Marcel Landeweerd, University of Twente, 2013

Thesis E-commerce user adoption of Google

THE SUCCESS OF GOOGLE SEARCH, THE FAILURE OF GOOGLE HEALTH AND THE FUTURE OF GOOGLE+

Table Of Contents

MASTER THESIS M. LANDEWEERD

Paper Foreword

THE SUCCESS OF GOOGLE SEARCH, THE FAILURE OF GOOGLE HEALTH AND THE FUTURE OF GOOGLE+

Mainly with great pleasure I spent last months researching user-acceptance of e-commerce, it was a great journey with the accidental bumps and obstacles on the road. Having own Webshops in the past and currently working on my own Webshop Trustmark, E-commerce is a matter that is close to my heart, which makes it interesting to study. E-commerce is an emerging topic nowadays. The internet is integrated in our lives and it is hard to imagine a world without global connectivity. Companies like Google and Facebook profit from this and are growing from startups into big multinationals in years.

When Dr. Ton Spil gave me the opportunity to research e-commerce and the case of Google I was happy to take it. Starting points were interviews supplied by Dr. Ton Spil concerning the adoption of Google Search and Google Health. These interviews were part of an academic course in which students used the PRIMA method to find user motivations behind adoption of Google Health and Google Search. This PRIMA model is co-authored by Dr. Ton Spil and is based on several leading adoption and resistance theories. With this input I started my research looking for the factors which made Google Search a success and Google Health a failure. This quest resulted in the current paper addressing the user adoption of Google products using an extensive literature search and interviews with potential users of Google Search, Google Health and Google Plus.

First of all I want to thank dr. Ton Spil for his support and help during my research. His input served as starting point for my research. His feedback was very valuable and his way of working was very practical allowing for conversations using Skype and allowing for my own input. Furthermore I like to thank dr. Rich Klein for his feedback and help on improving the level of English of the paper. Without the help of dr. Ton Spil and dr. Rich Klein this study would not have been possible. Mentions of “we” in this paper stress this collective effort.

Also I would like to thank all students who gave their input as interviewers and all people who spent their time on giving their input as interviewee. Without these results it would not have been possible to do my research. Further I would like to thank Ir. Drs. M.B. Michel-Verkerke, who as a co-author of the PRIMA/USE IT method gave valuable feedback on improving and structuring the paper.

Paper Summary

THE SUCCESS OF GOOGLE SEARCH, THE FAILURE OF GOOGLE HEALTH AND THE FUTURE OF GOOGLE+

With the Internet integrated in all aspects of our society, fast growing Internet companies like Google and Facebook have become part of our daily lives. In this paper we use the case of Google to study what makes certain project of the company successful, while others fail.

To study success versus failure first an extensive literature study is done to provide for an overview of current academic insights in the area of e-commerce user adoption. This literature search resulted in the following success factors: service quality, information quality, system quality, trust, perceived usability, perceived risks, perceived usefulness, perceived enjoyment, social and personal influence, and perceived compatibility.

To test how these factors affect the user adoption of Google, 127 potential users of the Google Search, Google Health and Google Plus products were interviewed. Google Search is an example of a successful product, Google Health retired on January 1st 2012 because of a lacking user adoption by which it can be considered as unsuccessful. The (future) success of Google Plus still remains unknown.

TABLE 1: SUMMARY OF INTERVIEW RESULTS

	Google Search Search Engine	Google Health E-Personal Health Record (ePHR)	Google Plus Social Network
Service quality	?	?	?
Information quality	✓	✗	✗
System quality	✓	✓	✓
Trust	✓	✗	✓
Perceived usability	✓	✓	✓
Perceived risks	Low	High	Medium
Perceived usefulness	✓	✗	✗
Perceived enjoyment	?	?	?
Social and personal influence	✓	✗	✗
Perceived compatibility	✓	✗	✓
	Google is considered the most successful search engine	Google Health retired because of lacking user adoption	Our study shows a lacking adoption

Google Search scores good on every success factor. Users consider the information as reliable simple and fast. The system quality is considered good, just like the usability. Users trust Google with their search queries and perceived risks are low. Social pressure of using Google Search is high. Last but not least Google Search is compatible with their experiences, values and work practices and the usefulness is considered very high. There was insufficient data to measure user enjoyment, furthermore users didn't use the customer service which made it impossible to measure this success factor.

Google Health scores bad on several success factors. Despite a good system quality and usability, the system in general is not considered useful. People currently don't administer their own health information and don't see the value in doing so. Currently this is a task of the medical specialist which makes Google Health incompatible with their experiences, values and work practices. Furthermore people considered information not very reliable, because they provide it their selves without having sufficient medical knowledge. They don't trust Google with their medical data since risks are considered too high for very privacy sensitive health information. Last there is no social pressure to use Google Health.

