Configuring envelopment over time in order to achieve business model innovation in digital platform companies
- A comparison of Amazon and Yahoo -

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ABSTRACT

The digital platform industry is subject to a very dynamic environment due to the continuous emergence of new technology that trigger business models to change over time. However, literature does not provide a clear answer on how to innovate business models over time. Eisenmann et al. (2010), attempt to address this question by identifying three types of 'platform envelopment', whereby the attacker tries to overcome platform specific barriers like network effect and high switching cost. Yet, he fails to consider the dynamic factor of digital platform companies leaving it unclear how platform envelopment evolves over time. Therefore, the purpose of this study is to fill this gap by identifying how business model innovate, by means of platform envelopment, over time. In doing so, envelopment patterns of Amazon and Google, with respect to their new value propositions, were scrutinized from 2006 to 2011. Thereby, the envelopment patterns reveal an extended envelopment typology, which adds a timely dimension to the envelopment typology of Eisenmann et al. (2010). This typology also inspired to develop the 'platform envelopment lifecycle matrix', which shed light on how to employ platform envelopment over time in order to achieve growth. Thereby, the matrix identifies that platform companies undergo two distinct stages – 'growth stage' and the 'maturity stage'. The 'growth stage' stresses the importance of 'get big fast' while staying focused in the core markets and in the 'maturity stage' digital companies engage in dispersed diversification. The main contribution of this paper lies in providing strategic directives in how to evolve business model innovation in highly volatile digital platform companies by means of platform envelopment.

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Keywords

Platform, Two-sided market, Envelopment, Business model innovation, Value proposition

1. CURRENT SITUATION IN THE DIGITAL PLATFORM MARKET

According to Sriram et al. (2014) there is a rapid growth of web-based platforms over the last decade. In general, platforms can be described as an intermediary between different parties where exchanges of values are facilitated (Evans, 2003; Gawer, 2010; Gawer & Cusumano, 2002; Rochet and Tirole, 2006; Sriram et al. 2014).

As a matter of fact, web based platforms are actors of a very dynamic environment due to the continuous emergence of new technology (Eocman, Jeho, & Jongseok, 2006; Gawer, 2010; Sriram et al., 2014). In this setting, business models (hereinafter referred to as BM) are subject to constant change. In order to be able to create value in future, platform companies must innovate their existing BM (Chesebrough, 2007). In literature one can identify an increasing consensus that BM innovation is key for firm performance, success and survival (Teece, 2010; Zott, Amit & Massa, 2011; Sosna et al., 2010; Al- Debei & Avison, 2010; Gambardella & McGahan, 2010; Achtenhagen et al., 2013; Chesebrough, 2010).

The notion of BM innovation is to recombine existing resources from firm or partners to design new activity systems without heavy investment in R&D (Amit & Zott, 2010). One form of business model innovation is accomplished through "platform envelopment" (Eisenmann et al., 2010; p.1). Hereby, one platform recombines and bundles valuable resources from another platform with its own platforms and forms one multi-platform (Eisenmann et al., 2010; p.17). Thereby, Eisenmann et al. (2010) distinguish between "complements", "weak substitutes" or "functionally unrelated" types of envelopment

Evidence for the occurrence of envelopment can be found at the first four (Apple, Facebook, Google and Amazon) out of the 50 most innovative companies in the Fast Company 2012 rankings (Fast Company, 2011), one will notice that initially they all competed in separate markets with one simple value proposition but now they are competing in several markets. For instance, Amazon started as a pure retailer but has enveloped in several markets ranging from operating systems market (Amazon Fire) to cloud services market (Amazon Cloud Service) and in the hardware market. Thereby, Amazon evolved to one of the world's leading ecosystems in media and web services (Ritala, Golnam and Wegmann, 2014). This trend can be observed in other internet-based platforms as well. Table 1 shows the four most innovative companies in 2012 (Fast Company, 2011) and their sphere of influence. Black boxes depict the companies' initial business and grey boxes their enveloped value propositions.

	Apple	Google	Amazon	Facebook
Search engine		■	■	■
Retail store		■	■	■
OS	■	■	■	
Social network		■	■	■
Hardware	■	■		

Table 1: Market influence

This envelopment activity also finds support in literature. Researchers claim that on the one hand, envelopment attacks help to overcome industry specific barriers like network effect and high switching cost (Eisenmann et al., 2010) and on the other hand, the success of a platform will be accelerated as complementary components increase in variety (Müller et al., 2011).

1.1 Problem statement & research question

Even though, Eisenmann et al. (2010) makes the first step towards explaining how business model innovation works in the digital platform market by means of the typology, this paper argues that Eisenman' (2010) typology and other current theories on value proposition evolution and business model innovation fail to consider the dynamic factor of digital platform companies. Concretely, by means of the typology provided by Eisenmann et al. (2010), one can identify individual "platform pairs" (Eisenmann et al. 2010; p.4) and define them as 'complement', 'weak substitute' or 'functionally unrelated'. However, the typology does not shed light on when to use what type of envelopment. Thus, there is no reasonable explanation on how platform markets, competition and envelopment evolve over time.

Following this discussion, the goal of this study is to extent this strategic perspective by examining the following research question:

How do digital platform companies envelop their value propositions over time in order to pursue growth in terms of revenue?

Thereby, the aim of this paper is to find out how envelopment evolves over time in digital platform companies. To do so, the research question will be addressed with an inductive theory-building study, whereby the envelopment evolution of Google and Amazon will be analyzed. In doing so, press releases and blog posts of products will be collected in the time frame of 2006 to 2011. These will be categorized according to an updated layer framework based on Franseman (2010). Ultimately, the patterns of value proposition portfolios will be linked to revenue as an indicator for growth.

Based on the findings and observations, this paper will develop an envelopment trajectory framework, which adds a timely dimension to the envelopment typology provided by Eisenmann et al. (2010).

1.2 Why Google and Amazon?

Both companies were among the four out of the 50 most innovative companies in the Fast Company 2012 ranking (Fast Company, 2011). Furthermore, this paper takes companies with two different core markets (Amazon in e-commerce and Google in search) in order to achieve high validity, as the result may not be limited to one sector only.

1.3 Relevance

The results of this research will give academics and practitioners deeper and comprehensive insights into how envelopment works and how it may be employed to achieve long-term growth in terms of revenue.

1.4 Outline of the thesis

The remaining paper is organized as following: In the next section the theoretical concepts and theoretical model used for the case analysis will be introduced and discussed. Next, the methodology will be explained, followed by the analysis part. This paper will then conclude with a discussion of the findings and present the paper's main contribution.

2 THEORETICAL BACKGROUND

In this section the main theoretical concepts related to platform market, platform envelopment and business model innovation will be elaborated.

2.1 Platform markets & Envelopment

In order to answer the research question, one needs to define the phenomena of platform companies. According to Müller et al. (2011), the platform itself can be described as a combination of elements like an operating system or physical components. Along with these elements, platforms act as an intermediary, which provides a meeting place (Evans & Schmalensee, 2008) for a two-sided market (Evans & Schmalensee, 2008; Luchetta, 2014), in order to facilitate economic interaction (Sriram et al., 2014). Hereby, service providers and users come together as two distinct groups of user and use the platform as a meeting place (Luchetta, 2014).

As a matter of facts, this explanation covers a lot of services and companies, which can be interpreted as platforms. In order to answer the research question, this paper will solely focus on digital platform markets. Digital platform companies are subject to certain economic situations. These include network effect and switching cost explained by Eisenmann et al. (2011). In order to overcome these barriers, digital platform companies engage in 'platform envelopment' (Eisenmann, et al., 2011). In essence, envelopment implies the entry of one platform (enveloper) into another's market whereby the customer utility is increased straightaway (Eisenmann, et al., 2011). Thereby, the enveloper bundles its own functionality with that of the target. In doing so digital platforms create an ecosystem that enables direct interactions between two or more distinct sides, whereby each side is affiliated with the platform. Thereby, the customer value increases as the size and connectivity of an entire network increases (Eisenmann et al., 2010). Also, it is claimed that a large ecosystem benefits from economies of scope, shared user relationships and common components (Eisenmann et al., 2010).

When attempting to understand the ecosystem of a digital platform company, one will encounter an ICT framework provided by Fransman (2010), whereby he categorizes the ecosystem in 'layer' (see Figure 1)

Figure 1: Franseman (2010); p. 9: Four layers model

The four layers of the new ICT ecosystem model are depicted as a hierarchically layered system consisting of four layers. According to Franseman (2010), layer 1 items include network elements like routers, servers, PCs or phones. The second layer is then called "converged communication and content distribution networks". As the name supposes, items in this category try to interconnect layer 1 items by coupling with them. Typical items are said to be mobile, fiber, copper, cable and satellite. Layer 3 is called "Platforms, content and application" which requires Layer 1 and Layer 2 as prerequisite. Altogether are then provided to the final customer who is in Layer 4 "Final consumer".

In digital platform companies one can expect to have the most value propositions in 'layer 4' as value proposition in this 'layer' requires less upfront investment compared to layer 1, 2, 3 value proposition. In order to distinguish software products in the platform market, this paper will follow the software product classification (hereafter referred to as SPC) provided by Zahavi and Lavie (2009). They provide an extensive classification of software products, whereby they distinguishes between four main SPCs namely (1) personal application, (2) system infrastructure applications (3) vertical applications and (4) business applications (see Appendix 26).

So with respect to Zahavi and Lavie (2009), it becomes evident that putting 'platforms', 'content' and 'application' in one layer (layer 4) is not sufficient when attempting to draw conclusions on what type of envelopment in the platform layer initiates growth. Therefore, in order to get a deeper understanding of how platform companies build their ecosystem, this paper argues that this layer must be divided into three separate layers leading to the 'adapted layer model' (see table 2).

