin Uberti (Teach Lead at

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• Transférer mes e-mails et mes contacts à partir de Gmail est assez simple, Google utilisant des méthodes standard.

• La firme de Mountain View utilise des protocoles ouverts pour ses services, qu'elle entoure d'une couche propriétaire. Au cœur de Google Talk, se situe le protocole de discussion, XMPP, dont Gmail.com est seulement un serveur. Il est donc simple de s'inscrire sur un autre serveur, le plus connu étant Jabber.org, de télécharger un client libre comme Pidgin puis de discuter avec ses amis utilisant Gmail.

10 Source: Google Developers, Google Accounts Authentication and Authorization (Google Inc.)

Google Realtime Communications) announced that Hangout, the videoconference feature integrated into Google+, would open up its technical specifications for developers to create applications that can operate with the product. A surge of new applications, including mobile applications, could then make this service even more attractive (Uberti, 2011).

However, Google is also heavily criticized for using open standards when it is convenient for the company. For instance, in an article posted on TechCrunch.com, Erick Schonfeld argues:

*Google, for instance, is a big proponent of open standards in social networking, mobile networks, Web applications, and practically everywhere — except the one place it makes money. Its advertising system is a black box.* (Schonfeld, 2007)

Erick Schonfeld points out that Google does not develop open standards for its search and advertising products. Strategic implications for Google to promote open standards will be discussed in section 4.2, page 58. In the mean time, we observe that regardless of Google’s definition of openness being good or bad, Google is very open on the open standards measure of openness, with the exception of its search and advertising products.

### 3.1.3 Value

Over the past few years, Google has accumulated a tremendous amount of personal information on its users: their preferences, their search habits, the name of websites they visit, the content of their emails, the people they contact, and more. Value, in the sense of open information defined by Rosenberg, is Google’s belief that a user should always understand the value he gains from disclosing his personal information in exchange for a better product. Google has made important progress in explaining to its users how they can benefit from yielding more information. Rosenberg uses the example of the Interest Based Advertising preference web page, which explains how a user benefits from more targeted ads. In addition, the Mountain View firm could not be more explicit about the value of a user’s information than when it rewards them with money or gift cards in exchange for their personal information. In its program, Screenwise, Google offers cash to all users who agree to be monitored.
In January 2012, Google announced that it would review its privacy policies to combine the 70+ individual policies that previously existed into a single Google privacy policy. User information that was previously unusable across the universe of Google products, will now be combined into a single user profile. By doing so, Google aims to act as a single entity, using all of its products to collect and centralize information. While this scares some users, Google plans to offer better products and more relevant information to its users. In a series of videos, blog posts, and official websites dedicated to privacy, Google tries to clarify how users will benefit from the new privacy policy:

- **Our search box now gives you great answers not just from the web, but your personal stuff too. So if I search for restaurants in Munich, I might see Google+ posts or photos that people have shared with me, or that are in my albums.**

- **We can make search better—figuring out what you really mean when you type in Apple, Jaguar or Pink**

- **We can provide reminders that you’re going to be late for a meeting based on your location, your calendar and an understanding of what the traffic is like that day**

- **Or ensure that our spelling suggestions, even for your friends’ names, are accurate because you’ve typed them before. People still have to do way too much heavy lifting, and we want to do a better job of helping them out.**

(Whitten, 2012)

Due to rising public concerns of privacy, educating users on the associated gains from sharing their information is increasingly important and aligns with Google’s value principle. This will prevent future protests, such as the user protests that arose with the announcement of the new single privacy policy.

### 3.1.4 Transparency

Jonathan Rosenberg insists on the importance of transparency and clearly letting the user know what personal information is kept about them. Jonathan Rosenberg describes how Google
fostered transparency when it introduced the Dashboard, a centralized control panel for users to view, modify or delete their stored information. The Dashboard contains organized information about users’ search history, web activity, emails, contacts, and provides a method for users to blatantly view their shared information. Moreover, the advertising preference manager provides users with information on how Google automatically classifies them into age, gender and interests categories, based on their browsing habits.

Lastly, while very controversial, the new privacy policy announced in January 2012 is a major step towards more transparency because it is more comprehensible and treats Google users as single users across all of the company’s products. Further, the privacy policy clearly outlines all types of information that Google can collect and how it uses it.

Based on the above facts, one can argue that Google is more transparent than ever about the information it holds, and probably more transparent than most of its competitors.

3.1.5 Control

Control of information is a major source of debate and the source of anxiety for privacy violation. According to Rosenberg’s definition, “control” is providing users with ownership of their personal information, allowing them to opt-out from data collection, modify, delete and retrieve their personal data. For Rosenberg, the main principle underlying the necessity for information control is that users should be free to leave Google at any time and should not be locked-in. Rosenberg’s belief being that users who are free to leave will prefer using Google over locked platforms; he uses the metaphor of the emergency exit doors on an airplane: You hope to never use them, but you’re glad they’re there and would be furious if they weren’t. (Rosenberg, 2009)

Google has taken noticeable actions to increase users’ control over their own information. First, Le Monde highlights how Google’s open standards are a move towards more control, as it is easy to retrieve all information from Gmail (contacts, mails, etc.) and export it to another service (Pépin, 2012). Second, the Dashboard makes it possible for users to completely remove all of their personal information. Third, the data liberation mentioned by Rosenberg in 2009 has evolved significantly, and it is now possible for one to extract most of his personal data
(including photos held on Google+) with a single click on the account-settings page. Fourth, users can opt-out of customized ads from their advertising preference page. Lastly, Google+ was designed with control of information sharing in mind, and allows users to decide with whom they share information.

However, the new policy introduced in January 2012 increased fears of privacy violation. Google is criticized for knowing people’s lives better than anyone else and is often compared to “Big Brother” in George Orwell’s classic, 1984. Does the Web Giant really allow users to have control over their information? Does it really work hard to prevent users to be locked-in? Or is it just a smoke screen? Following the new policy announcement, most articles seem to agree that Google is moving towards a model where users are increasingly locked-in.

Google’s new policy allows the firm to centralize all information into one single user profile. As described in a letter from the National Association of Attorneys General to Google’s CEO Larry Page, the fundamental level of concern lies in the fact that Google automatically shares user information across a wide range of products, but that users have diverse interests and concern, and may want to keep the information from one product separate from others. By merging information together and creating a unified platform, Google actually locks its users in and gives the false illusion that they are free to leave. As the National Association of Attorneys General said: It rings hollow to call their ability to exit the Google Product ecosystem a “choice” in an Internet economy where the clear majority of all internet users use – and frequently rely on – at least one Google product on a regular basis. (National Association of Attorneys General, 2012)

It appears from the various critics that Google’s users do not have real control over their personal information, nor any real way to opt out. In particular, Android users do not seem to have the choice to opt out from data collection. In its attempt to consolidate all products and services into one “Mega-Platform”, it seems that Google’s monopoly on the web goes against its control principle and locks-in users. (Whittaker, 2012; Dignan, 2012; Thomas, 2012; Honan, 2012; Eldon, 2012)

Beyond the controversy generated by the new privacy policy, there have been past instances of Google infringing its user control policy. For instance on February 17, 2012 the Wall Street
Journal reported that the Web Giant bypassed the privacy settings of the Safari browser in the aim to track web-browsing habits of people who blocked this kind of monitoring. While Google assures that this privacy break was not intentionally made and immediately deactivated the code retrieving information, it shows how Google does not yield total control of information to its users (Angwin & Valentino-Devries, 2012).

User lock-in could be become even more of an issue with Google’s year-long plan to improve its search algorithm with semantic search. On March 15, 2012 the Wall Street Journal reported on Google’s ambitions to use semantic search in order to better respond to users’ requests. This modification would allow the search engine to provide users with direct answers to their questions without sending them to external sites. Google also hopes the change to semantic search will entice some people to stay longer on the search site, said the New York Times. One can argue that providing users with direct response to their query, without sending them to other websites, is a further step towards a more closed platform that limits users’ ability to chose the source of information and locks them in even further (Efrati, 2012).

Therefore, we can conclude that while Google has made some efforts to give more control to its users, these efforts are counteracted by Google’s increasing presence in the Web. As Professor Keenan, from the University of Calgary, said in an interview with Global Calgary: They will actually allow you to liberate your data and get everything out of Google. But then where are you going to take it? That’s the question, right? Everybody uses Google (Keenan, 2012).