Google Plus has a good usability. People are already used to using social networks which makes Google Plus compatible with current experiences and work practices. The new functionality like circles and hangouts are considered of value, but many users also mention the same is possible with Facebook. Users see risks as medium, while companies know a lot about the user, but users mention putting not too much information online. Google is trusted with this information, while more people trust Google with their data than Facebook. The big problem of Google Plus is a lack of user adoption, which causes a lack of information, while friends are not active on Google Plus. This affects the perceived usefulness, while users don't consider Google Plus useful without information about their friends. Based on current results Google Plus is doomed to fail. Google should find a way to solve the chicken and the egg problem caused by usefulness and user adoption. Possible solutions include radical innovations or inclusion of friends data from external sources.

Looking at the selected success criteria, no single criteria at its own can explain the success or failure of the Google Products . Rather than selecting one criterion a service should be evaluated based on all criteria in which the importance of criteria may fluctuate based on the service. For example enjoyment will be more important for hedonic services than for utilitarian services. Furthermore trust should be in balance with risks, while services with higher risks need more trust as trust can mitigate specific risks.

The user adoption of e-commerce is a widely debated topic, and our study showed a wide variety of success factors all partially explaining the adoption of e-commerce. Looking at our literature study no single model encompasses all success factors found in our literature study. Furthermore the influence of groups and the business environment seems underrepresented in current models. That said, the complete answer remains hidden. Till that time rather than to draw on a single model our collection of success factors can serve as a valuable guideline both for research as practice.

Paper E-commerce user adoption of Google

THE SUCCESS OF GOOGLE SEARCH, THE FAILURE OF GOOGLE HEALTH AND THE FUTURE OF GOOGLE+

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***Abstract*— What makes an e-commerce company successful? In 2011 24% of venture capital in the US went into Internet companies adding up to a total of $6.9 billion (PwC & NVCA, 2011), with such high stakes the question of e-commerce success is more topical than ever. Google, one of the biggest e-commerce companies in the world, despite huge successful products like Google Search, has also seen failures. In this paper, we explore factors associated with successful and unsuccessful adoption of Google products using a literature study in conjunction with qualitative analysis of the Google Search, Google Health, and Google Plus products. Our research identifies key success factors for user adoption of Google products and predicts that Google Plus in its present form will lead to failure. The study shows that perceived compatibility, perceived usefulness, information quality, balancing risks with trust and finally social pressure are important success factors for Google. Despite limiting the examination to Google products, results can serve as a guideline for other e-commerce ventures.**

***Index Terms*— User adoption, User acceptance, E-commerce, Google, TAM**

1. Introduction

With the Internet integrated in all aspects of our society, fast growing Internet companies like Google and Facebook have become part of our daily lives as they have grown from small startup firms to multinational corporations in a matter of years. Despite economic difficulties in many countries, e-commerce continues to provide opportunity. Nevertheless, for every Internet success story, failures abound and even within the same firm some projects realize tremendous success while others fail. Explanations for success versus failure can be derived from user adoption of e-commerce. Looking at two projects from Google, we see both success and failure, with Googles search engine realizing widespread adoption (comScore, 2012), while Googles electronic personal health record (ePHR) under the name Google Health failed to reach a critical mass in audience (Google, 2011). This leads to the question, "what yields user adoption of e-commerce at Google?" The leading model in the area of user adoption is the Technology Acceptance Model (TAM) (Davis, 1989), which proposes usefulness, ease of use and attitude as leading success factors. A good runner up is the UTAUT model (Venkatesh et al, 2003) but recent studies show that there is a lot of criticism on this model (Williams et al, 2012, Dwivedi et al, 2011). Both user adoption models do not fully cover all factors associated with user adoption of e-commerce as important e-commerce specific factors like trust (Chervany, 2001-2002) (Corritore, Kracher, & Wiedenbeck, 2003), service quality (Lee & Lin, 2005) and risk (Lee M.-C. , 2009) remain unaddressed, many attempts have tried to extend the TAM model (Han & Jin, 2009) (Gefen, Karahanna, & Straub, 2003) (Chen, Gillenson, & Sherrell, 2002) to cover e-commerce specific success factors. Another leading model which has specific e-commerce measures in this area is the Delone & McLean Model of IS success (DeLone, 2003). In contrast with the user focus of the TAM

model the D&M IS Success Model views success more from the technology perspective looking at service quality, information quality and system quality as key determinants of user satisfaction. Despite sharing constructs and like propositions, no single model fully addresses all success factors of user adoption of e-commerce. Employing a grounded literature search approach, we explore factors associated with user adoption of e-commerce explaining these in greater detail through interviews of potential Google product users. Last, we use our results to make a prediction for the future of Googles social network; Google Plus.