Layer 1	Devices (Access Points)
Layer 2	OS (Operating System)
Layer 3	Network
Layer 4a	Platforms
Layer 4b	Content
Layer 4c	Applications

Table 2: Summary of the updated layer model

Having identified how digital ecosystem works by means of the ICT layers (Fransman, 2010) and by identifying different software products by means of the SPC (Zahavi and Lavie, 2009), one can get a deeper understanding about the different envelopment types provided by Eisenmann et al. (2010) which are *"complements"*(type I), *"weak substitutes"* (type II) and *"functionally unrelated"* (type III) *(p.5)*.

Type I envelopments aims at leveraging economies of scope, harnessing price discrimination and achieving user base overlap. These benefits will be achieved when two platform are 'reciprocally specific', whereby the target platform adds direct value to the attacker platform. Thus, type I envelopment can be interpreted as a means to enhance one's core activity by adding value. In a similar way, type II envelopments can be regarded as a way to enlarge one's core activity. Even though, type II envelopments cannot harness large user bases and price discrimination are said to be low, opportunity for economies of scope, and thus supporting the attackers' core activity, exist. Type III envelopments aims at combining two platforms, which has no reciprocal relationship like type I, envelopment. The reason for engaging in type III envelopment is to find common components and users, which can set the basis for economies of scope. Thus type III envelopment attacks can be interpreted as a way to engage in platform diversification.

In practice, digital companies employ platform envelopment to a great extent. According to Eisenmann et al. (2011) and Evans & Schmalensee (2001) platform markets are engaged in constant 'winner-take-all battles', whereby old platforms are replaces by newer ones. So in order to stay competitive, digital platform companies should 'get-big-fast' (Eocman et al. 2006) by means of envelopment.

However, when practitioners want to apply envelopment in order to 'get-big-fast', one will notice that the typology does not shed light on when to use what type of envelopment. In a

highly dynamic market like in the digital platform industry it may be crucial to know when to employ what type of envelopment.

Following this discussion, this paper tries to add a timely dimension to the envelopment typology offered by Eisenmann et al. (2010), which helps business practitioners to better employ envelopment in the highly volatile environment of digital platform markets and 'get-big-fast'.

2.2 Business models & Innovation

The concept of business model is frequently misused in literature (Magretta, 2002). That is why this paper will clarify the concept of business model first.

The definitions of a BM, as provided in the literature, vary in both breadth and specificity and presently no consensus exists among researchers on how to conceptualize the term. In addition, Teece (2010) identifies in his paper that the concept of a business model lacks theoretical grounding in business and economics literature. By the same token, BMs are often confused with terms like strategy, business concept, economic model, revenue model or business process modeling as identified by DaSilva & Trkmann (2013). The reason why it founds no consensus in literature is because BMs definitions are a rather new concept (Al-Debei & Avison, 2010) and they are rapidly updating as they react to each new stimulus (Al-Debei and Avison, 2010; p.364). In essence, a business model can be summarized into three broad categories. Namely, value creation, value delivering and value capturing (Teece, 2010; Rajala & Westerlund, 2007; Chesebrough & Rosenbloom, 2002; Zott & Amit, 2001).

Researchers also agree that BMs can provide a source of competitive advantage (Zott, Amit and Massa, 2011). Teece (2010) and Zott et al. (2011) claim that if business models are not easy to replicate by competitors, then it can be a source for competitive advantage. However, in order to sustain competitive advantage, companies need to innovate their business model (Chesebrough, 2007). In effect, new or improved business models (i.e. new products) are said to result in lower cost and/ or increased value to the customer (Teece, 2010).

Following this logic, platform envelopment (Eisenmann et al., 2010) depict a form of business model innovation because the notion of it is to recombine existing resources from firm or partners to design new activity systems without heavy investment in R&D (Amit & Zott, 2010). Hereby, the value proposition changes as the more complementary components are recombined, tied, bundled to valuable resources into one multi platform.

2.2.1 Business model innovation
According to Amit & Zott (2010) the notion of business model innovation is to recombine existing resources from firm or partners to design new activity systems without heavy investment in R&D. Concretely, business model innovation deals with (1) searching for new logics of the firm, (2) finding new ways to create and capture value, (3) finding new ways to generate revenues and (4) defining value proposition for customers, suppliers and partners (Casadesus-Masanell & Zhu, 2011). In light of the research question, this paper understands value proposition as a way to express the business logic of value creation for customers offering, product offerings and services that satisfy the needs of a specific target segments

(Chesbrough & Rosenbloom, 2002; Petrovic et al., 2001; Demil & Lecocq, 2010; Osterwalder et al., 2005; Osterwalder & Pigneur, 2010).

Literature does not provide a clear answer on how business model innovation can be achieved. Pioneers in this field claim experimentations are central in business model innovation (Chesbrough, 2007; Chesbrough, 2010; McGrath, 2010). It is assumed that due to high uncertainty about the future it is impossible to predict a definitive direction. Thus, "the only way forward is to conduct some experiments" (Chesbrough, 2007; p.17). For instance, with the emergence of netbooks (smaller and cheaper laptops) no one could estimate a future direction like which changes are involved. Some said it will replace laptops others said it will be a complementary product next to laptops. McGrath (2010) further argues that it is difficult to predict how to benefit from technological innovation through business model innovation. According to McGrath (2010), Google's current success stems from and builds upon the many previous experimental efforts.

This experimental activity can be linked to type III envelopment attacks because when engaging in type III envelopment, the degree of user base overlap cannot be estimated for sure like in type I or type II envelopments. Furthermore, it is said that functionally unrelated platforms will usually not share common components. So by means of type III envelopment, digital platform companies seem to experiment and thereby achieve business model innovation.

3. METHODOLOGY

3.1 Research Setting
In order to answer the research question, this paper will analyze press releases and blog posts with respect to product introductions. Thereby, the aim of this paper is to find out how envelopment evolves over time in digital platform companies. In doing so, this paper will focus on Amazon and Google in the years 2006 to 2011. Both companies were among the four out of the 50 most innovative companies in the Fast Company 2012 ranking (Fast Company, 2011).

This paper argues that both companies achieved their status with the help of envelopment attacks in the dynamic market at that time. Furthermore, this paper scrutinizes companies with two different core markets (Amazon in e-commerce and Google in search) in order to achieve high validity, as the result may not be limited to one sector only.

In the following, both companies will be shortly portrayed, followed by an introduction into data collection and data analysis.

3.1.1 Google
Google is a USA based multinational technology company specializing in Internet-related services and products. Google entered the Internet search market in 1998 and began as a provider of search engine. According to Luchetta (2013), Google emerged as the leader of the search industry in the early 2000s after a fierce competition in the 1990s. Luchetta (2013) also claims that the reason for Google's success lies in the innovative business model based on advertising. Nowadays, Google is represented in several markets like online advertising technologies, search, cloud computing, hardware and software.

3.1.1 Amazon

Amazon was found in 1994 and is a USA based company specializing in electronic commerce. This web-based retailer started as an online bookstore, but soon diversified, selling DVDs, Blu-rays, CDs, video downloads/streaming, MP3 downloads/streaming, software, video games, electronics, apparel, furniture, food, toys and jewelry. Next to the retailing business Amazon.com, also produces consumer electronics like Amazon Kindle e-book readers, Fire tablets, Fire TV and Fire Phone. Furthermore, they are a major provider of cloud computing services. Currently, it is said that Amazon is the leading e-commerce firm in the world (Ritala et al., 2014). According to the Time Magazine, Amazon has a market share of 23% of online retail sales with which the Amazon does more "e-commerce business than its next 12 largest competitors, which includes the likes of Staples and Wal-Mart" (Bowman, 2015).

3.2 Data collection

In order to answer the research question, this paper collected newspaper articles containing information on new value propositions.

Thereby, data was mainly collected through the official company website of Amazon and Google. Here, one can find press releases, which are shared with external news but also company website-only news articles. Next to this source, data was collected through Factiva, which provides all the press releases sent to wires. As a consequence, website-only news articles which are not sent to wires and which are not on the website anymore will be missed in this analysis.

In sum, this paper will use 1949 blog releases and 770 press releases containing information on Google's and Amazon's NPVs in the years 2006 to 2011. However, not all of the data were relevant as many articles were irrelevant or duplicates.

3.5 Data analysis

After date collecting the necessary data, this paper analyzed the data. Therefore, this paper categorized press releases according to a template shown in Appendix 25. Thereby, new value propositions (NVP) will be classified with respect to four categories namely: (1) Direct extraction, (2) Product category, (3) ICT Layer, (4) Software Classification.

In the first category (*Direct extraction*), basic information on company, product name, launch date, product version, product type and customer classification will be extracted from the text. This groundwork will be necessary in the analysis phase as this will briefly indicate the necessary key information at glance.

In the second category (Product category), NVPs will be categorized as product launch or new version. In the same manner, the data will categorize each NVP as a launch with partners, bundling or platform.

In order to understand the ecosystem of Google and Amazon, this paper performed an ICT layers analysis (Fransman, 2010), which will be slightly adjusted to fit in to the platform market and ultimately to the research question (see table 2). Thereby, the layer 3 (platform, content and application) will be detached and put in separate layers.

Besides, this paper will distinguish software products according to the taxonomy provide by Zahavi and Lavie (2009) who provide an extensive classification of software products.

Thereby, this paper can draw conclusions on in which markets digital platform companies enveloped.

3.6 Reliability

In order to examine the reliability of this test, this paper will make use of Cohen's kappa, which measures the inter-rater agreement of qualitative (categorical) items between two raters (Carletta, 1996; Cohen, 1968; Mishina et al., 2004). Thereby, both raters agree in their rating or they disagree, thus there are no degrees of disagreement (e.g. no weightings). According to Carletta (1996), this test is said to be more robust than percent agreement calculation because κ is adjusted for random chance. If both raters show total consensus in the results then k is equal to one. If there is no agreement k is equal to zero. For the sake of objectivity, this paper will take Krippendorff's (1980) ways of interpretation. According to him, if k is higher than 0.8 there is good reliability. If k lies between 0.67 and 0.8 then one can make tentative conclusions (see Appendix 5 for a detailed description on how to perform the Cohen's kappa test).

This paper, tries to find out whether the inter rater agreement between two raters is acceptable when filling in the before mentioned template.