Google’s actions to create a single integrated platform, centralize and increase the acquisition of user data, and invest in search quality improvements are strategic decisions aimed to resist competition. As Techcrunch.com says, data is ammunition in the war for delivering the most relevant information. In a Web economy, where users require increasingly customized products, supported by advertisers who want more targeted ads, Google acts strategically to face the strong competition from companies including Facebook, Apple and Twitter. (Eldon, 2012)

3.2 Role-based framework for analyzing openness
In this section, we assess Google’s openness using the above framework. We do however recognize the difficulty in assessing the openness of the company as a whole, since the degree
of openness can differ from one product to another. Nevertheless, comparing openness of the
different products for each role allows us to provide an overall understanding of Google’s
openness.

In a paper titled OPENING PLATFORMS: HOW, WHEN AND WHY?, Eisenmann et al. conclude that
characterizing a platform as “open” without referencing relevant roles can cause confusion
(Eisenmann, Parker, & Van Alstyne, 2009). Therefore, the authors define a role-based
framework comprising the four roles that interact with a platform. First, demand-side users are
the end users of a platform (for example, Android users). Second, supply-side users are
supplying complements used by demand-side users in conjunction with the core platform (for
example, Android application developers). Third, platform providers are the ones distributing
the platform and act as the point of contact with platform (for example, mobile phone
manufacturers HTC, Samsung etc.). Fourth, the platform sponsor is the owner of the core
platform. For assessing the platform sponsorship openness, we analyze the Android platform
using West & O’Mahony’s framework.

3.2.1 Demand-side user openness

Eisenmann, Parker, & Van Alstyne (2009) emphasize that a platform is “open” on the demand-
side user role when everyone can use it without any discriminatory restrictions. Unlike the
iPhone that can only be accessed by customers of certain mobile operators, Google products
are accessible to all internet users. In this respect we conclude that Google is “Open” on the
demand-side user role.

3.2.2 Supply-side user openness

According to the authors of OPENING PLATFORMS: HOW, WHEN AND WHY?, a platform is “open” on
the supply-side user role if anyone can develop complements without discriminatory
restrictions.

In the case of Google’s ecosystem, it is difficult to define the core platform and the associated
complements. Is the platform the infrastructure/servers and the complements are the products
(Search, Gmail, Maps, AdWords, etc.)? Is any individual product a platform on its own, nested
into the Google “mega-platform”? Is AdWords the platform while all other products and
inventory are complements? Is YouTube a platform or is YouTube a complement of Chrome OS and Android platforms? If we consider the Google infrastructure as the core platform of which every product is a complement, then Google is a closed platform because Google develops most of the complements. However, almost every single Google product (including Search, Maps, AdWords, Android, Documents, etc.) has programming interfaces that allow programmers to develop complements. In this regard, Google is an "Open" because it is composed of many open platforms (i.e., each product).

In order to draw a middle line, we attempt to identify sufficiently large and independent ecosystems that constitute platforms, but might include smaller nested platforms (e.g. YouTube). AdWords, Enterprise (Gmail, Calendar, and Documents), Android, Chrome OS and Google+ can therefore be considered as individual platforms, which are complemented by products including YouTube, Maps, and search engine. Nevertheless, we recognize the imperfection of this classification since the platforms identified above are not totally independent.

In the AdWords platform, complements include third-party software developments through the AdWords API (e.g. automatic bidding systems, inventory synchronization systems, ROI optimization algorithms, etc.) and advertising inventory (i.e., advertising space), which comprises Google’s services and platforms (search, Maps, YouTube, Android) and independent partner websites. The AdWords platform is “open” on the supplier-side user in the sense that anyone can develop an application interacting with AdWords and anyone can add their own website content with AdSense.

In the Android and Chrome OS platforms, Google provides a large number of essential complements including Maps, Navigation, Gmail, Voice recognition. However, third party developers are free to create applications and post them on dedicated stores (Android Market or Chrome Web Store). Unlike the Apple store, Google does not control which applications are authorized on the market. In this regard, Android is more “supply-side user open” than its competitor iOS, because Apple is the ultimate authority for deciding which application can be released for the iPhone.
However, when conflicts of interest arise, Google does not allow any third party to complement its Android platform. For example, in September 2010, Skyhook Wireless sued Google for using the Compatibility Tests (Android certification program allowing OEM's to use Android trademark) to force Motorola to remove Skyhook Wireless technology in favor of Google’s own mapping technology (VisionMobile Ltd., 2011). Furthermore, Google recently showed a more closed behavior while trying to push its new payment system, Google Wallet. In an attempt to copy Apple’s model of the Apple Store, Google tried to restrict alternative payment services from entering mobile applications sales. Reuters reports that in an email sent to a developer in late August, Google said the developer had 30 days to comply [with exclusive use of Google Wallet], otherwise the developer's apps would be “suspended” from Android Market (Barr, 2012). From these examples we conclude that the Android platform is not entirely open on the supply-side user. Indeed, it seems that Google’s willingness to create a single platform forces the company to close the supply-side user role openness and favor proprietary technologies.

The Enterprise platform comprises products including Documents, Gmail, Calendar, and Video Conference. With the exception of Documents, the platform offers the possibility for third parties to develop scripts; however, Google maintains control over the complements and does not allow external parties to develop applications for the enterprise platform. Consequently the enterprise platform is closed on the “supply-side user”.

While we have highlighted that Google allows most developers to freely develop applications that complement Google services (using API), we also observe that Google regularly acquires technologies that complement its services. For instance, Google acquired Maps, which complements many platforms including Android, Enterprise and the AdWords. Similarly, Google acquired DoubleClick and Invite Media, which are complements of the AdWords platform. By acquiring complements (or absorbing complements), Google is vertically integrating which is, according to Eisenmann et al., a way to reduce supply-side user openess.

3.2.3 Platform provider role

Most of Google’s Platforms or products are not bundled with hardware and are provided directly (AdWords, Enterprise or Google+). In this regard, we can argue that the latter platforms
are “closed” on the provider side. Nevertheless, we can also argue that the various APIs allow third parties to become platform providers. For instance, a Web marketing agency can become a platform provider of the AdWords platform, providing its own services and algorithms to interact with the platform. Similarly, any website can include YouTube videos, Google Maps and search bar, thus acting as platform provider.

Any mobile hardware manufacturer that meets certain standards (e.g. Samsung, HTC, LG, etc.) can theoretically provide the Android platform. Consequently, Android is an “open” platform on the provider role. However, while Google cannot prevent any hardware manufacturer from downloading the Android code and commercializing it, the company manages to tightly control the platform providers. Vision Mobile emphasizes, *Device manufacturers must pass the Compatibility Definition Document (CDD) and Compatibility Test Suite (CTS) tests in order to be allowed use of the Android trademark, the Android Market or other important Google Mobile Services such as GMaps, Gmail and GTalk.* (VisionMobile Ltd., 2011). Archos and oPhone are examples of devices running Android system but that did not pass the compatibility tests. If the technical requirements and tests are non-discriminatory, the Android platform remains open on the platform supplier role. However, Vision Mobile argues that *devices that pass the CTS can then “seek” approval to use the Android trademark and the Google Mobile Services, although the final criteria appear both undocumented and somewhat capricious.* [...] As Dan Morrill put it in an e-mail on Aug. 6, 2010, “We are using compatibility as a club to make them [OEMs] do things we want.”(VisionMobile Ltd., 2011). Consequently, we conclude that although advertised as open on the platform provider role, the Android platform is however more “closed” than initially expected.

The Chrome OS platform aims to eventually become open on the platform provider side because Google partnered with several OEM’s including Acer, Adobe, Asus, Freescale, Hewlett-Packard, Lenovo, Qualcomm, Texas Instruments, Toshiba, Intel, Samsung, and Dell. However, Acer and Samsung Electronics are currently the only two companies manufacturing Chrome OS devices commercial devices.

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Based on the above analysis, we conclude that Chrome OS and Android are Google’s most open platforms on the provider role, but that discriminatory selection of OEMs can reduce their openness. Other platforms can be considered more “closed” since they are distributed directly by Google; however, APIs make it possible for third parties to provide the platforms, and improve the openness of the platform.