2. Background

E-commerce is a popular term associated with almost every business activity conducted on the Internet. The academic literature defines e-commerce very narrowly as "the buying and selling of information, products and services via computer networks" (Kalakota, 1997) to very broadly as "the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks." (Zwass, 1996). In order to keep focused on the transactional part of e-commerce, we adopt the narrow definition put forth by Kalakota and Whinston (1997). Noteworthy, buying and selling, not per definition, takes place via direct monetary transactions, but also by different means like showing adds, building user profiles, and other mechanisms of monetizing electronic services.

Google is one of the biggest companies operating on the internet. Using our definition Google is considered an ecommerce company, while Google sells information and electronic services. Google doesn't ask direct money for this, but monetizes its services mainly using advertisements. Products of Google include both hugely successful products as well as ones that resulted in failure. This makes Google the ideal case to compare successful with unsuccessful ventures.

The first product studied is Google Search. Google Search started in March of 1996 as a research project of Larry Page and Sergey Brin, students at Stanford University. The project, name BackRub, sought to develop enabling technologies for a universal digital library (Google Inc., 2012). The new algorithm used links placed on the Internet (similar to academic citations), a technique known by the name PageRank. The new search engine adopted the name Google in 1997 and started a rapid growth trajectory that resulted in its first billion URL indexes by June of 2000, making it the largest search engine. Research identified as Google as the most widely used search engine among students (Griffiths, 2005). By May of 2011 Google grew to the most visited website within the European Union with a reach of 94% of Internet users (comScore, 2011). By June of 2012 Google gained almost 67% of the United States market share (comScore, 2012), making Google the most successful search engine in the world.

The second product studied is Google Health. Google Health offers the user the opportunity to manage their own health information. Introduced in 2008 and retired on January 1st of 2012, Google Health failed to capture widespread adoption achieving only limited use (Google, 2011). Google Health can be classified as an electronic personal health record (ePHR). ePHRs offer users a variety of advantages aimed at patient empowerment. Personal health records allow users to control their own information, creating a more balanced and complete view than current provider maintained health records (Ball, Smith, & Bakalar, 2007). Further, ePHRs afford extra features such as making online appointments, supplemental information about illnesses, information about health care providers, self-care possibilities, and more (Pagliari, 2007). Sunyaev (2010) presents a framework for the evaluation of ePHRs based on functionality and adopts this to evaluate both Google Health as Microsoft Health Vault. Subsequently, finding it difficult to evaluate a service based only on end-user functionality.

The third product studied is Google Plus. Google Plus launched in June of 2011 as a rival to Facebook. Google Plus introduced the concept of circles as an easy way of dividing relations into groups and deciding what information to share with specific groups of people. This feature allows for better privacy settings, but has also seen debate given equivalent options available on Facebook (Desmedt,

2011). Further, Google Plus introduced hangouts, video chat function for groups of up to 10 people. This does not constitute Google's first attempt at launching a social network. Google Buzz started in 2010 ending a year later, Google Friend Connect launched in 2008 to retired in March of 2012, and Orkut hit the market in 2004 and operates only by Google Brazil today. An important reason for Google to enter the social network market lies in harvesting user information, allowing Google to personalize both search results as advertisements (Poelhekke, 2011).

The user adoption of e-commerce constitutes a requisite component for overall e-commerce success. Success as an outcome often consists of groupings of outcomes influenced by subjective measurements of good and bad results. The academic literature related to information system success provides for a more objective definition of e-commerce success. We separated these success definitions in distinct measurements of IS success; namely:

- Quality of implemented system (technology level)
  Models that focus on the system as unit of analysis. Evaluations measures employed often include such constructs as information quality, system quality, and service quality (DeLone, 2003) these characteristics affect user constructs like use, intention to use and user satisfaction (Urbach & Müller, 2012).
- End-user adoption / User acceptance (User level)
  Models that focus on the (end)user as unit of analysis. User adoption and acceptance of systems constitutes a leading success measure, given extensive academic research of the construct. The terms user adoption and user acceptance, often employed synonymously, captures the extent to which users willingly to use the system. Research often adopts the two terms interchangeably; however, for the purposes of this study we chose the term adoption, as acceptance insinuates a non-voluntary context with the user forced to accept an introduced system. The e-commerce, or consumer, context warrants an assumption of voluntary adoption. Different measures for success for this context appear in the literature and include perceived ease of use, perceived usefulness (Davis, 1989), intension to use, actual use, and user satisfaction (DeLone, 2003).
- Organization survival and financial outcomes (Organizational level)
  Models that focus on the organization as unit of analysis, as opposed to user or application models, sees success of an e-commerce initiative defined in organizational measurements such as return-on-investment (ROI), profitability, and organization survival. Success factors include organizational culture, organizational structure (Elahi & Hassanzadeh, 2009), strategy (Lee C.-S. , 2001) and CEO characteristics (Jeon, Han, & Lee, 2006)..