Therefore, tests on (1) relevant article or not relevant article, (2) new product or new version, (3) bundling or not bundling (4) platform or not platform, (4) acceptance in ICT layer, (5) acceptance in Software classification will be performed. The results from this test can be seen in the Appendix (see Appendix 6 and 7) section.

In summary, one can conclude that the reliability of this test is relatively high. In five out of six cases, Cohen's kappa is larger than 0,80. Following the logic of Krippendorff's (1980), the inter-rater agreement of the qualitative (categorical) items between two raters is good.

4. STRATEGIC ENVELOPMENT

How do digital platform companies envelop their value propositions over time in order to pursue growth? In answering this question, this paper observed that both companies followed different strategies, whereby envelopment was employed differently over time.

Over the same time frame of 2006 to 2011, Amazon introduced 69 NVPs (of which 15 are new version) and Google introduced 135 NVPs (of which 38 are new versions). Classifying the SPC according to Zahavi and Lavie (2009), one will observe that, in general, Amazon was active in fewer markets than Google (see Figure 2).
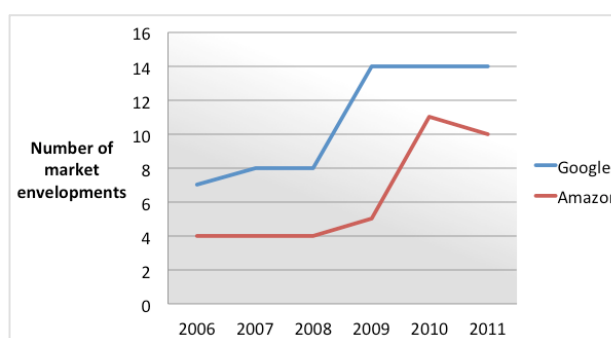

Figure 2: Market entries between 2006 and 2011

However, in light of the ICT layer provided by Fransmann (2010), it becomes evident that Amazon was mostly active in more ICT layers than Google (see Figure 3). Whereas both companies started with equal presence in a similar amount of ICT layers (both companies in 3 markets), in the following three years (2007 to 2009), Amazon was active in each one layer more compared to Google. In 2010, both companies showed presence in an equal amount of ICT layers (2010 = 5) and in the final year Google was active in in one more layer compared to Amazon (5).
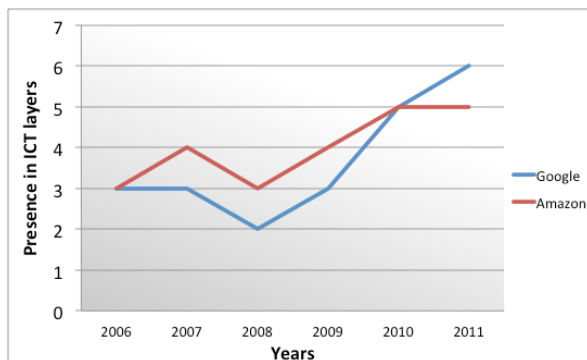

Figure 3: Presence in ICT layers Google vs. Amazon

Relating this information to the financial development in terms of revenue (see Figure 4), one will observe that both companies started with nearly equal revenue in 2006 (Google = US$10,604; Amazon = US$10,711 million). In the following two years, Google's revenue was slightly higher than Amazon's revenue, while being present in more markets and in less ICT layers than Amazon. However in 2009, Amazon surpassed Google in terms of revenue while being active in less markets but in one more ICT layer than Google. In the following two years (2010 and 2011), Amazon gained more revenue than Google.
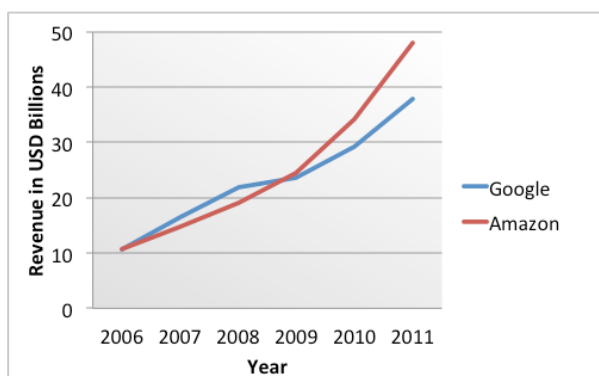

Figure 4: Revenue Google vs. Amazon

Synergizing this information, one can derive two distinct phases. Phase 1 will depict the years from 2006 to 2009, which is characterized by focused growth through steadily growing the envelopment scope. Thereby, Amazon and Google show presence in a low to moderate number of ICT layers (2 to 4 ICT layers out of 6)

Hypothesis I: A focused envelopment scope in the early stage sets the foundation for sustainable growth

In phase 2 (2010 to 2011), Amazon and Google increase the envelopment scope and also the presence in ICT layers (5/6 out of 6 ICT Layers).
Hypothesis II: Increasing the envelopment scope in the subsequent phase leads to sustainable growth

In doing so, the findings will shed light on how envelopment evolves over time and achieves long-term success.

4.1 Engaging in focused growth (2006 to 2009)
Consolidating and defending one's own digital platform characterizes the first phase. Thereby, both companies aim for achieving focused growth by employing two distinct types of envelopment. One the one hand, both companies are engaged in enhancing their core market. On the other hand, digital platform companies engage in focused diversification by slowly enveloping into new markets.

Considering 'core market enhancement', it becomes evident that both companies employed type I envelopment attacks (Eisenmann et al. 2010), which enhanced their core market portfolio. For instance, Amazon enhanced its core market value proposition portfolio with retail stores like automotive parts & accessories store, wheels store and jewelry store. Similarly, Google enhanced its core market portfolio by extending their search service portfolio with Google Book Search, Google Social Search, Google Voice Search and Google Music search.

Comparing both companies in light of focus in the core market, it becomes evident that Amazon focuses more in the core market than Google (see Figure 5). In doing so, Amazon devotes more than 50% of all product launches to their core market in the first four years (2006 = 63%; 2007 = 50%; 2008 = 63%; 2009 = 53%). On the other hand, Google started with devoting 53% of all products launches to their core market (search) in year 2006 but in the following years, the focus in the core market got weaker with each 33% and 31% in 2009.

So, whilst Amazon keeps its focus in the core market relatively high, Google displays a decreasing trend of focus in the core market.
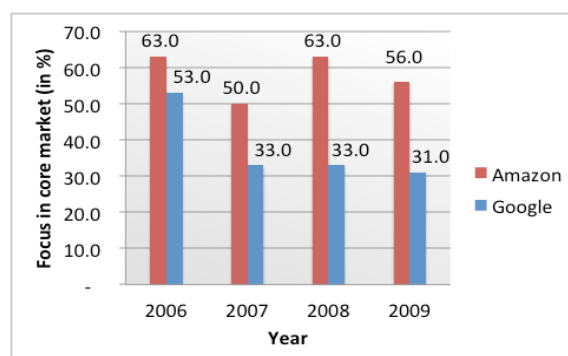
Figure 5: Focus in core market Amazon vs. Google

Next to core market enhancement, there is evidence that Google and Amazon engage in 'focused diversification' in this phase. As identified before, Amazon's core market lies in the e-commerce market. However, looking at Table 3 one can identify that Amazon made envelopment attacks in the entertainment market, hardware market and the storage market. Thereby, Amazon introduced Amazon s3 (storage market), Kindle (hardware market), Amazon Unbox today - known as Amazon Instant Video- (entertainment business) in 2006. In the

following years, Amazon enhanced their product-offering portfolio by launching NVPs in the hardware market (Kindle DX and Kindle 2), storage market (Amazon CloudFront and Amazon Virtual Private Cloud) and the entertainment market (Amazon Music, Amazon MP3 Music Service).

Rank	SPC	NVP	Share of total NVP
1.	Retail & Wholesale	18	54,5%
2.	Entertainment & Media Communication	4	12,1%
3.	Hardware	3	9,1%
4.	Storage	3	9,1%

Table 3: Amazon - focused diversification 2006 to 2009

In a similar fashion, Google made envelopment attacks in the Internet communication market, mapping market and in the sales & marketing market, next to its core business area "Data Structuring, Access & Manipulation" (see Table 4). Envelopment attacks in the Internet communication market involve product offerings like Google Talk, Google Voice, Google Friend Connect and Gmail voice & video chat. Also in the Mapping market, Google enhanced its existing service – Google Maps – with expanding their value proposition (e.g. Map my photo, My maps, My location).

Rank	SPC	NVP	Share of total NVP
1.	Data Structuring, Access & Manipulation	30	36,1%
2.	Internet Communication	9	10,8%
3.	Mapping	7	8,4%
4.	Sales & Marketing	5	6%

Table 4: Google - focused diversification 2006 to 2009

Also here, it is proven that Amazon is more focused in creating their 'new core markets' compared to Google. Whereas, Amazon devotes 84,8% of all NVP to four markets (core market + focused diversification markets) Google devotes just 61,1% of all NVPs towards their core market and 'new core markets'. Strikingly, 24,1% out of the remaining share (38,8%) depict 'one NVP per market', which can be interpreted as an attempt to diversify more than Amazon in this phase.

When questioning the existence of both types of envelopment ('core market enhancement' and 'focuses diversification') one can argue that both companies aim at get-big-fast by quickly acquiring the base of users (Eocman et al., 2006). So, by expanding their core markets by means of type I envelopments, both companies aim at expanding the base of users. In doing so, both companies aim at leveraging network effect (Eisenmann et al., 2010), and thus to lock-in-the user (Eocman et al., 2006).

So, being focused in phase 1 and growing the base of users in order to get big fast is seen as essential step towards growth. This theoretical background gives support for H1.

The ICT layer analysis (see Appendix 26 and 27) also supports the previous findings because in the phase 1 both companies mostly focus their NVP around the platform layer (4a) and the application layer (4c) where the network effect is crucial. However, it becomes evident that Amazon also slowly moves into adjacent layers in the first phase unlike Google. For instance, by introducing the Kindle, Kindle DX and Kindle 2

Amazon enters the device (access points) layer and by means of Amazon S3, Amazon enters slowly in to the network layer earlier than Google. In doing so, Amazon slowly expanded its ecosystem in phase 1.