3.2.4 Platform sponsor role: West & O’Mahony

According to Eisenmann et al., a platform is “open” on the sponsor role if third parties can contribute to it, for instance, they highlight that Linux is open on the sponsorship role. As we emphasized in our assessment of Google’s Openness as defined by Rosenberg, Google does not open source the majority of its products and therefore is mainly “closed” with respect to platform sponsor openness. However, Android and Chromium OS are examples of open platforms whose sponsor openness can be assessed using West and O’Mahony’s framework. In the remaining part of this section, we assess the sponsor role openness of the Android platform. (West & O’Mahony, 2008)

West and O’Mahony developed a framework for assessing the openness of a sponsored platform based on three dimensions: production (how the community organizes code production), governance (how decisions are made) and intellectual property (who owns the code, who can use it, and how). Each of the dimensions are subdivided into transparency (the ability to get information on that dimension), and accessibility (the ability to act on that dimension). The table bellow, extracted from West & O’Mahony’s paper, summarizes the framework.

<table>
<thead>
<tr>
<th>Dimension of participation architecture</th>
<th>Form of openness</th>
<th>Transparency</th>
<th>Accessibility</th>
<th>Proprietary model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production – the way that the community conducts production Processes</td>
<td>Ability to read code and observe or follow production processes</td>
<td>Ability to change code directly</td>
<td>Production remains within a single corporation</td>
<td></td>
</tr>
<tr>
<td>Governance – the processes by which decisions are made within the community</td>
<td>Publicly visible governance, observers can understand how decisions are made</td>
<td>Ability to participate in governance</td>
<td>The corporation makes all decisions at its own discretion</td>
<td></td>
</tr>
<tr>
<td>Intellectual property – the allocation of rights to use the community’s output</td>
<td>Rights to use code and access source code</td>
<td>Ability to reuse and recombine code in the creation of derivative</td>
<td>Limited use rights are granted by the corporation for a</td>
<td></td>
</tr>
</tbody>
</table>
3.2.4.1 Production – Mildly transparent & not accessible

Assessing Android’s open source openness first requires an understanding of how the production is organized. The description of the production process that follows is adapted from Android’s official website (for more details, refer to Figure 6 and Figure 7 in Appendix 7.1, page 74):

When Google develops a new version of the Android code (e.g. Ginger Bread, Ice Cream Sandwich, Honeycomb, etc.), the Mountain View based firm initially works alone on a private branch of the code that is not released to the public. When the branch is stable, Google releases it to the public as a new “release code line” (e.g. Ice Cream Sandwich). Simultaneously, when releasing the new code line, Google creates a copy of it called “experimental code line” (e.g. Ice Cream Sandwich Experimental). Third parties developers have read only access to the experimental line of the code; they can then download it and perform modifications in their local environment before submitting changes for approval by Google’s Approvers and Verifiers. When changes are approved, Google merges the submitted patch with the “experimental branch” of the code. The experimental code line is iterated with an eye towards stability.

The release code line, which is the only line to be used by OEMs, can only be modified by Google’s direct contributions. Some stable changes from the community are selected by Google and drawn from the experimental code-line to the release code line. When the platform APIs for the next version are stable and fully tested, Google creates a cut in the code line and releases a new sub-version of the code line. Google is the only authority for deciding on cut releases.

Using the above information and applying it to West and O’Mahony’s framework, we observe the following. First, the production is poorly transparent. While anyone can access the public releases of the code this cannot be done anonymously because it requires a Gmail address and

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13 Android open source project, Android Community (Google Inc.)
a full real name\textsuperscript{14}. In addition, developers do not have access to the latest version of the code held in the private branch, and there is no clear publicly available roadmap on the direction, goals, and timing of the software development. Moreover, as VisionMobile emphasizes, we do not know how long it takes for a modification to be integrated in the public repository nor what the criteria are for a modification to be approved.

Second, the production is not accessible. While people can contribute to the code by sending patches (improvements & bug fixes), Google remains in control as it only approves patches that match with the direction of the project. In addition, it does not appear possible for any third party to gain direct access to the public repository to perform direct modifications. Moreover, as Google keeps the “Deep development” branch of the code secret, third parties have absolutely no accessibility to it. Instead, they have to focus on incremental improvements. Finally, subprojects (independent derivatives of the code or “start-ups”), are not possible in the community because Approvers first check if the changes are a “good fit” for the project. If not, the modification is rejected (cf. Figure 7 in Appendix 7.1)

The control exercised by Google on the development of Android created a significant amount of discomfort when Google decided to delay the release of the private branch of the Honeycomb line (the 3\textsuperscript{rd} generation of Android Code designed for tablets). As mentioned by ZDnet: [this move] goes to the heart of whether Android truly is “open source” [...] when independent developers can’t get at the source code for Honeycomb and design the next great thing in the tablet space (Dawson, 2011).

\textbf{3.2.4.2 Governance - No transparency, no accessibility}

West and O’Mahony define governance as the \textit{amount of control that the Sponsor relinquishes to the community} (West & O’Mahony, 2008). They observe that sponsors who are more open on the governance use this delegation of authority as a strategy to attract talented people. Cautious to keep the integrity of the platform and avoid fragmentation, Google retains exclusive control over decisions of the platform.

\textsuperscript{14} Source: Android Open Source Project, Downloading the Source Tree (Google Inc.)
No transparency – While Google publishes the verification process and roles on the official Android website, VisionMobile highlights that the criteria for the implementation of an improvement in the new public release are unknown. In addition, VisionMobile states that we do not know the proportion of Google contributors to external parties. Furthermore, the firm keeps major strategic decisions secret until the release of the private code to the public: we must refrain from revealing sensitive features until we've secured the appropriate protections (Android official website, refer to Appendix 7.1.1 page 76 for full extract). It is therefore not possible to understand how decisions are made. Moreover, while Google publicizes the roles of projects such as Project Leads, Approvers, Verifiers and Contributors, the firm does not share the necessary steps to become an Approver or a Verifier; thus, it appears that for the time being, only Google employees can hold these roles.

No accessibility – Google explicitly takes all decisions and keeps all control:

Google retains responsibility for the strategic direction of Android as a platform and a product [...] we have structured the open-source project -- including third-party contributions -- to focus on the currently-public stable version of Android. "Deep development" on the next version of the platform will happen in private, until it's ready to become an official release.

(Android official website, refer to Appendix 7.1.1 page 76 for full extract).

Examples of this tight control are observed at multiple levels. For instance, the Web Giant decides on the timing of releases, and tries to prevent OEMs or third parties from distributing non-approved versions of the code. As mentioned earlier, Google uses the Compatibility Program to prohibit OEMs to sell non-approved devices or derivatives of the code with the Android trademark and benefit from proprietary Google services (Maps, Market, Gmail, etc.). In doing so, Google keeps complete control over the project and avoids fragmentation of the program; however, Google consequently closes the Android platform.

15 Source: Android Open Source Project, People and Roles (Google Inc.)
The extract of the license agreement between OEM’s and Google is an obvious example of Google’s willingness to dissuade any third party to distribute a software development kit derived from Android or derived from Android Compatible devices.

4. The following is added to the end of Section 2.2 (License Grant Restrictions):

"(g) take any actions that may cause or result in the fragmentation of Android, including but not limited to the distribution by Company of a software development kit (SDK) derived from Android or derived from Android Compatible Devices and Company shall not assist or encourage any third party to distribute a software development kit (SDK) derived from Android, or derived from Android Compatible Devices; (h) Company will only distribute Android Products that are either: (i) in the case of hardware, Android Compatible Devices; or (ii) in the case of software, distributed solely on Android Compatible Devices."

Figure 4 - Extract of OEM & Google license agreement for Android. Source: (Patel, 2011)

3.2.4.3 Intellectual property

The intellectual property dimension of West and O’Mahony’s framework consists of two elements: ownership of the code, i.e., the legal owner of the code, and license type, along with the freedom of third parties to re-use the code.

Similar to the majority of sponsored open source projects, Google retains ownership of the Android code because it desires to control the technology. In this respect, Android is more closed than other platforms whose ownerships are attributed to dedicated foundations. For example the source code of the open source web browser Mozilla Firefox is owned by the Mozilla foundation.

With the exception of Linux kernel and other core components, Google uses the Apache 2.0 license for the majority of the code. This license authorizes any third party to use the code, modify it and resell it without any restrictions. West & O’Mahony highlight Rosen’s (2004) classification of such a license as “permissive”, which is by nature more open than “reciprocal” licenses entitling the developers to send back their modifications.