While all proposed measures appear relevant, technology stands out as a necessary antecedent to user adoption, which in turn constitutes a necessary component of organizational financial success. Different views on success are primary tooted in divergent levels of analysis ranging from the task/technical to the organizational levels. The context of our research focuses on the user insights. In this context, we define success as *the ability of an e-commerce service to attract and maintain customers*. This definition focuses on the user adoption of e-commerce services with technology as a necessary antecedent. Keeping in mind that overall success also requires financial success at the firm level, a necessity that derives from our definition of success.

3. LITERATURE STUDY

An extensive literature search provides for an overview of the current academic insights in the area of e-commerce adoption. Academics have widely debated the topic of user adoption of e-commerce. Despite many valuable works in the area of user adoption of information system, we limited our search to literature applicable to user adoption of e-commerce, because of the different nature of IS adoption and the availability of sufficient literature on user adoption of e-commerce. The subject of selected papers should be e-commerce in general or specific e-commerce applications. We excluded papers focusing on specific technologies like mobile commerce and television commerce given the very specific nature of these technologies. Furthermore, the search only includes literature on the application and user levels, while we focus our research on the user adoption of e-commerce. We further exclude literature focusing on the success factors from a management perspective from our review. The articles were selected based on title, abstract, and publication in journals or conference proceedings. The search employed the academic search engines Web of Science and Google Scholar. Within Web of Science, the search query Topic=((e-commerce OR "electronic commerce") and ("user adoption" or "user acceptance")); refined by Research Areas=(COMPUTER SCIENCE); Timespan=All Years; and Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH; resulted in 150 articles. Searching Google Scholar, the terms ((e-commerce OR "electronic commerce") and ("user adoption" or "user acceptance")), excluding citations and patents, resulted in 945 articles. Given the large number of articles identified and Google's algorithm ordering articles based on relevance, only the first 100 articles were selected for assessment. Articles of both search engines resulted in significant overlap.

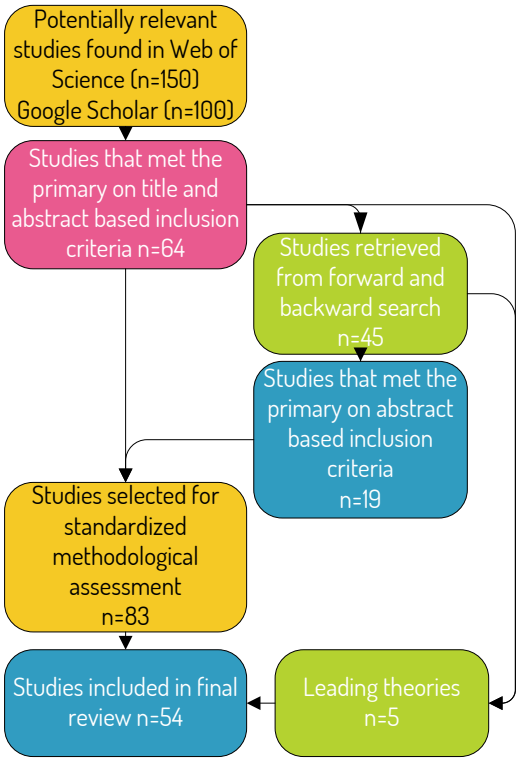

Figure 1: Selected papers (See appendix A for a complete overview)

Regularly cited models in the area of e-commerce success and e-commerce user adoption in our literature review from the search include the Technology Acceptance Model (TAM), Roger's Innovation Diffusion Theory (IDT), the DeLone and McLean model of IS success, and the theory of planned behavior (TPB). In most papers these general user adoption theories are extended and adapted for e-commerce specific applications. All studies give an explanation of factors influencing intention to use and/or actual use. Both TAM as IDT are influential in explaining the adoption of new technologies, and despite having different foundations both share some resemblances. The construct of perceived usefulness (TAM) mirrors the relative advantage construct (IDT), while the perceived ease of use construct (TAM) looks opposite to the complexity construct (IDT) (Chen & Tan, 2004).

DeLone and McLean's (2003, 2004) widely used IS success framework, and subsequent e-commerce success model, employs characteristics of the software artifact to explain the influence on intention to use. Wang (2008) proposes a model combining the D&M IS success framework with TAM in which the constructs of System Quality, Information Quality, and Service Quality can shape perceived value and user satisfaction, which may explain how constructs of these different models are connected. In the area of social influence, the theory of planned behavior (TPB) (Ajzen, 1991) and theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) emerge as highly influential in explaining how attitude and subjective norms shape intention to use. As leading models or theories, we add these four articles to our literature review.