4.2 Engaging in experimental envelopment (2010 to 2011)

Whereas in phase 1, both companies stayed relatively focused in a few markets, in phase 2 the scope of envelopments increased to a great extent. In doing so, Amazon enveloped in 10 markets in 2010 and in 8 markets in 2011, which is nearly twice as much as in the previous years (2006 = 4; 2007 = 4; 2008 = 4; 2009 = 5). A similar increase can be observed at Google. While from 2006 to 2008 Google stayed focused around 7 to 8 markets, in 2009 to 2011 Google enveloped into twice as many markets (14 markets). Thereby, the number of type III envelopments (Eisenmann et al., 2010) into unrelated markets increased to a great extent in phase 2.

It also becomes evident that both companies deployed type III envelopments for rather experimental reasons as both companies increasingly introduced just one product per market. For instance, Amazon employed type III envelopment attacks in unrelated markets like, business productivity software, software application development, network management and banking software by introducing one NVP in each market. Thereby it is striking that Amazon launched one product per market in a low number of markets in phase 1 (see Figure 6) but after 2009, the employment of the 'one product per market' strategy increases to 4 in 2010 and to 7 in 2011 markets. This depict that the experiential activity primarily increases in phase 2.
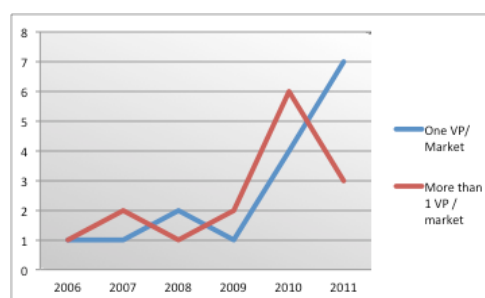

Figure 6: Experimental activity at Amazon

Whereas, Amazon was mainly engaged in experimental type III envelopment in the second phase (2010 – 2011), Google was experimental in both phases (see Figure 7). Thereby, Google employed the 'one product per market' strategy in 4 to 5 markets in the first three years followed by steady increase from 7 (2009) to 8 (2010) to 9 (2011) number of 'one product per market' envelopments. Thereby, Google made type III envelopment into unrelated markets like in the lifestyle application market, collaborative applications market and personal multimedia productivity market.
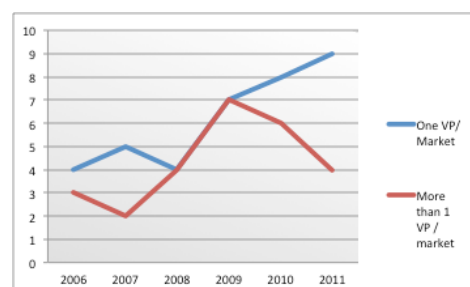

Figure 7: Experimental activity at Google

This rather experimental type of envelopment is line with (Chesbrough, 2007; Chesbrough, 2010; McGrath, 2010) who claim that experimentation is a form of business model innovation. So, by means of this experimental type of envelopment, Google and Amazon try to search for new logics of the firm and to try find new ways to create and capture value (Casadesus-Masanell & Zhu, 2011). Furthermore, this paper interprets the 'one product per market' as a 'real options' (Johnson et al., 2011). So by means of the 'one product per market' strategy, digital platform companies create 'real options'. This implies that digital platform companies employ type III envelopment attack in order to enter a new market and based on the development of the platform, the market presence will be further exploited and expanded when the real option is successful or abandoned if not successful.

The ICT layer analysis (see Appendix 26 and 27) also reflects the experimental behavior as Google and Amazon show presence in nearly all six layers in the second phase. Besides, one can observe that Google started to increase its scope and entered into the device layer (Chromebook and Nexus) and into the OS layer (Chrome OS).

Considering this phase with respect to financial development (revenue) it becomes evident that Amazon surpassed Google in terms of revenue after 2009 and in the following years the gap increased. Thereby, Amazon gained US$ = 4,8 billion more than Google in 2010 and in the following year the gap increased to US$ = 10,1 billion. This development supports H1 because this observation supports that being focused in a few markets in the early stage in combination with low number of experimental activity in the early phase sets the foundation for subsequent growth. So, whereas experimental activity was low at Amazon in the first phase, the focus in the core market was quite high. On the other hand, Google was engaged in experimental activity in both phases while partially neglecting to pay attention to its core market. Furthermore, the ICT layer analysis reveals that being active in a moderate number of layers (like Amazon) in phase 1, while being active in a small number of markets, supports growth in subsequent phases. This implies that one should quickly create a large ecosystem with which digital platform companies can address users.

5. THE PLATFORM ENVELOPMENT MATRIX

This study set out to understand how envelopment in digital platform companies evolves over time. Thereby, the envelopment patterns of Google and Amazon reveal an extended envelopment typology, which adds a timely dimension to the envelopment typology of Eisenmann et al. (2010). 'core market enhancement', 'focused diversification' and 'experimential' envelopment. The analysis also revealed that digital platform companies undergo two distinct stages of platform maturity stages, which this paper will describe as the 'growth stage' and the 'maturity phase'. In each phase, different envelopment strategies are employed in order to generate sustainable revenue.

The findings and observations from the analysis can be synergized in to the following 'platform envelopment lifecycle matrix" - short PELM (see Figure 8).

	Characteristics	Stages of platform maturity		
		Growth stage		Maturity stage
	Envelopment type	Core market enhancement	Focused diversification	Experimental
	Number of Market Envelopments	Low	Moderate	High
	Presence in ICT layers	Moderate (2 - 4)	Moderate (2 - 4)	High (5 - 6)
	Main focus	(1) get-big-fast by acquiring and expanding the base of users and by (2) searching for new logics for the firm (3) gradually locking in the user		Create real options in order to find new ways and to create and capture value

Figure 8: Platform Envelopment Lifecycle Matrix

In the growth stage, digital platform companies engage in core market enhancement and focused diversification. Thereby, digital companies show a rather low to moderate scope of envelopment while engaging in type I and type II envelopment (Eisenmann et al. 2010), which complement the core platform. Also, in the early stage, digital platform companies engage in 'focused diversification', which can be seen as an initiative for searching new logics of the firm and to find new ways to create and capture value by adding a new core competence. Thereby, digital platform companies achieve business model innovation (Casadesus-Masanell & Zhu, 2011). With respect to Eocman et al. (2006), it can be reasoned that in this 'growth stage' companies try to 'get-big-fast' by quickly acquiring and expanding the base of users with launching product introductions in their core market. Thereby, both companies aim at consolidating and defending their market position in their core market. For instance, as Amazon widens its online shop by introducing several sub-stores, they expand their base of users. In a similar fashion, Google tries to acquire and expand their base of users by introducing enhanced and better ways to search (Google Image Search, Google Voice Search etc.). In light of the winner-takes-all strategy, it can be reasoned that by creating new core markets, digital platform companies also seek to get-big-fast by acquiring and expanding the base of users (Eocman, et al. 2006). Furthermore, this matrix also implies that in the growth stage, digital companies should not engage in experimental activity, since this can distort the focus in its core markets. Besides, this paper argues that by means of core market enhancement, digital platform companies aim to harness economies of scope (Eisenmann et al., 2010) .

In the saturation stage, digital platform companies engage in experimental envelopments in unrelated markets. Thereby the envelopment scope is higher than in the early stage. Here, digital platform companies create 'real option' by launching 'one product per market'. This rather experimental type of envelopment is related to Chesbrough (2007), Chesbrough, (2010) and McGrath (2010) who claim that experimentation is a form of business model innovation.

Furthermore, the case study reveals that creating a large ecosystem in the 'growth stage' facilitates sustainable revenue in long term. Whereas, Google was active in a rather low number of ICT layers (between 2 and 3 out of 6 layers),

Amazon was active in more layers (3 and 4 out of 6 layers) in the 'growth stage'. Thereby, it can be observed that Amazon established an ecosystem around its 'platform layer products'. For example, by introducing the Kindle (Device – layer 1), Amazon created an ecosystem which enhanced the value proposition in the platform layers (book store and Amazon shopping. In doing so, Amazon aims at get-big-fast by expanding its ecosystem in adjacent layer.

So, with respect to long term success, growing the ecosystem by entering adjacent ICT layers in the 'growth stage' will be seen as a groundwork for subsequent growth.

5.1 Application of PELM: Case of Yahoo

In order to increase the validity of the PELM, this paper will apply this matrix on Yahoo! Inc. (hereafter referred to as Yahoo). Yahoo was found in 1994 (like Amazon) and is a US based Internet service company and provides users with online utilities, information, and access to other Web sites. Whereas, Amazon and Google emerged as the market leader in their respective business field, Yahoo did not (Bowman, 2015; Luchetta, 2013). In this respect, it may be interesting to find out the reasons.

Over the same time frame of 2006 to 2011, Yahoo introduced 90 NVPs (of which 22 are new version). Classifying these products according to the SPC provided by Zahavi and Lavie (20XX), one will observe that Yahoo was active in 13 markets over the said period. Comparing these numbers with those of Amazon and Google, one can say that Yahoo launched and enveloped into more markets than Amazon and less than Google in the introduction stage and in the growth stage. However, in terms of revenue, Yahoo is not head to head with Amazon and Google (see Figure 9).
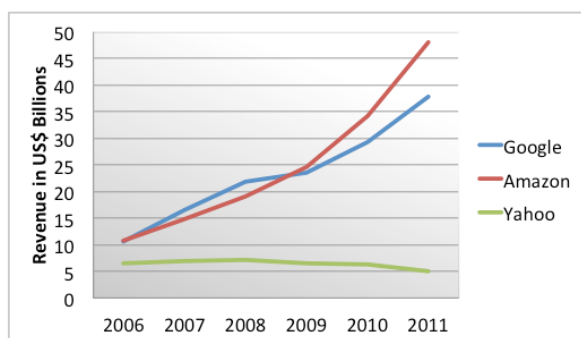

Figure 9: Revenue Google vs. Amazon vs. Yahoo

Based on PELM, which was derived in this paper, one can make assumptions on why Yahoo did not succeed in their envelopment strategy over time.