West and O’Mahony observe that numerous open source projects implement a dual-license strategy for distinguishing between non-profit users and for-profit users. However, Google does not make any difference between for-profit and non-profit users with Android.

If Google decided not to use the Android trademark and proprietary applications to discriminate usage of the platform between users, the Android platform would be substantially open on the
IP dimension. Google’s tight control over the Android platform lowers the value of the platform for those who modify it without approval because unofficial versions will not benefit from the Android brand or from essential proprietary applications such as the Android Market. Consequently this mechanism lowers accessibility of the IP dimension, and in turn reduces Google’s openness.

3.2.4.4 Conclusion on Platform sponsor openness
Applying West and O’Mahony’s framework for assessing the openness of Android, we have shown that the Android platform is inaccessible on nearly all dimensions and lacks transparency in the production and governance. In particular, Google’s tight control on the project strongly affects the openness of the platform. We therefore reach similar conclusions as VisionMobile.

In VisionMobile’s report, Google’s open source and public sector engineering manager, Chris DiBona, clearly disagrees with the above conclusions:

\[\text{I got >10million lines of code that says otherwise. Be wary of large consultancies selling reports... (DiBona, Twitter, 2011)}\]

DiBona further explained his perception on openness in a Google+ post arguing that when assessing open source openness we should look at what matters: the location of the code, the license it is under and to possibility for anyone to build it (DiBona, Google+, 2011).

However, observing that few of Google’s products are truly open source, and specifically highlighting the “low” openness of the Android product with respect to West and O’Mahony’s framework, we conclude that Google is mostly “closed” on the platform sponsor role as defined by Eisenmann, Parker, & Van Alstyne.

3.2.5 Conclusions on role-based openness
Stressing the difficulty to assess the openness of Google as a whole because of its product diversity and the existence of nested platforms within the ecosystem, we emphasize the dominantly “open” demand-side user role and the dominantly “closed” platform sponsor role of the ecosystem.
We have shown that openness of the supply-side user role depends on the product, and we conclude that the majority of products are “open” in this dimension due to the large number of API’s. In addition, we have demonstrated that the Android and Chrome OS platforms are more open than their Apple competitor iOS with respect to the supply-side user dimension of openness.

Ultimately, we argued that the majority of the products are “closed” with respect to the platform supplier role; Android and Chrome OS being among the few “open” exceptions. We however strongly emphasize the control that Google’s Android Compatibility Program continues to use for discriminating between platform suppliers, and thus reducing the platform supplier role’s openness.

3.3 Openness, not a single dimension

So far, our analysis has focused on specific frameworks for assessing openness. In particular, we extensively used the framework of Eisenmann et al. in combination with the work of West & O’Mahony for assessing Google’s openness beyond Rosenberg’s definition. Nevertheless, we recognize that while our methodology gives one point of view about openness at Google, it does not investigate the plethora of other dimensions that also define openness.

For instance, if we considered openness according to Chesbrough’s definition of open innovation, our assessment of Google’s degree of openness would have been significantly different. In light of Chesbrough’s definition of the open innovation process, by which innovations transit through the walls of the company, we would have concluded that Google’s practices are open given the amount of acquisitions\(^\text{16}\) that the company made for developing new technologies and services.

\(^{16}\) Google made its first acquisition in February 2001 when it acquired Deja that became Google Groups. Since then, Google acquired a very large amount of companies in order to complement its technology or propose new products. Android, YouTube, Voice, Talk, Maps, Blogger, Google+, Picassa, Flights, etc. are all derived or improved from successful acquisitions. Google made 109 acquisitions since 2001. Source: Wikipedia, List of Acquisitions by Google (Wikimedia Foundation Inc., 2012)
Similarly, our assessment of openness excludes the people/community dimension of openness that Facebook (Recordon, 2010) and Clay Shirky describe, (Shirky, 2010) cf. appendix 7.3.1 for more details.

Furthermore, had we carried our openness analysis in terms of von Hippel’s (von Hippel, Democratizing innovation, 2005) user innovation definition, we would have allocated a greater importance to user-available toolkits and to the 20% innovation time allocated to engineers (cf. appendix 7.3.3). Finally, our conclusions on the openness of the search engine would have been radically different if we based our discussion on Yochai Benkler’s idea that Google’s search engine is effectively crowd-sourcing the ranking of the webpages to the web (cf. Appendix 7.3.2)

Observing the diversity in the definition of openness, we define openness as a set of nested dimensions along which openness can be assessed. Consequently, we can classify the previously discussed dimensions of openness in two large categories: internal openness and external openness. Internal openness relates to the openness of a company regarding its own products. For example, internal openness for Google is the openness of Google’s products and platforms. On the other hand, external openness relates to the company’s support of openness outside the company walls. For example, Google’s support of the Mozilla Foundation and its involvement with the development of Linux are considered to be external openness, even if they serve internal goals.

External openness comprises two components: the company’s involvement in external open source projects and the company’s involvement in developing open standards. Note, however, that the application of open standards in a company’s products is considered as internal openness.

Eisenmann et al. characterize internal openness into four roles: user-side demand, supply-side user, platform provider and platform sponsorship. Each of these roles contains a set of subdimensions or nested frameworks for assessing openness in more detail. For instance, the platform sponsorship role includes West & O’Mahony’s framework for assessing openness of open source platforms.
While this adapted framework attempts to organize the previously mentioned concepts of openness, it does not pretend to serve as a comprehensive map of openness as other dimensions of openness can easily be added.

In this context, we reiterate open innovation as the combination of any dimensions of openness that improves a firm’s or other’s technology/products. For instance, open-source and outsourcing of complements are dimensions of openness leading to the creation of technological innovations. Likewise, as highlighted by Chesbrough, technology transactions are a form of open innovation. However, while non-discriminatory user access to the platform is a dimension of openness, it does not constitute as a source of improvement for technology/products, and hence is not considered to be open innovation.
**Production Access/Transparency**

- Non-discriminatory access to platform by users (Eisenmann et al.)
- Outsourcing of content creation & Sharing of information (Recordon, Benkler, Shirky)
- Information openness: Value, Transparency, Control (Rosenberg)

**Governance Access/Transparency**

- Non-discriminatory outsourcing of complements (Eisenmann et al.)
- Platform/Category exclusivity (Eisenmann et al.)
- Absorption of complements (Eisenmann et al.)

**Ucensing Access/Transparency**

- Outsourcing platform delivery in non-discriminatory fashion (Eisenmann et al.)
- Freedom for providers to innovate on platform support
- Interoperability with competitors, use of open standards

**Demand-side user**
- Acquisition of external innovations
- Technology transactions & markets (Chesbrough)
- User innovation (von Hippel)
- Open source platform (West & O’Mahony)
- Production Access/Transparency
- Governance Access/Transparency
- Licensing Access/Transparency

**Supply-side user**

**Platform Provider**

**Platform sponsorship**

**EXTERNAL OPENNESS**

- Open source support (Rosenberg)
- Open standards support (Rosenberg)

*Figure 5 - Openness viewed as a set of nested dimensions and frameworks. Adapted from (Eisenmann, Parker, & Van Alstyne, 2009; West & O'Mahony, 2008)*
4 Openness, a strategy for profiting

A significant amount of blogs and web articles criticized Google's open strategy following Rosenberg's post on Google's willingness to embrace an open strategy. For instance, Erick Schonfeld, former chief editor of TechCrunch, said that openness has become a marketing mantra (Schonfeld, 2007). Howard Lindzon supports Schonfeld's argument: Open intent is great. *No person or business should need to or advertise being open. But if you are as big as Tiger Woods, Google, or Goldman Sachs you are best to just leave the subject alone and just be great at what you do.* (Lindzon, 2009)

The critics find evil in that Google only open-sources products in industries that it hopes to disrupt (Schonfeld, 2009). In particular, Google is heavily criticized for not opening the source code of its search and advertising products (Dixon, 2009; Schonfeld, 2009).

In the public's opinion, it appears that openness comes with a meaning of generosity and altruism. Consequently, a firm that profits from its selective openness strategy generates virulent reactions. However, while Google is heavily criticized for advocating itself as "open", the Mountain View based firm clearly defines openness as a strategy to generate profits: *Our commitment to open systems is not altruistic. Rather it's good business* (Rosenberg, 2009).