Looking at the literature on both IS acceptance and e-commerce adoption small differences manifest, with the roll of trust in the adoption of e-commerce, the most evident. Given the different nature of e-commerce transactions with greater perceived risk present because of the lack of real contact between consumer and e-commerce firms, research finds trust an important factor under these conditions (Turban, 2011). Several studies successfully integrate the concept of trust and risk into TAM (Kim J. B., 2012) (Pavlou, 2003) (Gefen, Karahanna, & Straub, 2003); however, no single model reaches a widespread consensus within the literature.

By looking at the success factors mentioned in literature and grouping these into an overall success factor, we find 10 success factors receiving regular mention. These factors include service quality, information quality, system quality, trust, perceived usability, perceived risks, perceived usefulness, perceived enjoyment, social and personal influence, and perceived compatibility. A more detailed overview of success factors mentioned in articles can be found in Appendix A, while an explanation of factors and a description of their relationships is given in the following sections.

Success factor	# Article mentions
Service quality	13
Information quality	18
System quality	20
Trust	31
Perceived usability	40
Perceived risks	11
Perceived usefulness	42
Perceived enjoyment	10
Social and personal influence	30
Perceived compatibility	9
Total nr of articles	54

Table 2:Success factors in literature with number of articles mentioning the success factor (Based on Appendix A)

3.1 Service quality

Service quality is of great importance for every company. Reducing defections by customers by only 5% has the potential to boost profits by as much as 85% to 100% (Reichheld & Sasser, 1990). Good service quality increases good behavioral intentions and decreases bad behavioral intensions (Zeuthaml, Berry, & Parasuraman, 1996), such as stimulating customer retention and improved loyalty versus preventing bad word-of-mouth communications. Given the impersonal nature of e-commerce, service quality is especially important to such transactions (Kim, Galliers, Shin, Ryoo, & Kim, 2012) (Zeithaml, Parasuraman, & Malhotra, 2002). Service Quality measurements for e-commerce tend vary broadly and include information quality, usability, and trust (Collier & Bienstock, 2006) (Santos, 2012). In the context of our research, the inclusion of a broad service quality measure results in an "overall" quality measurement of the business enterprise. Hence, we chose a more limited measure focusing on support and customer service. Factors associated with service quality include quick

responsiveness, assurance, empathy, reliability, following-up service, and personalization (Liu & Arnett, 2000) (Lee & Lin, 2005).

3.2 Information quality

Information quality influences both perceived usefulness (Green & Pearson, 2011) (Chen & Tan, 2004) and perceived usability mediated by trust (Zhou & Zhang, 2009). Information quality can be measured in terms of accuracy, timeliness, completeness, relevance, and consistency (DeLone, 2003). Egger (2001) gives some guidelines for informational content, and these encompass product and service information, information about the company, and information limiting user risks. First product information should create value as well as instill credibility and transparency. Company information should present the firm, describe organizational achievements, and communicate company values; hereby increasing consumer trustworthiness and making it possible for the user to identify with the organization. Information that limits risks should include security and privacy policies in addition to contractual terms.

3.3 System quality

System quality measures system design aspects and the way in which the system was built, through measures like usability, availability, reliability, adaptability, and response time (DeLone, 2003). Individual measures of system quality have overlap with other success factors in our study including perceived usability (Green & Pearson, 2011) and perceived usefulness true measures like system features (Kim, Galliers, Shin, Ryoo, & Kim, 2012) (Urbach & Müller, 2012). For the web some specific measures exist such as security, valid links, page load times, search facilities, and anonymity (Aladwani & Palvia, 2002).

3.4 Perceived usefulness

Venkatesh et al. (2000) define perceived usefulness as "*the extent to which a person believes that using the system will enhance his or her job performance",* in other words, the system must deliver some value. Distinct from perceived usefulness (Wang, 2008), usefulness is often not objectively measurable, but rather a subjective perception of an individual user. Perceived usefulness consistently predicts purchase intention across a large variety of research contexts (Bhattacherjee, 2000) (Pavlou, 2003) (Venkatesh V. A., 2000) (Dubinsky, 2003) and is thereby an important CSF in e-commerce. Value derives in different ways including task-based timesavings, task ease enablement, as well as user entertainment and innovativeness. To deliver value, system use should incorporate efficiency, resulting in a close connection with perceived usability (Al-Gahtani, 2011).

3.5 Perceived usability

Usability or ease of use defines how effortlessly a user can interact with a system. The International Standard Organization (ISO) defines usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use". Hence, usability is both user and goal specific, making it difficult to create universal guidelines; however, despite this, some practices likely prove more beneficial for many purposes. Consider, minimal clicks to reach a desired result (Hicks, 2002), placing important information before the page fold, clear navigation (Bhatia, 2002), use of breadcrumbs, good search possibilities (Freeman & Hyland, 2003), read fonts, and cross browser compatibility.

Research posits higher usability increases both perceived usefulness (Crespo, 2008) and intention to use (Bhattacherjee, 2000), but studies show weak or no support for a direct effect on intention to use (Chen & Tan, 2004) (Klopping & McKinney, 2004) (Crespo, 2008) (Shih, 2004).