According to the PELM, in the 'growth stage' it is important to consolidate one's own core market by launching products in their own sphere. However, looking at Yahoo one can observe that they devote less product introductions to their core market in the first three years (see Figure 10). Thus, it can be assumed that Yahoo did not consolidate their core market in a proper way.
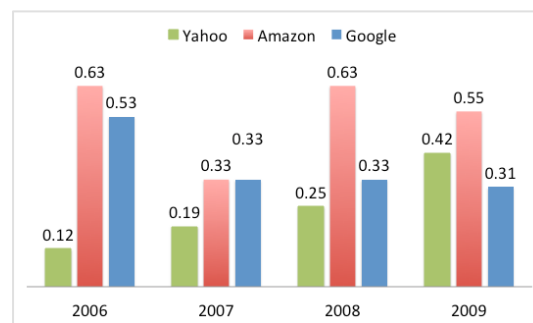

Figure 10: Focus in core market

When comparing the experimental activity with Google and Amazon, one can observe that Yahoo show downward tendency. In 2011, there is no experimental 'one product per market' activity (see Figure 11).
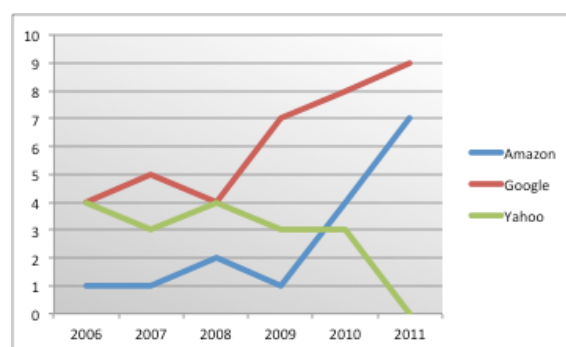

Figure 11: Experimental activity

Also when it comes to the ICT layer analysis, it can be observed that Yahoo decided to create its ecosystem around three ICT layers only in all six years (see Figure 12). Thereby, it is striking that Yahoo launched all their NVP only in the platform layers (platform, application and content) only. With respect to Google and Amazon, this paper stresses that digital platform companies must also engage in 'non-platform layers' because a larger ecosystem is more attractive to the user as the size and connectivity of an entire network increases (Eisenmann et al., 2010). Besides, the company itself cans also leverage the large ecosystem by means of economies of scope, shared user relationships and common components.
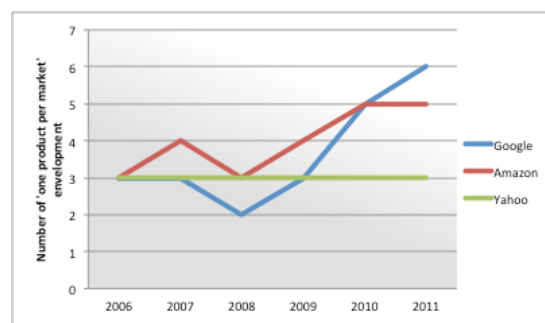
Figure 12: Presence in ICT layers

Synergizing the observations and findings, one can conclude that Yahoo did the complete opposite of what Amazon and Google did. Yahoo started with experiential type of envelopments without consolidating their core market, then slowly moved back to core market enhancement and focused diversification (in 2009) and finally ended up with focusing their value proposition around three main core competences

only. Thereby, Yahoo neglected to create an ecosystem around its platform layer which would added value to the current ecosystem and simultaneously would stimulate to get-big-fast.

Furthermore, as the revenue of Yahoo behaves in the complete opposite direction to Amazon and Google, one can assume that the PELM is valid because Yahoo proves what happens when a digital platform company employs envelopment in a different order.

6. CONTRIBUTIONS AND CONCLUSION

This paper argues that recent theory on value proposition evolution and business model innovation fail to consider the dynamic factor of digital platform companies. Thus, there is no reasonable explanation on how digital platform markets, competition and envelopment evolve over time. Therefore, this paper aimed at identifying how envelopment evolves over time in digital platform companies by adding the dynamic element to envelopment attacks.

In order to address this concern, this paper compared and analyzed Amazon's and Google's press releases and blog posts with respect to product introductions in the time frame of 2006 to 2011. In doing so, the envelopment patterns reveal an extended envelopment typology, which adds a timely dimension to the envelopment typology of Eisenmann et al. (2010). This typology also inspired to develop the PELM ('platform envelopment lifecycle matrix'), which shed light on how to employ platform envelopment over time in order to achieve growth. Thereby the matrix identifies that platform companies undergo two distinct stages – 'growth stage' and the 'maturity stage'. In the ' growth phase', it is important to consolidate and to defend one's own core market by means of 'core market enhancement envelopment'. Also, digital platform companies should engage in focused diversification, whereby companies diversify in a few unrelated markets. In this stage, it is also important to slowly create an ecosystem around the 'non-platform-layers', thereby increasing the size and the connectivity of the entire network.

In the 'mature phase', the focus should be around experimentation in order to find new ways to create new value. Thereby, digital platform companies launch 'one-products-per-market' and speculate whether to expand the market presence in the given market or not.

6.1. Theoretical & managerial implications
The main contribution of this study is to add valuable insights to the envelopment strategy provided by Eisenmann et al. (2010). Thereby, this paper extended the work of Eisenmann et al. (2010), by adding a timely dimension to the envelopment typology of Eisenmann et al. (2010).

Furthermore, this paper shed light on how business model innovation is achieved in platform companies, which is still vague in research (Amit, & Zott, 2001; Casadesus, & Ricar, 2010). By means of the PELM model, one can assess how digital platform companies employ different type of envelopments over time in order to innovate their business model.

By means of the PELM matrix, business practitioners will now be able to identify envelopment as a source of business model innovation. Thereby, business practitioners can better employ envelopment attacks at different stages in order to get-big-fast

6.2 Limitations
This paper suffers from typical limitation of a case study. As a matter of fact, this paper's result is limited to two Internet based platform companies. Nevertheless, it is argues that generalizability could be increased to some extent by choosing two digital platform companies from two different core fields (Google – Search Market; Amazon – ecommerce).

Furthermore, this paper is subject to the time frame ranging from 2006 to 2011. According to Al-Debei and Avison (2010), business models are rapidly updating as it reacts to each new stimulus. Thus, it is reasoned that business model innovation in other time frames can be different.

6.3 Future research
Future research can test the proposed matrix in different industries and in different types of business models. Also, it may be interesting to apply this framework to smaller and emerging digital platform companies.

Furthermore, researches can extent the implication of PELM (see Figure 9) and shed light on other perspectives like financial capability, partnering, demand and speed of technology in different stages of digital platform companies.

Another issue for future research can be coopetition. This phenomenon is described as a situation whereby a company has a collaborative and competitive relationship with one or more companies simultaneously (Rita et al., 2014). Like value proposition, coopetition evolves over time and shapes the competitiveness of firms, as well as the overall logic of industries (Rusko, 2011; Wang & Xie, 2011). However, literature does not give an answer on how coopetition shapes the evolution of envelopment over time.

Based on this discussion, the following research question emerges: *How does coopetition shape envelopment over time?*

So by adding a time dimension to coopetition, digital platform companies and business practitioners can identify when and how to employ coopetition in order to shape envelopment.

References

Amit R And Zott C (2001) Value creation in eBusiness Strategic Management Journal 6–7(22), 493–520.

Amit, R., Zott, C. (2012). Creating value through business model innovation. MIT Sloan Management Review.

Barker, A., & Vasagar, J. (2014, October 13). Amazon is our biggest search rival, says Google's Eric Schmidt. Retrieved July 16, 2015, from www.ft.com/intl/cms/s/0/748bff70-52f2-11e4-b917-00144feab7de.html

Barnes, C., Blake, H., & Pinder, D. (2009). What is a value proposition? In *Creating & delivering your value proposition: Managing customer experience for profit* (pp. 21 - 26). London: Kogan Page.

Bowman, J. (2015, January 16). Why Amazon Is Losing Market Share to Big Box Chains - TIME. Retrieved July 16, 2015 from http://time.com/money/3671937/amazon-staples-walmart-ecommerce/

Caillaud, B., Jullien, B. (2003). Chicken & egg: competition among intermediation service providers.

Carletta, J. (1996). Assessing agreement on classification tasks: the kappa statistic. Computational linguistics, 22(2), 249-254.

Casadesus-Masanell, R., & Ricart, J. E. (2007). Competing through business models.

Casadesus-Masanell, R., & Ricart, J. E. (2010). From strategy to business models and onto tactics. Long range planning, 43(2), 195-215.

Chesbrough, H. (2010). Business Model Innovation: Opportunities and Barriers. Long Range Planning, 43,354-363. doi:10.1016/j.lrp.2009.07.010

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and corporate change*, 11(3), 529-555.

Cohen, J. (1960) A coefficient of agreement for nominal scales. *Educational and Psychological Measurement* 20, 37-46.

Cohen, J. (1968) Weighted kappa: nominal scale agreement with provision for scaled disagreement or partial credit. Psychological Bulletin 70, 213-220.

Cusumano, M. A., & Gawer, A. (2008, January 1). How Companies Become Platform Leaders | MIT Sloan Management Review. Retrieved from http://sloanreview.mit.edu/article/how companies-become-platform-leaders/

DaSilva, C. M., & Trkman, P. (2013). Business Model: What It Is and What It Is Not. *Long Range Planning*.

Demil, B., & Lecocq, X. (2010). Business model evolution: in search of dynamic consistency. *Long Range Planning*, 43(2), 227-246.

Eisenmann, T. 2008. Managing proprietary and shared platforms. California Management Review, 50(4), 31-53.

Eisenmann, T., Parker, G. & Van Alstyne, M. 2006. Strategies for two-sided markets. Harvard Business Review, 84(10): 92–101.