Many academics have described openness as a strategy from which firms profit. Chesbrough is one of the first thinkers proposing that firms should profit by opening their innovation processes (Chesbrough, 2003) and adapt their business models (Chesbrough, 2006). In particular Chesbrough highlights that open source often fails to capture value: *open-source shares the focus on value creation throughout an industry value chain, [but] its proponents usually deny or downplay the importance of value capture* (Chesbrough, 2006). In addition, Lichtenthaler highlights West and Gallagher's work, arguing that open innovation must capture value through the business model (Lichtenthaler, 2011). West and Gallagher also observe that firms who sponsor open source communities are doing so as part of their open innovation strategy (West & O'Mahony, 2008).
According to Rosenberg, the main benefit of openness derives from the belief that openness fosters the industry as a whole, which in turn benefits the individual firms that share a larger market. However, we have shown that Google is reluctant to open all of its products, which implies that openness is not always beneficial to a single firm and suggests a greater complexity of openness as a business model strategy. Understanding the web industry and Google’s key success factors is therefore necessary for assessing the Web Giant’s openness strategy.

The Internet is a very competitive industry where “free” has become the rule; as Chris Anderson emphasizes, *anything that touches digital networks quickly feels the effect of falling costs: the moment a company’s primary expenses become things based in silicon, free becomes not just an option but the inevitable destination* (Anderson, 2008). In order to cope with the “free” environment, Anderson identifies six business models, among which lies the advertising business model used by Google.

Google’s revenue model is based on offering free services and software to users for generating traffic that is monetized by advertising. Rosenberg describes this model as a transaction between the users who give valuable personal information and Google who provides free services in return for this information commerce. Google’s openness strategy comes into play in the context of free supported by advertising, rising costs of technological developments (Chesbrough, 2006), short product life cycle (Chesbrough, 2006) and increasing user needs for interconnected and interoperable systems\(^\text{17}\).

In the following sections, we highlight the main reasons as to why Google is open in some cases and relatively closed in others. While we recognize that Google’s strategy has been un-arguably amongst the most successful innovation strategies, we however highlight some of the downsides of Google’s approach to openness. We end our discussion with an analysis of the consequences of large firm’s openness strategies on the industry.

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\(^{17}\) As highlighted by Microsoft (Microsoft Corp., 2008), Facebook (Recordon, 2010) and Google (Rosenberg, 2009)
4.1 Motivations for broadening sponsorship

Open source is a way of broadening sponsorship and sits at the core of Google’s openness definition. Earlier in this work, we showed that only a few of Google’s products are open source (Android, Chrome OS, Chrome and Web Toolkits); in this section we will try to identify potential reasons why Google should or should not open-source a product.

When a company decides to open the source of its product, it inevitably implies that anyone can use or replicate the software free of charge, which can make it more challenging for the company to monetize the product itself. Instead, revenues must come from selling other products or services, which Google does with advertising (Chesbrough, 2006; West & O’Mahony, 2008; Spolsky, 2002). Eisenmann et al. share West’s conclusions that established platform sponsors will generally prefer the superior rent-capturing regime of proprietary governance models and will only open the sponsorship role when:

- Their established platform faces significant pressure either from rival platforms or from users demanding open standards to avoid lock-in
- Comoditizing the platform significantly enhances its appeal, allowing the original platform sponsor to increase its profits from the sale of complementary products and services.

(Eisenmann, Parker, & Van Alstyne, 2009)

Google is increasingly pressured by competition and users that fear lock-in and privacy concerns. At the same time, Google benefits significantly from the commoditization of the platform. Therefore, according to West’s criteria, Google should find it advantageous to open the sponsorship of its products, including search.

One might wonder why Google doesn’t open source more the code of its products given the rising competition and the benefit it gains from commoditizing them. Answering this question requires the analysis of critical elements in Google’s strategy. Google’s success is built on its ability to deliver highly targeted advertising to an extensive user base. Therefore, Google’s main advantage relies on the firm’s ability to collect user data and its capacity to make sense of it.
Consequently, any decision that decreases the quantity of data collected reduces Google’s ability to make sense of user data, or reduces the size of advertising inventory, which is likely to hurt Google’s revenue. The search engine provides significant *advertising inventory* and is at the *heart* of Google’s ability to collect meaningful data. Google currently captures 66% of the search queries in the US and above 90% in some European countries. Unlike any other product, the search engine provides Google with valuable information about what users search and want, which makes the product a privileged place for advertising.

Consequently, the advertising revenues generated by the search engine represent a significant share of Google’s total revenues; thus Google must prioritize maintaining the popularity of its search engine. We can imagine that if the Web Giant were to open the code of the search engine or the advertising system, it would be quickly and easily replicated. In addition, Google would risk its users switching to the competition, which would result in instantaneous reduction of incentives for advertisers to spend their budget on AdWords. Accordingly, we can argue that Google is unlikely to open the sponsorship of its products if: 1) the product is significantly generating advertising revenues, 2) the value of the product comes from the superiority of its technology, 3) there are no network effects that increase the value of the product to the user, and 4) the user’s switching costs to an equivalent product are low.

In addition to search, numerous products at Google like Maps and Gmail are popular because of their technical superiority. Unfortunately, these products do not benefit from network effects value, meaning they do not improve with increase in usage, and have relatively low switching costs. For instance, switching away from Gmail is simple as it allows email forwarding to any address. Consequently, we can argue that opening the source code of those products would also hurt the company’s revenues.

According to Eisenmann et al., opening the source of a product may be desirable for a company that greatly benefits from commoditizing the product, we do however observe that Google does not need to open source a product in order to commoditize it. Indeed, Google manages to commoditize its products by making them free to use and cross-subsidizes them with advertising, hence spurring adoption.
Nevertheless, not all products are closed source at Google: exceptions include Android and Chromium. We observe that Google’s open source products are alternatives to well established competitors who benefit from strong network effects on the complements side and the end users side, thus creating strong barriers to entry (Schonfeld, 2007). Indeed, open source can be used as a strategy to hurt the competitor and enter more easily in a market (Matias, 2011; Asay, 2009; Eisenmann, Parker, & Van Alstyne, 2009). For instance, Apple and Windows/Macbook benefit from a large base of third-party developers that create a multitude of applications, and increase the value of the platform. Similarly, end user network effects are observed on built-in services such as facetime on the iPhone; the more people use it, the more valuable the iPhone gets.

Apple’s closed platform is a source of frustration for many developers who enjoy tweaking products and improving them. Positioning itself as an open source system, Android takes advantage of this developer community, which is usually unsupportive of closed platforms. In addition, open sourcing the product allows Google to get support from OEM companies, including Samsung and HTC, wishing to compete against Apple in the smartphone market. Google therefore uses open source as a tool to lower barriers to entry, spurring innovation, and gaining the support of device manufacturers.

In this context, opening the sponsorship of the platform provides Google with a great advantage since it is not the core of the company. Google provides proprietary complements (e.g. Advertising, Maps, Gmail, Market, etc.) and commoditizes the platform as a complement to the core advertising (Dixon, 2009; Asay, 2009); Joel Spolsky supports this strategy with his statement: smart companies try to commoditize their products’ complements (Spolsky, 2002).

In addition, when it does not lead to a loss of a strategic advantage, open sponsorship brings many other benefits. First, in a context were competition is intense and technical developments are becoming more expensive, it allows companies to share R&D costs (Chesbrough, 2006; Eisenmann, Parker, & Van Alstyne, 2009). According to Joi Ito, open systems become necessary once a company is working at a level of complexity that one designer simply can't anticipate all of the possible uses (Matias, 2011). Second, open source allows companies access to experts
they do not have in house (Chesbrough, 2003) while benefiting from lead users’ knowledge on market needs (von Hippel, Democratizing innovation, 2005). Third, open source is a vehicle for exchanging information (von Hippel, Democratizing innovation, 2005) and a way to coordinate people’s work (West & O’Mahony, 2008; Shirky, 2005). Fourth, open source is a way to access the long tail of low contributors who would not provide any contribution in the traditional institutions model. In general, the sum of the contributions of low contributors can exceed the sum of the contributions of the high contributors (Shirky, 2005). In particular, Android benefits from the long tail of low contributors who correct important bugs and help to perfect the product. This phenomenon is expressed in Linus’ Law, given enough eyeballs, all bugs are shallow. Finally, open source increases modularity and increases innovation at the component level (Eisenmann, Parker, & Van Alstyne, 2009).