3.6 Perceived enjoyment

The online experience is not based purely on utilitarian measures like usefulness, but also on hedonic measures such as enjoyability (van der Heijden, 2004). Research among students examining the value of the hedonic shopping experience shows an increased intention to use by hedonic measures, but does not demonstrate a link to an increase in the number of sales (Bridges & Florsheim, 2008). Other research, however, reports a significant influence of hedonic experience on

repurchase intention by students (Kim, Galliers, Shin, Ryoo, & Kim, 2012). While tempting, treating e-commerce as "cold information systems" neglects the importance of the hedonic online experience (Childers, Carr, Peck, & Carson, 2001). Given the use of e-commerce systems outside the utilitarian work context, such systems should provide for both usability and enjoyment.

3.7 Trust

The relative novelty of e-commerce and online shopping gives rise to greater (feelings of) uncertainty and risks. Hence, perceived risks and feelings of safety potentially drive the adoption of e-commerce, trust, or trustworthiness, an important and related underlying factor (Turban, 2011). Previous research shows trust as an important indicator of willingness to buy (Andrea Basso, 2001), particularly with respect to the initial purchase (Gefen, Karahanna, & Straub, 2003) (Koufaris & Hampton-Sosa, 2004) with a stronger influence than even perceived price (Kim, Xu, & Gupta, 2012). Furthermore trust is known to mitigate risk (Corritore, Kracher, & Wiedenbeck, 2003).

McKnight and Chervany (2001, 2002) define trust to encompass attitude, belief, intention, and behavior. Within the context of the current work, trust constitutes "an attitude of confidence formed by a combination of faith and knowledge that a second actor can and will perform as expected." The "will perform" implicitly encompasses the intention to do so, hereby capturing all four characteristics of trust as described by McKnight and Chervany (2001, 2002).

User privacy constitutes an additional issue for e-commerce firms. In a survey of 158 online users, privacy concerns ranked as most the most important concern when transacting via the Internet at 55% of all respondents (Udo, 2001), highlighting the importance of privacy online. The right to privacy has existed for decades (Brandeis, 1890), but recent research shows users believe privacy a growing concern (Ackerman, 1999). That said, when using websites these same users take little to no precautions to protect their privacy online (Berendt, 2005) (Spiekermann, 2001) (Ackerman, 1999). Accordingly, users' willingness to disclose privacy-sensitive information to trusted organizations constitutes an important factor shaping e-commerce adoption.

3.8 Perceived risks

By using an e-commerce service, users incur different risks. Lee (2009) identifies different perceived risks from the user perspective. Specifically, she identifies *performance risk, social risk, time risk, financial risk*, and *security risks* as risk facets of perceived risks (Lee M.-C. , 2009).

Perceived risks has a negative influence on perceived usefulness, user attitude and intention to use (Lee M.-C. , 2009) Lee, Park, & and Ahn, 2001). In situations of higher risks, higher trust is also necessary as trust can mitigate risk (Corritore, Kracher, & Wiedenbeck, 2003).

3.9 Social & personal influence

> "Much of human behavior is not best characterized by an individual acting in isolation" (Bagozzi, 2007)

People are both influenced by their environment and their own attitude towards a specific e-commerce service and e-commerce in general. Attitude encompasses the sum of beliefs weighted by its evaluations (Miller, 2005). Hence, attitude implicitly derives from past experiences. The social pressure, a subjective norm (Venkatesh V. A., 2000) (Crespo, 2008), influences one's attitudes specific to intention to use (Venkatesh V. A., 2000) (Crespo, 2008). In an online context, social pressure can result from interactions with friends and acquaintances, but also from informational social influences (Lee, Shi, Cheung, Lim, & Sia, 2011) like online reviews. The theory of planned behavior (Ajzen, 1991) adds perceived behavioral control as an influential factor explaining the difference between intention and actual behavior. Perceived behavioral control captures one's perception of internal and external controls that constrain a certain behavior.

3.10 Perceived compatibility

Rogers (1983) defines compatibility as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters", and the degree to which an innovation is compatible can "either speed up or retard its rate of adoption" (Rogers, 1983) (Eastin, 2002). Karahanna et al (2006) validates three distinct aspects of compatibility, namely, compatibility with prior experience, compatibility with existing work practices, and compatibility with values. These compatibility beliefs can be instrumental in shaping beliefs about usefulness and ease of use, and they also influence usage directly (Karahanna, Agarwal, & Angst, 2006). In addition to the effect of compatibility on perceived usefulness and ease of use, compatibility also influences attitude (Hernández-García, Iglesias-Pradas, Chaparro-Peláez, & Pascual-Miguel, 2010).