Eisenmann, T., Parker, G. & Van Alstyne, M. 2011. Platform envelopment. Strategic Management Journal, 32(12), 1270-1285.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they. *Strategic management journal*, 21(1), 1105-1121.

Eocman L, Jeho L, Jongseok L. 2006. Reconsideration of the Winner-Take-All Hypothesis: Complex Networks and Local Bias. Management Science 52 (12): 1838–1848.

Evans, D. S. 2003. Some empirical aspects of multi-sided platform industries. Review of Network Economics, 2: 191–209.

Evans, D. & Schmalensee, R. 2002. Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries. NBER Chapters, in: Innovation Policy and the Economy, National Bureau of Economic Research, Inc, 2: 1-50.

Fastcompany. (2011). The Great Tech War Of 2012 | Fast Company Business + Innovation. Retrieved from http://www.fastcompany.com/1784824/great-tech-war-2012

Finger, M., & Künneke, R. W. (2011). *International handbook of network industries: The liberalization of infrastructure.* Cheltenham, UK: Edward Elgar

Fransman, M. (2010). The new ICT ecosystem: implications for policy and regulation.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). Stakeholder theory: The state of the art. Cambridge University: Press Cambridge.

Hagiu, A., & Wright, J. (2015). Multi-sided platforms. Inernational Journal of Industrial Organization, 1-13. Retrieved from http://dx.doi.org/10.1016/j.ijindorg.2015.03.003

Haucap, J., & Heimeshoff, U. (2014). Google, Facebook, Amazon, eBay: Is the Internet driving competition or market monopolization? *International Economics and Economic Policy*, 11(1-2), 49-61. Doi: 10.1007/s10368-013-0247-6

Johnson, G. (2010). *Exploring strategy*. Harlow: Financial Times Prentice Hall.

Luchetta, G. (2014). Is the Google platform a two-sided market? *Journal of Competition Law & Economics*, 10(1),185-207. doi:10.1093/joclec/nht026

Li, S. X., & Greenwood, R. (2004). The effect of within industry diversification on firm performance: synergy creation, multi-market contact and market structuration. *Strategic Management Journal*, 25(12), 1131-1153.

Mahadevan, B. (2004, December). A framework for business model innovation. In *Proceedings of IMRC 2004 Conference, Bangalore, India*.

Müller, R., Kijl, B., & Martens, J. K. (2011). A Comparison of Inter-Organizational Business Models of Mobile App Stores: There is more than Open vs. Closed.*Journal of Theoretical and*

Applied Electronic Commerce Research, 6(2), 63- 76. doi:10.4067/S0718-18762011000200007

Osterwalder, A. (2004). The business model ontology: A proposition in a design science approach.

Osterwalder, A., & Pigneur, Y. (2010). Business model generation: a handbook for visionaries, game changers, and challengers. Hoboken, New Jersey: John Wiley & Sons, Inc.

Rindova, V. P., Yeow, A., Martins, L. L., & Faraj, S. (2012). Partnering portfolios, value-creation logics, and growth trajectories: A comparison of Yahoo and Google (1995 to 2007). *Strategic Entrepreneurship Journal*, *6*(2), 133-151.

Sriram, S., Manchanda, P., Bravo, M. E., Chu, J., Ma, L., Song, M., & Shriver, S. (2014). Platforms: a multiplicity of research opportunities. Retrieved from DOI 10.1007/s11002-014-9314-1

Teece, David; Pisano, Gary; Shuen, Amy (August 1997). Dynamic Capabilities and Strategic Management "Dynamic Capabilities and Strategic Management". Strategic Management Journal 18 (7): 509–533.

Teece, D. J. (2010). Business models, business strategy and innovation. Long range planning, 43(2), 172-194.

The Economist. (2012). Another game of thrones | The Economist. Retrieved from http://www.economist.com/news/21567361-google-apple-facebook-and-amazon-are-each-others-throats-all-sorts-ways-another-game

Zahavi, T., Lavie, D. (2009). Software product classification.
Zott, C., & Amit, R. (2008). The fit between product market strategy and business model: implications for firm performance. *Strategic Management Journal, 29*(1), 1-26.

Zott, C., Amit, R., & Massa, L. (2011). The business model: recent developments and future research. *Journal of management, 37*(4), 1019-1042.
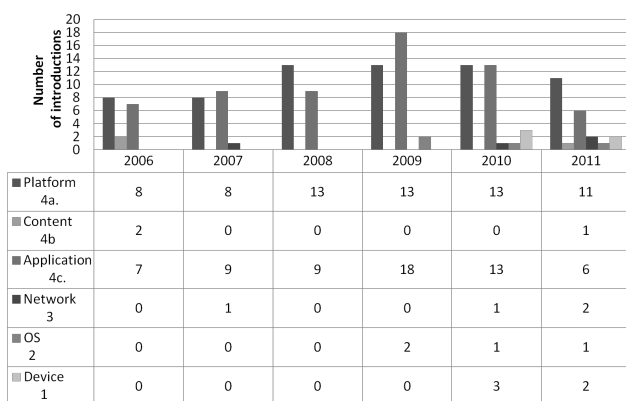
Appendix:

Appendix 1:Amazon Data – " product classification"

	Product Category				
Launch Date	Product Launch	New Version	Launch w Partners	Bundling	Platform
2006	9	0	2	9	6
2007	6	0	1	4	6
2008	8	0	0	8	6
2009	7	3	0	10	9
2010	12	11	1	21	15
2011	13	4	2	17	13
Total	55	18	6	69	55

Appendix 2: Google Data – " product classification"

	Product Category				
Launch Date	Product Launch	New Version	Launch w Partners	Bundling	Platform
2006	12	5	3	16	11
2007	11	7	2	14	11
2008	18	4	4	18	15
2009	27	6	4	30	21
2010	20	10	3	20	22
2011	13	5	4	18	15
Total	101	37	20	116	95

Appendix 3: Google– " ICT Layer"

	2006	2007	2008	2009	2010	2011
Platform 4a.	8	8	13	13	13	11
Content 4b	2	0	0	0	0	1
Application 4c.	7	9	9	18	13	6
Network 3	0	1	0	0	1	2
OS 2	0	0	0	2	1	1
Device 1	0	0	0	0	3	2

Appendix 4: Amazon – " ICT Layer"

	2006	2007	2008	2009	2010	2011
Platform 4a.	5	3	6	6	4	2
Content 4b	0	1	0	0	1	1
Application 4c.	3	1	1	1	6	5
Network 3	1	0	1	1	6	6
OS 2	0	0	0	0	1	0
Device 1	0	1	0	2	4	3
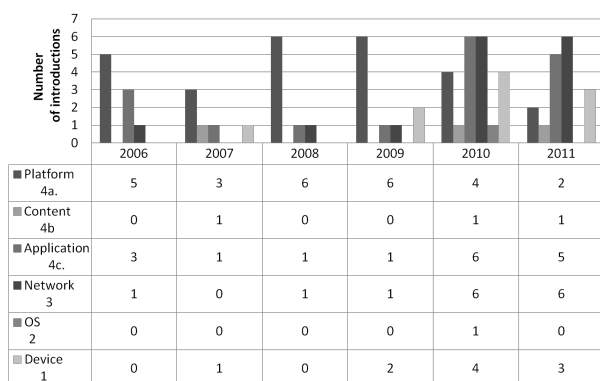
Appendix 5: Cohen's Kappa calculation

The first step is to each classify N items into mutually exclusive categories like yes and no categories.

Rater B

	1	2	k	Total
1	n_{11}	n_{12}	n_{1x}	$\sum n_{1x}$
2	n_{21}	n_{22}	n_{2x}	$\sum n_{2x}$
k	n_{x1}	n_{x2}	N_{kk}	$\sum n_{xk}$
Total	$\sum n_{x1}$	$\sum n_{x2}$	$\sum n_{kx}$	N

(Rater A labels the rows)

Table X: Example

Next, one needs to determine Pa and Pe. Hereby, Pa represents the portion of times both coders agree on a category and is calculated as the following:

$$p_a = \frac{\sum of\ consensus}{Total} = \frac{n11 + n22}{n - (nkx + nxk)}$$

Pe is the portion of times that would be expected to occur by chance. This will be calculated as the following:

$$p_e = \left(\frac{\sum n1x}{n} * \frac{\sum nx1}{n}\right) + \left(\frac{\sum n2x}{n} * \frac{\sum nx2}{n}\right) + \left(\frac{\sum nxk}{n} * \frac{\sum nkx}{n}\right)$$

Concluding, Cohen's kappa, measures the degree of rater agreement, is then defined as:

$$\kappa = \frac{p - pe}{1 - pe}$$

For the sake of completeness, the next step will be to calculate the standard error, which proofs the statistical significance. Cohen (1960) gave the following expression for SE(κ).

$$SE(\kappa) = \sqrt{\frac{p(1-p)}{n(1-pe)2}}$$

The final step is to calculate the confidence interval for $\varkappa$. In this paper, we will calculate with a confidence interval of 95%. (z = 1,96). A confidence interval for $\varkappa$ may be calculated using the standard normal distribution as follows $\kappa \pm 1,96*SE(\varkappa)$

Appendix 6: Cohen's Kappa calculation – first round

Round 1	Po	Pe	K	SE (95%)	CI - lower bound	CI - upper bound	N
Article Selection	0,99	0,75	0,95	0,03	0,89	1,00	300
New Product vs New	0,95	0,69	0,85	0,11	0,64	1,05	42
Bundling vs not bundling	0,95	0,87	0,64	0,25	0,16	1,13	42
Platform / not Platform	0,81	0,48	0,63	0,12	0,40	0,86	42
ICT Layer	0,83	0,40	0,72	0,10	0,53	0,91	42
Software classification	0,81	0,11	0,79	0,07	0,65	0,92	42

Appendix 7: Cohen's Kappa calculation – second round

Round 2	Po	Pe	K	SE (95%)	CI - lower bound	CI - upper bound	N
Article Selection	1,00	0,75	1,00	0,00	1,00	1,00	300,00
New Product vs New	0,95	0,69	0,85	0,11	0,64	1,05	42,00
Bundling vs not bundling	0,98	0,93	0,66	0,34	-0,01	1,32	42,00
Platform / Not Platform	0,95	0,51	0,90	0,07	0,77	1,03	42,00
ICT Layer	0,93	0,45	0,87	0,07	0,73	1,01	42,00
Software classification	0,86	0,11	0,84	0,06	0,72	0,96	42,00