However, open source products do not come without significant disadvantages. With the example of Android, we have shown that Google places tight control on open source products, and makes them more “closed” than other open source projects. West and O’Mahony explain how sponsors who open source their products do so in the hope to profit from their investments. Sponsors often face the dilemma of opening governance to encourage external participation, versus closing the governance to keep control over the technologies that are critical to their business’ success. West and O’Mahony observed that there was no direct correlation between the provision of accessibility and the participation of the external community.

When control is entirely relinquished to the community, the development of the product can be slowed by complex coordination and political conflicts (Eisenmann, Parker, & Van Alstyne, 2009; Gladwell, 2005). In this regard, Joel Spolsky mentions that open source software tend to be less user friendly because all possible options are built-in due to problematic decision making (Gladwell, 2005). Furthermore, Steve Jobs (former CEO of Apple) heavily criticized open source software for being fragmented:

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“In reality, we think the open versus closed argument is just a smokescreen to try to hide the real issue, which is what’s best for the customer: Fragmented versus integrated” [...]

Mr. Jobs said that Android sometimes left users to be the “system integrators.” [...] “When selling to users who want their devices to just work, we believe integrated will trump fragmented every time.” [...]

“We are confident that it will triumph over Google’s fragmented approach, no matter how many times Google tries to characterize it as open [...]”

(Helft, 2010)

Conscious that fragmentation is inherent to open source software, Rosenberg mentions that Google is trying hard to avoid fragmentation of Android. The tight control that Google keeps over the governance of its Android platform, such as decision making processes, compatibility tests, control over Android trademark, and control through proprietary applications, therefore makes sense. Google’s willingness to keep absolute control over technical decisions made on Android is motivated by its desire to take decisions quickly, maintain user friendly design and to guarantee the integrity of the platform.

4.2 Motivations for promoting interoperability

Interoperability appears to be an essential element of Google’s, Microsoft’s and Facebook’s strategies. Jonathan Rosenberg stresses that open standards (at the origin of interoperability) are necessary for an industry to flourish and hence for individual firms to profit from a larger industry. Rosenberg uses examples of the railroad and the internet industries, which experienced slow growth before the availability of common standards that made technologies interoperable. Other examples of firms working to develop open standards to grow the industry and profit from it exist in the mobile industry. For instance, Nokia was a key developer in the design of the GSM standard (Global System for Mobile Communications). Before GSM, mobile communication operators used different technologies in countries throughout Europe; calls were therefore incompatible between networks and countries. Setting GSM as a European standard enabled the first roaming calls, decreased complexity for handset manufacturers and
resulted in the booming adoption of mobile technologies to the extent that GSM and its newer derivatives are used for about 80% of today’s communications worldwide. Nokia’s involvement in the creation of the GSM standard allowed the company to leverage its experience and become the dominant actor of an industry it contributed to expand.\textsuperscript{19}

Eisenmann et al. emphasize that interoperability may not be desirable until a market/technology is mature. They mention that in growing markets where adoption rates are large, dominant platforms are likely to restrain interoperability with smaller rival platforms. On the other hand, smaller platforms benefit from interoperability, because interoperability decreases barriers to entry. Once a platform is established and user acquisition rates are slow, a dominant platform might consider becoming more interoperable with competitors. Eisenmann et al. emphasize that the attractiveness of interoperability of a platform with rival platforms will depend on:

- **Market size**: Interoperability might be attractive if network effects on the platform are significant and positive. In this case, opening interoperability will likely generate more revenues, provided that competition does not decrease prices significantly.

- **Market share**: Interoperability is attractive if a platform can maintain its market share while being interoperable. To do so, it needs to technically differentiate itself from competitors; the post-interoperability market share will also depend on user’s switching costs, converter costs and multi-homing costs\textsuperscript{20}.

- **Margins**: do not apply here because of the cross-subsidy business model.

While network effects are not significant for some of Google’s products (e.g. Gmail, Search, Maps, Android, Chrome) Eisenmann et al. would suggest that interoperability is not critical. However, Google’s focus towards the development of open standards is a strong encouragement for the community of developers to learn how to use Google’s services and build upon them, hence spurring adoption. For instance, the Google Maps API and associated

\textsuperscript{19} This paragraph is inspired from two Wikipedia articles:
- Nokia (Wikimedia Foundation Inc., 2012)
- GSM (Wikimedia Foundation Inc., 2012)

\textsuperscript{20} Multi-homing costs are the costs incurred by users when they use more than one platform.
mapping standards allow developers to create maps based on Google’s technology, which increases the rate of adoption of Google Maps.

On the other hand, platforms like YouTube that benefit from strong network effects are cautious about interoperability; for instance, while YouTube is interoperable with indirect competitors such as Facebook, it does not allow for interoperability with more direct competition such as Vimeo. Similarly, YouTube doesn’t allow users to take their content and bring it somewhere else; once a video is uploaded to YouTube it is not possible to download it. This makes sense for Google because interoperability of the content would strongly hurt the advertising revenues. On the other hand, while interoperability with Facebook decreases YouTube’s advertising potential with side banners and master heads, this strategy makes it possible for Google to leverage the popularity of the Facebook platform to increase the audience of YouTube videos while keeping control over the delivery of advertising through its proprietary player.

Beyond the benefits that Jonathan Rosenberg mentions for growing an industry, interoperability also allows Google to enter new markets that are protected by strong network effects. For instance, the compatibility of Google documents with Microsoft office formats, allow users to import MS office files into Google documents and export Google documents into MS office file formats. By doing so, Google makes it easy for users to shift from the Microsoft platform to the new platform. In addition, by developing open standards Google makes sure that technology developments of the industry follow the direction that is the most convenient for the Web Giant. Open standards therefore create an ecosystem of third party products that use and are compatible with Google products/technology. Thus, open standards promote interactions with Google platforms and increase their value.

In a web-based world offering a multitude of different and complementary systems, interoperability appears as a strong user demand. With the accumulation of online user data, users increasingly favor interoperable platforms to systems that need information to be replicated, hence implying more efforts from users. Therefore, interoperable platforms provide great advantage to attract users. Nevertheless, if the platform’s main value dominantly
originates from the network effects rather than stand alone differentiation, incumbent platforms might prefer to deter entry with restricting inter-operability (Eisenmann, Parker, & Van Alstyne, 2009)

### 4.3 Consequences of openness strategy on Google

Google’s openness strategy is described by Jonathan Rosenberg as a chaotic innovation process profitable for companies able to move fast. However, Google believes the benefit of chaos in innovation goes well beyond its openness strategy. As highlighted by Iyer & Davenport, Google’s innovation strategy mainly relies on a proprietary, flexible and scalable technical architecture acting as a hosting and testing platform for innovations created by a mash-up of creators, independent software vendors, Google’s own engineers and open source communities. As a consequence, product-development life cycles are short and iterative. Multitudes of new products or features are constantly tested live on the user base giving instantaneous feedback for iteration. Google’s innovation, which is built into organizational design, further reinforces this chaotic and rapid innovation process. For instance, Google budgets 20% of its software developer’s time to personal projects, and hence creates a plethora of burgeoning ideas and projects (Iyer & Davenport, 2008).

While openness and chaotic innovation processes have led the company to grow extremely successful products, we previously highlighted that the chaos involved by open sponsorship platforms tends to produce poorly controlled and sometimes fragmented products. Fourteen years after the incorporation of Google, the company has become a gigantic conglomerate of more than 70 disconnected products. For instance, YouTube looks nothing like Gmail and can be used with a different login than the main Gmail account. As a direct consequence, Google may lack the stickiness and the positive network effect that other platforms like Facebook or Apple provide. Nokia’s CEO Stephen Elop said\(^2\) that for a company like Nokia to grow its smartphone business, the real competitor is Google because the Android platform is less sticky and users can switch to Windows mobile more easily.