4. Research method

The main question answered in this study is "What factors result into user adoption of Google products?" Google is chosen because the firm is one of the biggest companies in e-commerce with both hugely successful products as well as ones that resulted in failure. The products selected for our research include Google Search, Google Health, and Google Plus. These products were selected because of sufficient availability of interview data and variation in success. Substantial market share (comScore, 2011) makes Google Search the pre-eminent success; Google Health retired in January of 2012 as a result of lagging interest (Google, 2011), classifying it as an unsuccessful venture. The success of Google Plus, one of the newest Google offerings, is still up in the air. Comparing characteristics of Google Search and Google Health derived from the interviews we can make a prediction regarding the potential user adoption of Google Plus.

Interview method

We employ an interview model-based research method called PRIMA (Spil & Michel-Verkerke, 2012) (also known as USE IT) (Spil, Schuring, & Michel-Verkerke, 2004), the model is based on a large body of knowledge including TAM (Venkatesh V. A., 2000), the Information System Success Model of Delone and McLean (2003) and the innovation diffusion model of Rogers (1983). The model has two dimensions; the innovation-dimension and the domain dimension. The innovation dimension is separated into the process and the product. Both process and product determine the success of an innovation (Saarinen & Sääksjärv, 1992). The domain-dimension is separated into the user domain and the information technology domain. The user domain primary covers factors associated with end-user adoption measurements. The information technology domain primary covers factors associated with quality of implemented system measures. This makes the method very suitable for studying adoption of e-commerce services. The qualitative research method is chosen to afford a more detailed understanding of the success measures, while complementing literature study with the interview method to allow the unraveling of the underlying end-user motivations. Further, few qualitative research initiatives in the area of e-commerce user adoption appear within the existing literature.
Data is collected as part of an academic course in which students get the instruction to commence interviews using the PRIMA model (Spil & Michel-Verkerke, 2012). This allows us to triangulate data using different interviewers and vary interviewees across different socio demographic criteria to improve validity (Miles & Huberman, 1994). The interviewers where given the same instructions and question lists.

Interview contents

The PRIMA model (Spil & Michel-Verkerke, 2012) consists of five areas of analysis, namely, (1) Process, (2) Relevance, (3) Information needs, (4) Means and people, and finally (5) Attitude. For our research primary the micro definitions of the constructs are used. In the following sections we explain which success factors we expect to measure by each construct. The validation of these expectations follow in the discussion.

The **process** consists of a description of the activities the user performs completing certain

tasks. Roger (1983) states that an innovation has to be compatible with existing values, experiences and practices. Therefore unraveling the current process is expected to be a good indicator of this compatibility. Further, by asking questions related to process information and working habits we expect to get more insights in the user characteristics and experience of the user with the discussed products.

The **relevance** answers the question "what is the value for the user of the e-commerce service?". While a subjective measure, the user both understands what value means to them and when value exists. Accordingly, relevance primary covers our definition of perceived usefulness. Consistent with our literature study, the usefulness of the e-commerce service closely aligns with the usability of the service (Al-Gahtani, 2011), resulting in information relevant to both success factors.

Information needs describes which information the user likes to receive from the system and should align with the information the service delivers and captures. Our interviews explicitly cover the relevance and completeness of information, while implicitly reviewing other information quality measures such as accuracy and timeliness. With information being the primary value of many Google products, information needs to also address the usefulness of the service. Our literature study demonstrated several connections between information quality and factors directly influencing the adoption of a service.

Means and people aspect examines the resources available to the user given the assumption that hardware and support enable effective use of the e-commerce service. In the case of Google, customer support is the only direct contact with the customer, while other contact is only indirectly using the website. Thereby the customer support is a measurement of customer service quality.

Questions asked in this section of the interview also concern risks like safety, privacy and reliability. Hereby covering the risk factor from our literature search.
Further, questions are asked concerning the availability, speed and reliability of the service. Hereby expecting measurements of system quality.

Finally, **attitude** explores user resistance to an innovation. Resistance is not per definition positive or negative, but can serve as useful input exposing flaws in the system (Lapointe & Rivard, 2005). While resistance itself is not per definition the problem, but is primary caused by underlying problems and tends to disappear when satisfactorily certain conditions have been met, i.e., usefulness, ease of use, and so forth. With other words:

> "...there is no resistance to good change." (Spil & Michel-Verkerke, 2012, p. 11)

Effective communication can still convince the user that the e-commerce service adds sufficient value. Further questions asked concern the social pressure of using the service.
While not an explicit part of our interview questions, we implicitly expect to cover trust via attitude towards the e-commerce service and the Internet in general.

Looking at the PRIMA method (Spil & Michel-Verkerke, 2012), most success factors from our literature study are expected to appear either directly or indirectly. Only perceived enjoyment remains explicitly unexamined, but our interview questions related to relevance of the e-commerce service give way to explore the construct when enjoyment is the objective as might be with Google +.