Appendix 8: Market entries 2006 – Google vs. Amazon
- Orange (Amazon), Blue (Google)

Appendix 9: Market entries 2007 – Google vs. Amazon
- Orange (Amazon), Blue (Google)

Appendix 9: Market entries 2008 – Google vs. Amazon
- Orange (Amazon), Blue (Google)

2008	Device	OS	Network	Platform	Content	Application
	1	2	3	4a	4b	4c
Hardware	Orange					
1.1 Education & Training						
1.11 Operating S. Enhancement						
1.12 Internet Comm.				Blue		
1.4 Entertainment						
1.5 Life Style						
1.6 Personal Productivity						
1.7 Personal Multimedia P.						
1.8 Personal Productivity U.						
1.9 Business Productivity						
2.2 Network managment (physical)						
2.3 Data Structuring, Access & Manipulation				Blue		Blue
2.5 Software App. Design						
2.6 Software application development						
2.7 System Level A.						
2.8 Storage			Orange			
2.9 Security						
2.10 Distributed Computing						
2.11 Middleware						
3.1 Banking						Orange
3.15 Mapping						
3.17 Telecomm.						
3.19 Retail & Wholesale				Orange		
3.3 Healthcare Service & Med.						
3.6 Entertainment & Media Comm.						
4.4. Financial Analysis & Management						
4.6 Sales & Marketing				Orange		
4.9 Collaborative App.				Blue		
4.11 Data Analysis						
4.12 Decision Support Systems						

Appendix 10 : Market entries 2009 – Google vs. Amazon
- Orange (Amazon), Blue (Google)

2009	Device	OS	Network	Platform	Content	Application
	1	2	3	4a	4b	4c
Hardware	Orange					
1.1 Education & Training						
1.11 Operating S. Enhancement						
1.12 Internet Comm.						
1.4 Entertainment						
1.5 Life Style						Blue
1.6 Personal Productivity						
1.7 Personal Multimedia P.						Blue
1.8 Personal Productivity U.						
1.9 Business Productivity						
2.2 Network managment (physical)						
2.3 Data Structuring, Access & Manipulation						Blue
2.5 Software App. Design						
2.6 Software application development						
2.7 System Level A.						
2.8 Storage			Orange			
2.9 Security						
2.10 Distributed Computing						
2.11 Middleware						
3.1 Banking						
3.15 Mapping						Blue
3.17 Telecomm.						
3.19 Retail & Wholesale				Orange		
3.3 Healthcare Service & Med.						
3.6 Entertainment & Media Comm.				Blue		Orange
4.4. Financial Analysis & Management						
4.6 Sales & Marketing						Blue
4.9 Collaborative App.						
4.11 Data Analysis						
4.12 Decision Support Systems						

Appendix 11: Market entries 2010 – Google vs. Amazon
- Orange (Amazon), Blue (Google)
- Green means both companies

2010	Device	OS	Network	Platform	Content	Application
	1	2	3	4a	4b	4c
Hardware	Green					
1.1 Education & Training						
1.11 Operating S. Enhancement						
1.12 Internet Comm.						Blue
1.4 Entertainment						
1.5 Life Style						
1.6 Personal Productivity					Orange	Orange
1.7 Personal Multimedia P.			Orange			Orange
1.8 Personal Productivity U.						
1.9 Business Productivity				Blue		
2.2 Network managment (physical)						
2.3 Data Structuring, Access & Manipulation				Blue		Orange
2.5 Software App. Design						
2.6 Software application development						Orange
2.7 System Level A.				Blue		
2.8 Storage						
2.9 Security						
2.10 Distributed Computing						
2.11 Middleware			Orange			Orange
3.1 Banking						
3.15 Mapping				Blue		
3.17 Telecomm.						Blue
3.19 Retail & Wholesale				Green		
3.3 Healthcare Service & Med.			Orange			
3.6 Entertainment & Media Comm.						
4.4. Financial Analysis & Management						
4.6 Sales & Marketing				Green		
4.9 Collaborative App.						
4.11 Data Analysis						Blue
4.12 Decision Support Systems						

Appendix 12: Market entries 2011 – Google vs. Amazon
- Orange (Amazon), Blue (Google)
- Green means both companies

2011	Device	OS	Network	Platform	Content	Application
	1	2	3	4a	4b	4c
Hardware	Green					
1.1 Education & Training						
1.11 Operating S. Enhancement						Orange
1.12 Internet Comm.						
1.4 Entertainment						Orange
1.5 Life Style						
1.6 Personal Productivity				Blue		
1.7 Personal Multimedia P.						
1.8 Personal Productivity U.						
1.9 Business Productivity						
2.2 Network managment (physical)						
2.3 Data Structuring, Access & Manipulation			Orange		Blue	
2.5 Software App. Design			Orange			
2.6 Software application development						Orange
2.7 System Level A.						
2.8 Storage						
2.9 Security						
2.10 Distributed Computing						
2.11 Middleware			Orange			Orange
3.1 Banking						
3.15 Mapping						Blue
3.17 Telecomm.						
3.19 Retail & Wholesale						
3.3 Healthcare Service & Med.						
3.6 Entertainment & Media Comm.			Orange	Green		
4.4. Financial Analysis & Management						
4.6 Sales & Marketing						Orange
4.9 Collaborative App.						
4.11 Data Analysis						
4.12 Decision Support Systems						

Appendix 13: Amazon's market activity in 2006

- 3.19 Retail & Wholesale
- 1.11 Operating S. Enhancement
- 2.8 Storage
- 3.6 Entertainment & Media Comm.
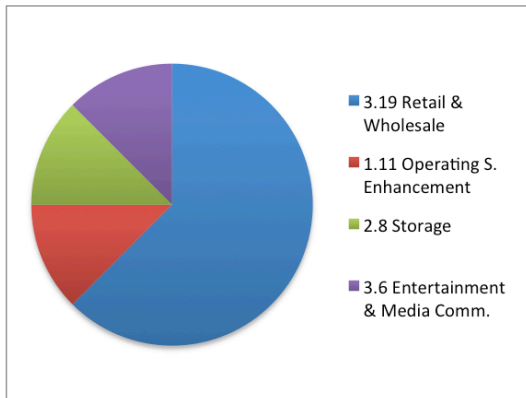
Appendix 14: Amazon's market activity in 2007

- 3.19 Retail & Wholesale
- Hardware
- 4.6 Sales & Marketing
- 3.6 Entertainment & Media Comm.
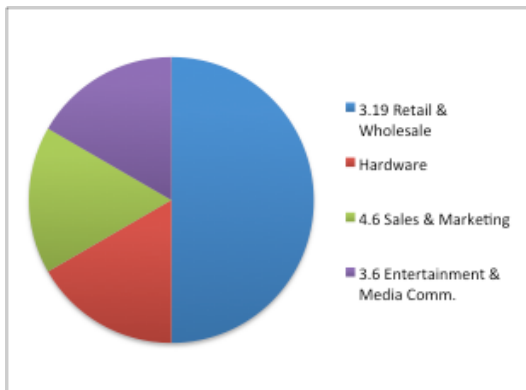
Appendix 15: Amazon's market activity in 2008

- 3.19 Retail & Wholesale
- 2.8 Storage
- 1.11 Operating S. Enhancement
- 3.6 Entertainment & Media Comm.
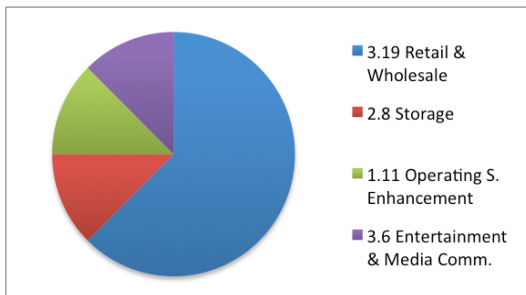
Appendix 16: Amazon's market activity in 2009

- 3.19 Retail & Wholesale
- 4.6 Sales & Marketing
- 2.8 Storage
- 3.1 Banking
- 4.6 Sales & Marketing
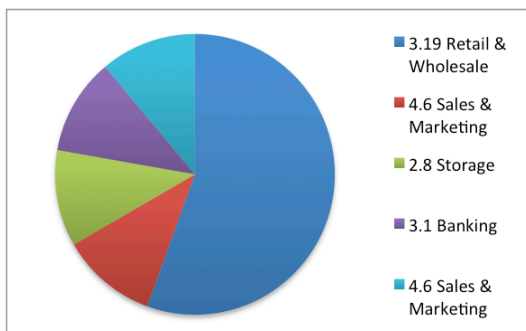
Appendix 17: Amazon's market activity in 2010

- Hardware
- 2.3 Data Structuring, Access & Manipulation
- 3.19 Retail & Wholesale
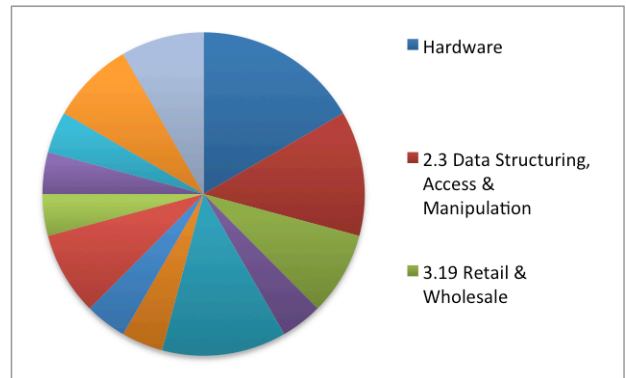
Appendix 18: Amazon's market activity in 2011