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\(^2\) MIT Sloan class “Corporations at the Crossroads: The CEO Perspective” lectured by Peter Kurzina & Howard Anderson. Session of April 4th
It was not until Larry Page became CEO in April 2012 that Google started to take actions for unifying the company into a single platform offering its users *a beautifully simple experience across Google* (Page, 2012). As Sergey Brin said, *we’ve let a thousand flowers bloom; now we want to put together a coherent bouquet* (Page, 2012). However, Google’s previously explosive and chaotic innovation methods have caused the company to lose focus. Since Page took the lead of the company more than thirty products were closed or combined (Page, 2012), a proof of the companies consciousness about the problem. While Google is now trying to put a more coherent platform together, the loss of focus it previously experienced might have been caused Google’s to miss several key trends like the social trend. In the mean time, when the company was too busy trying new products, enormously popular social networks such as Facebook and Twitter emerged. Innovation at Facebook and Twitter was more controlled and strategically decided; it was not until the platforms grew to a significant size that they opened up to leverage external innovation. Facebook and Twitter acquired many users and are now protected with strong network effects that act as powerful barriers to entry.

Google tried to enter social, first with Buzz, and then with Google+, which is more evolved and technically comparable to the Facebook. However, it is still unsure whether Google+ is going to be able to pierce in social; its value proposition (being able to share your data differently with different people) may not substantially differentiate from Facebook’s network effects and quantity of accumulated data.

As all forecasts seem to predict a more social web, Google may have missed a trend that could create costly consequences for the long term. Nevertheless, Google’s ecosystem has strong assets including a large user base, a powerful processing capability, and a large storage system. At this time, Google+ may not be positioned in a way that most favors Google’s user adoption. However, given that data is increasingly stored in the “cloud”, Google has strategic positioning to meet this trend with Google Play, Google Documents, YouTube, and Picasa. We make the hypothesis that Google+ could better gain traction if it relied on a more united cloud storage platform containing all user’s photos, videos, and music, so that Google+ would act as the sharing tool for data that is already “in the cloud”. In order to do this, Google products, including YouTube, Picasa and Play, need to be integrated into a unified product whose first goal
is to provide cloud storage for users with a web visualization and management interface so that users can access and modify their data from anywhere. This platform would incentivize uploads by automatically synchronizing user's local data with the cloud in a manner that is similar to the Dropbox Software. Google+ would then act as an integrated sharing interface providing tools and streams like Facebook's profile page, hence making it possible for users to share their albums with the right people, straight from their online cloud "file system".

Adopting such strategy would reduce switching costs for users, as they would not have to recreate a significant portion of their data in the new platform. Sharing would be simpler and stickiness of Google as an ecosystem would increase.

4.4 How does openness strategy affect the industry?

According to Rosenberg, open innovation in the context of Google's definition is beneficial for the whole industry because open standards and open source incentivize innovation. We have given examples of how standards, like GSM, help foster an entire industry because they make systems interoperable, yet there are many other standards necessary to spur innovation in the industry (Wi-Fi, USB, and HTML). The web and technology industries are particular industries because their value is more heavily dependent on network effects than the majority of all other industries. Therefore, users demand products and services to be interconnected and interoperable, hence justifying the necessity for standards.

Furthermore, openness on the complementing role of a platform can spur innovation and generate profits. If Apple did not incorporate a certain form of openness towards complementors in the iPhone, the plethora of innovative applications whose success are dependent on the iPhone ecosystem may have never been created. Similarly, profitable companies like Zinga would have never formed without some level of openness on the complementor side of the Facebook platform.

Opening the sponsorship role of a platform allows great innovations in the industry. Rosenberg uses the example of Apache, the open source web server, at the origin of the rapid growth of the web. There is a multitude of other instances where open sponsorship was truly beneficial for the industry. Benjamin Mako Hill, PhD candidate at MIT, highlights the importance of hacks
as a source of ground-breaking innovation. For instance, the CHDK software allowed Canon camera users to innovate in photographic techniques and get extremely fast exposure times (Mako Hill, 2012). Von Hippel highlights user innovation as one of the best ways to truly innovate.

However, while some degree of openness can spur innovation and creation, open innovation does not necessarily imply increased profits for the industry because openness increases competition and might drive the prices down (Schonfeld, 2007). In the case of Google, this is not as much of a problem since revenues are generated through cross-subsidizing with advertising and search revenues.

Rosenberg advocates that bigger is better since open systems require long time thinking and larger firms will be able to take on longer projects before starting to generate revenues (Rosenberg, 2009). However, because bigger is better, openness can also be used as a weapon to disrupt industries, enter a new market, and commoditize the technology. For example, when Google decides to launch a new mobile platform into the mobile industry with an open source product, like Android, it commoditizes the software (Dixon, 2009; Schonfeld, 2009). Matt Assay goes even further and advocates that open source is a great way for companies to collaborate without running afoul of antitrust laws. It's collusion without the collusion [...] proprietary vendors have figured out that open-sourcing key complements to their core businesses can be strategically decisive in hurting competitors while helping themselves (Asay, 2009). Was open sourcing Android a strategic decision to hurt Apple and RIM? Maybe.

Eric Clemons & Nehal Madhani further argue that third-party business models, like the one Google uses, may decouple Google’s services from the price discipline of the marketplace (Clemons & Madhani, 2010). Consequently, they highlight that when coupled with internet technology those models can create new forms of winner-takes-it-all models (Clemons & Madhani, 2010). This suggests that openness combined with third party business models and Rosenberg’s “bigger is better” could have a negative effect on the industry as it would create monopolistic actors. For instance, even though Android is open source, Google would never have been able to support and grow the product to its current size (50.1% market share in the
US\textsuperscript{22}) without cross-subsidies from search advertising. Openness coupled with the cross-subsidizing business model therefore leads to monopolistic situations that approach anti-trust. Since Google’s definition of openness means that revenues have to come from complementary products or services (e.g. IBM selling service with Linux software), when large companies incentivize open models they can significantly disrupt the industry, freeing the rule and eliminating competition. In addition, as highlighted by Rosenberg, open systems are profitable for those who move fast. Indeed, due to large network effects of those models, open systems may strongly benefit from first mover advantage. Companies profiting at a faster rate than the open systems may therefore become the new monopolies.

As a consequence of a monopolistic dominance, the openness strategy could become a way for a company to influence the standards that best fit the company’s technology and goals, but do not favor innovation and industry growth. The abuse of bargaining power to influence standards was recently observed when Apple used its pressure on mobile operators to influence the design of the SIM card standard in Europe. As a result, Nokia publicly raised the following concern: 

\textit{We believe that Apple is mis-using the standardization process, seeking to impose its own proprietary solution on the industry and using ETSI merely to rubber stamp its proposal, rather than following established principles and practices} said Henry Tirri, Executive Vice President and Chief Technology Officer at Nokia (Ogg, 2012)

We conclude that while openness can spur innovation around a single open platform or standard, when large companies apply open principles (open-source and open standards), they might use it as a weapon to easily enter new markets that are then commoditized through third party business models. When large companies with strong positive network effects use this tool, they can easily enter new markets and eradicate competition, hence becoming a monopolistic actor. The monopolistic power can then be used to set industry standards in a way that benefit the company, but not the industry as a whole.

\footnote{22 3-months average ending Feb. 2012 for total smartphone US subscribers aged 13+. Source: comScore Press release (comScore Inc., 2012)}
5 Conclusion

From Chesbrough's general conception of open innovation to Rosenberg's specific definition of openness at Google, we highlight that openness means different things to different people. While the meaning of openness is widely debated in pursuit of consensus on a single definition, in our approach to the problem we consider openness to be composed of numerous dimensions along each of which the openness of a platform or company can be assessed.

Building upon Eisenmann et al. we propose a classification of openness composed of different dimensions and nested frameworks that attempts to provide a structure reconciling the concepts discussed in this thesis. At the highest level, our structure makes the distinction between internal openness and external openness, where internal openness is the openness of the company with respect to its own products and external openness relates to the level of commitment in which the company engages for supporting the development of the industry. The internal openness dimension is subdivided using the Eisenmann et al. role-based model. Each of these roles is then further divided into sub-dimensions. To reconcile the concept of openness with that of open innovation, we describe open innovation as the combination of any dimensions of openness leading a firm to improve its or others' technology/products.

While the openness of a firm is sometimes described as a binary value, "open" or "closed", we conclude that openness needs to be assessed on a continuous scale for two reasons. First, because openness is composed of a multitude of dimensions that can each be further subdivided, and second, because companies or platforms are often composed of multiple products with different degrees of openness.

In assessing Google's openness we observe that the company is very open along some dimensions of openness for specific products, but remains relatively closed for other products and other dimensions of openness. Overall, we argue that the Web Giant is more open than the vast majority of its competitors, including Apple, Microsoft and Facebook.

**External Openness** – Google heavily supports the development of open source and open standards.
Internal Openness – Google performs a very selective internal open strategy.

- **Demand side user role** – Google’s products are easily accessible by anyone and the company strives to provide more transparency, value, and control to users regarding their information. We, however, emphasize the effect of Google’s size on the implicit reduction of users’ information control. Nevertheless, we conclude on a very open demand side user role.

- **Supply side user role** – While significantly depending on the product, on the supply side user role, the majority of products are “open” due to the large number of application programming interfaces that allow third parties to develop complements. In addition, we demonstrate that the Android and Chrome OS platforms are more open than their Apple competitor iOS with respect to this role.

- **Platform Provider role** – Since Google directly provides the majority of its products, the platform is mostly closed on the platform provider role, yet the exceptions of Android and Chrome OS are more open with respect to this role. Nevertheless, Google’s control over the approval of Android devices is reducing the platform provider openness of the platform.

- **Platform sponsor role** – While Google heavily supports open source projects and uses open source products, the majority of its products are closed. In addition, using Android to assess the open source openness, we highlight that the platform is not accessible. In particular, we emphasize the low openness of the governance. We therefore conclude that Google is very limitedly open on the platform sponsor role.

While firms advocating their openness are often criticized, we show that openness is a strategy for profiting and not a purely altruistic decision. In a commoditizing environment where development costs are very important, we highlight that openness can provide the necessary tools for companies to innovate adequately. Open source allows companies to tap into external knowledge resources that would not be available otherwise. When developing with open standards, companies can foster the growth of their industry in a direction that matches the
goals of the company. Furthermore, we highlight that open strategies can be used to lower barriers to entry in markets with strong network effects.
6 Bibliography


7 Appendix

7.1 Android Production and Commit Process

![Diagram of Android version and releases process](http://source.android.com/source/code-lines.html)

Figure 6: Illustration of Android version and releases process (simplified version from Android official website: [http://source.android.com/source/code-lines.html](http://source.android.com/source/code-lines.html))
Android Open Source Project
Contribution Workflow

Author sets up local development environment with Git & Repo

Author develops code / edits files then commits changes

Author syncs to pull code from public depot to local client

Author submits change commit to Gerrit for review

Gerrit notifies project owners / verifiers

Author notifies reviewers via Gerrit or email

Approver looks at code diffs within Gerrit to determine if change is a good fit for the project

Is the change correct?

YES

NO

Approver sets the "code looks good" bit in Gerrit, adds comments

Verifier patches the commit to their local client, then builds & tests the change

Verifier sets the "verified" bit in Gerrit and submits the change commit

Gerrit merges commit with public depot.

Verifier unsets the "code looks good" bit, adds comments & notifies author

Approver adds comments, notifies author

The "verified" and "code looks good" bits are unset

Did edits to the same file merge without conflicts?

YES

NO

Did the merge go through without conflicts?

YES

NO

The "verified" bit is unset

Change is submitted to public depot, included in future syncs

Verifier manually merges files or notifies the author to merge & resubmit

Te "A"

Figure 7 - Android patch revision process - source: official website - http://source.android.com/source/life-of-a-patch.html
7.1.1 Extract of Google’s comment about the private branch of Android Code

The source management strategy above includes a code-line that Google will keep private. The reason for this is to focus attention on the current public version of Android.

OEMs and other device builders naturally want to ship devices with the latest version of Android. Similarly, application developers don’t want to deal with more extant platform versions than strictly necessary. Meanwhile, Google retains responsibility for the strategic direction of Android as a platform and a product. Our approach is based on focusing on a small number of flagship devices to drive features, and secure protections of Android-related intellectual property.

As a result, Google frequently has possession of confidential information of third parties, and we must refrain from revealing sensitive features until we’ve secured the appropriate protections. Meanwhile, there are real risks to the platform arising from having too many platform versions extant at once. For these reasons, we have structured the open-source project -- including third-party contributions -- to focus on the currently-public stable version of Android. "Deep development" on the next version of the platform will happen in private, until it's ready to become an official release.

We recognize that many contributors will disagree with this approach. We respect that others may have a different point of view; however, this is the approach that we feel is best, and the one we've chosen to implement.

(Source: Android Website: http://source.android.com/source/code-lines.html)

7.2 Steve Job's views on Android fragmentation

Extract from the New York Times:

"In reality, we think the open versus closed argument is just a smokescreen to try to hide the real issue, which is what's best for the customer: Fragmented versus integrated, [...] We think Android is very, very fragmented and getting more fragmented by the day."
Mr. Jobs noted that major Android manufacturers like HTC and Motorola put their own user interfaces on their devices and that different versions of the operating system with different capabilities are built into different devices, causing headaches for both consumers and application developers. Mr. Jobs said that Android sometimes left users to be the “system integrators.”

“We think this is a huge strength of our approach compared to Google’s,” Mr. Jobs said. “When selling to users who want their devices to just work, we believe integrated will trump fragmented every time.”

Then he added: “We are very committed to the integrated approach, no matter how many times Google tries to characterize it as closed.”

“We are confident that it will triumph over Google’s fragmented approach, no matter how many times Google tries to characterize it as open”


7.3 Alternative considerations of Google’s openness

7.3.1 Google closed in Facebook’s definition of openness between people

Beyond openness of Technology and openness of data, Facebook considers openness to be openness between people, which happens when people openly share and publicly disclose personal information amongst each other. Clay Shirky highlights the social benefit of such form of openness using the example of communities like “Patients Like Me” (Shirky, Creativity and Generosity in a Connected Age (Wired Business Conference), 2010). PatientsLikeMe is a website that allows patients to publicly share their symptoms; treatments pain levels and dosage in an attempt to improve how medicine works through sharing what used to be confidential. Indeed, PatientsLikeMe shares their views on openness:

[...] at PatientsLikeMe, we’re more excited about our Openness Philosophy.
[...] we believe sharing your healthcare experiences and outcomes is good. Why? Because when patients share real-world data, collaboration on a global scale becomes possible. New treatments become possible. Most importantly, change becomes possible.

(PatientsLikeMe Inc.)

Google on the other hand does not explicitly consider openness between people to be part of the openness of a platform. Google's social network (Google+) is relatively closed in this sense as it markets itself as a platform on which people share information with only the people they want, and that different pieces of information will be shared with different people.

To this point, Vic Gundotra (SVP Engineering at Google) said: we do not believe in over-sharing, we have a different philosophy, we think curation matters [...] There is a reason why every thought in your head doesn’t come out of your mouth (Gundotra & Brin, 2011)

7.3.2 An open view of Google's search engine

While Google's search engine is often described as closed because it doesn't open sponsorship or supply-side user, Yochai Benkler described the ranking algorithm as open, since the decision of the relevancy of each page is effectively outsourced (or crowdsourced) to the web (Benkler, 2008). Google ranks the pages mainly using the criteria of how many hyper-links point to a given webpage from other websites; the more links point to a page the more it is likely to be ranked higher. By doing so, Google relinquishes the decision of what is important and what is not important; a form of openness through crowd sourcing says Yochai Benkler.

7.3.3 Google lead user open?

For Eric von Hippel open innovation means innovation by users (von Hippel, Democratizing innovation, 2005). Von Hippel highlights different methods for capturing user innovation. Open source products (e.g. Android) and open supply-side user (i.e., complements) are methods for tapping into user innovation, making Google more open according to von Hippel's definition of open innovation. Furthermore, Google encourages its software developer employees to dedicate 20% of their time to a personal project hence acting as lead users, developing
something they believe fits better with their own personal needs. We can argue that by doing so, Google artificially reproduces user innovation in-house.

Another way of tapping into user innovation is to provide users with toolkits which remove technical complexity and allow them to innovate (von Hippel & Thomke, Customers as Innovators: A New Way to Create Value., 2002). Google Web Toolkit is a great example of this form of openness as its goal is to enable productive development of high-performance web applications without the developer having to be an expert in browser quirks, XMLHttpRequest, and JavaScript\textsuperscript{23}

\textsuperscript{23} Official definition from Google Developer website (Google Inc.): https://developers.google.com/web-toolkit/overview