- Hardware
- 2.3 Data Structuring, Access & Manipulation
- 2.11 Middleware
- 3.6 Entertainment & Media Comm.
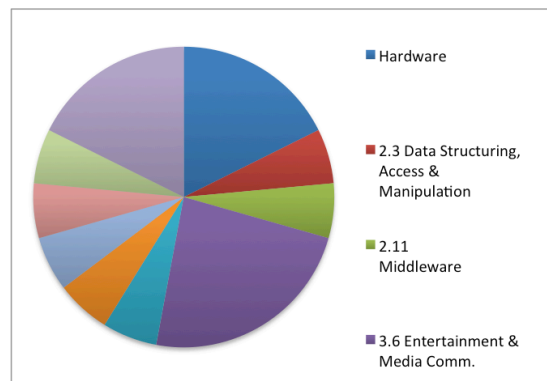
Appendix 19: Google's market activity in 2006

- 2.3 Data Structuring, Access & Manipulation
- 4.4. Financial Analysis & Management
- 1.6 Personal Productivity
- 1.12 Internet Comm.
- 1.11 Operating S. Enhancement
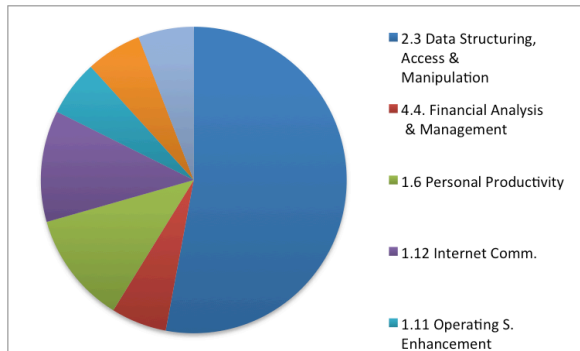
Appendix 20: Google's market activity in 2007

- 2.3 Data Structuring, Access & Manipulation
- 3.15 Mapping
- 2.5 Software App. Design
- 1.9 Business Productivity
- 1.12 Internet Comm.
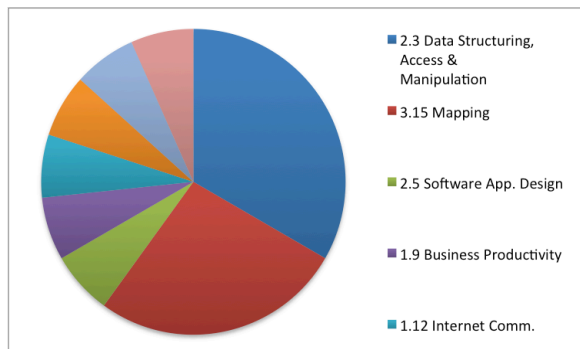
Appendix 21: Google's market activity in 2008

- 2.3 Data Structuring, Access & Manipulation
- 1.12 Internet Comm.
- 3.6 Entertainment & Media Comm.
- 4.6 Sales & Marketing
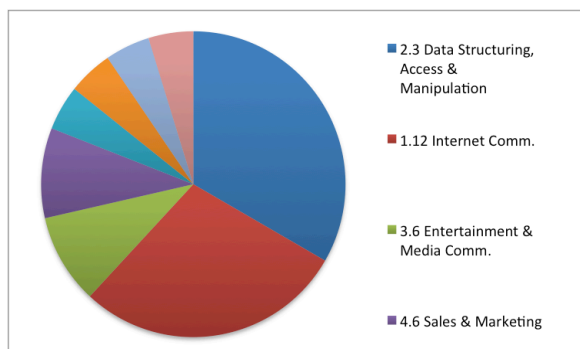
Appendix 22: Google's market activity in 2009

- 2.3 Data Structuring, Access & Manipulation
- 4.6 Sales & Marketing
- 3.6 Entertainment & Media Comm.
- 3.15 Mapping
- 1.5 Life Style
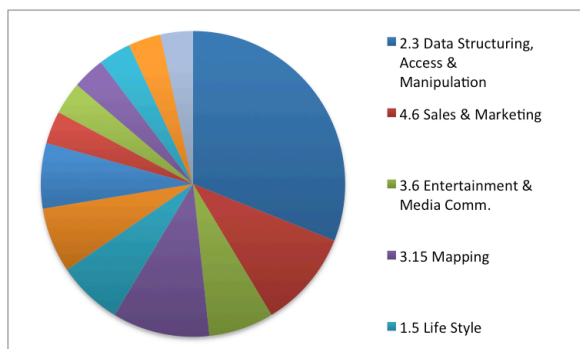
Appendix 23: Google's market activity in 2010

- 2.3 Data Structuring, Access & Manipulation
- 3.15 Mapping
- 3.6 Entertainment & Media Comm.
- 4.6 Sales & Marketing
- 1.12 Internet Comm.
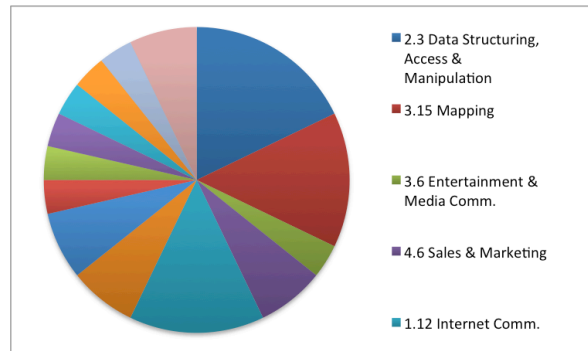
Appendix 24: Google's market activity in 2011

- 2.3 Data Structuring, Access & Manipulation
- 2.7 System Level A.
- 3.6 Entertainment & Media Comm.
- 4.6 Sales & Marketing
- 1.12 Internet Comm.
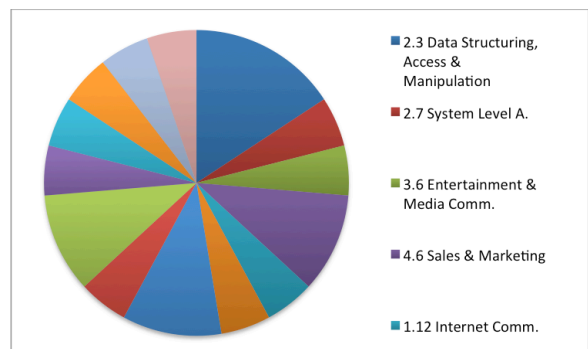
Appendix 25: The columns of the MS Excel-based data collection template

1. Full article
2. Headline and paragraph
3. Launch date
4. Company (Samsung/Apple)
5. Product name
6. Product version
7. Product type
8. Customer classification
9. Category choice
   a. Product launch
   b. New version
   c. Launch with partners
   d. Bundling
   e. Platform
10. Software classification (see appendix 26)
11. Platform layer

Appendix 26: Software classifications by Zahavi & Lavie used in this paper

1. Operating system enhancements
   a. Performance measurement and enhancement
   b. Peripheral device drivers
   c. File system management
   d. Print utilities/spoolers
   e. Report generators
   f. Screen formatting
   g. Screen savers
   h. Security/auditing
   i. Year 2000 conversion
2. Entertainment
   a. Performing arts
   b. Fine arts
   c. Astrology
   d. Movies/television
   e. Gambling
3. Storage
   a. Backup and archiving
   b. Storage device management
   c. Storage infrastructure
   d. Storage replication
   e. Storage resource management
   f. Online storage & data backup
   g. Data compression
   h. Data/file recovery
   i. Hierarchical storage management (HSM)
   j. Information lifecycle management (ILM)
   k. Network-attached storage (NAS)
   l. Storage area network (SAN)
4. Internet communications
   a. Browsers
   b. Dial-up & connectivity
   c. Email
   d. Instant messaging (IM)/chat/internet relay chat (IRC)
   e. SMS tools
   f. Webcam
   g. Voice telephony
5. Sales & marketing
   a. Customer relationship management (CRM) (Package)
   b. Affiliate marketing
   c. Customer club/Program membership management
   d. Partnership relationship management (PRM)
   e. Professional services automation (PSA)
   f. Sales analysis
   g. Sales force automation (SFA)
   h. Survey analysis
   i. Telemarketing management
   j. Click-stream analysis
   k. Contact center
   l. Classifieds
   m. Customer service/support (CSS)
   n. Direct marketing
   o. E-commerce enablement
   p. Email campaign
   q. Help desk and field service
   r. Market research tools
   s. Pre-sale/proposal preparation
6. IT system management software
   a. Application management
   b. Change & configuration management and control
   c. Diagnostic/troubleshooting/problem management
   d. Event automation
   e. Job scheduling
   f. Load balancing
   g. Output management
   h. System performance management

7. Life style

    a. Buying guides

    b. Social networking/dating

    c. Cooking

    d. Health and physical exercise

    e. Home design/gardening/landscaping

    f. Parenting/family/genealogy

    g. Fashion

    h. Special hobbies

    i. Personal improvement

    j. Trip planners/travel

8. Personal productivity utilities

    a. CD/DVD writing

    b. Data entry

    c. Desktop management

    d. Password management

    e. Media management

    9. System-level applications

    a. Virtual machine

    b. Virtual user interface

    c. Web hosting automation

    d. Web server

    e. Clustering/availability

    f. Distributed file system management

    g. Email server

    h. Instant messaging servers

    i. Operating systems

    j. Printer/fax server

    k. Remote access and control

    l. Replication server

Appendix 26: ICT layer Analysis Amazon

Amazon	ICT Layer Platform	ICT Layer Content	ICT Layer Application	ICT Layer Network	ICT Layer OS	ICT Layer Device
2006	5	0	3	1	0	0
2007	3	1	1	0	0	1
2008	6	0	1	1	0	0
2009	6	0	1	1	0	2
2010	4	1	6	4	0	3
2011	2	1	5	6	0	3

Appendix 27: ICT layer Analysis Google

Google	ICT Layer Platform	ICT Layer Content	ICT Layer Application	ICT Layer Network	ICT Layer OS	ICT Layer Device
2006	8	2	7	0	0	0
2007	7	0	7	1	0	0
2008	13	0	9	0	0	0
2009	13	0	18	0	2	0
2010	13	0	13	1	1	3
2011	11	1	6	2	1	2