PRIMA construct	Success factors expected to be measured	Examples of questions asked
Process	Perceived compatibility	Which search engines you regularly use? Are you using a fixed sequence of actions when searching online? Which alternatives you have to find information?
Relevance	Perceived usefulness Perceived usability	Which functions of a search engine are most important for you? Which parts of the system you experience as a bottleneck? Do you have suggestions for improvements?
Information needs	Information quality	Which information you need to get from the service? Do you get sufficient information from the system? Is the information quality sufficient?
Means and people	Service quality System quality Perceived risks	Do you get sufficient support? Is the system reliable? Does the system offer enough privacy?
Attitude	Trust Social and personal influence	Do you think IT is necessary to improve health information? Do you feel social pressure of using the service? How much time do you want to spend for learning to use the service?

Table 3: Expected success factors to be measured by PRIMA construct

Interviewees

Interviewees where given an introduction of the Google product and had the possibility to test the products before starting the interview, this to get familiarity with the Google product.

As prescribed our interviews should represent all homogenous groups (Yin, 1994). Drawing on the UTAUT (Venkatesh, Morris, Davis, & Davis, 2003) model we include gender, age, and experience as moderators influencing the determinants of behavioral intention and actual use behavior. Previous research shows that experience positively influences adoption, while users that adopt one service express a greater likelihood to adopt another (Eastin, 2002) (ROGERS, 1983) with perceptions evolving over time (Hernández, Jiménez, & Martín, 2010). Gender similarly influences e-commerce adoption with female customers more sensitive to social norms and male customers more sensitive to perceived enjoyment (Hwang, 2010). Further, information cues show a greater influential on trust for females than males (Murphy & Tocher, 2011). Earlier research of age as an influential factor showed older participants being slower in information retrieval tasks (Freudenthal, 2001), but Roger (1983) found no difference in age between earlier and later adopters. This stresses the need for selecting our interviewees with a variation in age, experience, and gender. Rogers (1983) defines more generalizations like level of formal education, exposure to mass media and level of income, because of practical limitations such information was not available.

Younger users in the age of 15-25 are the main group of analysis, so to test if results are representative for different groups we commence interviews in the age range of 24-45 and 45+ to validate our results in these groups.

Processing interviews

We obtained a total number of 127 interviews among potential users of Google Search (46),

Google Health (27) and Google Plus (54). These interviews represented different homogenous groups (Yin, 1994).

First individual outcomes are extracted while scanning the interviews by using the success factors found in literature. Several studies have tried to extend existing models like TAM (Han & Jin, 2009) (Gefen, Karahanna, & Straub, 2003) (Chen, Gillenson, & Sherrell, 2002) and the Delone and McLean model (Wang, 2008), while other work has integrated different models (Lee M.C., 2009) (Klopping & McKiney, 2004). Despite sharing constructs and like propositions, no single model fully addresses all success factors of user adoption of e-commerce. Therefore, rather than draw upon a single model, we extract success factors identified across the literature and independently evaluate these factors using interview data. Success factors found by the extensive literature study are used as input for our research.

We processed interviews manually using the key success factors identified within the literature as handholds and scanning the interviews for these success factors. This manual processing allows us to come to a more detailed understanding of the information provided. The individual outcomes of Google Search and Google Health are used to make a comparison of characteristics of successful and unsuccessful products. These characteristics are used to draw conclusions considering the future of Google Plus.

5. RESULTS

First, we individually look at the interview outcomes for Google Search and Google Health. We then use these outcomes to draw an overall conclusion related to user adoption of Google products. We subsequently use this conclusion to predict potential user adoption of Google Plus.

5.1 Google Search

Different interviewers conducted a total of 45 interviews across the period 2008 till 2012. Experience with IT in general and search engines specifically fluctuated from very experienced to reasonable and moderate experience.

Age	Amount
15-25	32
25-45	6
45+	8

Gender	Amount
Male	24
Female	22

All participants indicated a reasonable familiarity with Google Search with only two not using Google as their primary search engine, confirming the success in user adoption of Google Search.
In general older users need more time to find the right results, consistent with previous research findings (Freudenthal, 2001). Users expressed satisfaction with Google Search, noting ease of use in addition to fast, good, and well-organized results. Despite 7 users mentioning privacy concerns, it did not stop them from using Google.
All users see the value of Google, as the alternative would involve time consuming and potentially unsuccessful library searches. The perceived compatibility is high, while most users spent significant time behind the computer and using Google, as searching with Google fits into their work patterns.
Sparse negatives mentioned specific to Google include sometimes not getting satisfactory results, too many results, the presence of commercial advertisements, and limited specialized information. These negatives did not, however, dissuade using Google Search.

Google Search	Positive	Negative
Process	Compatible with current (work) practices and experiences **Frequent usage**: Small usage sessions; Usage pattern; Study & Work **Little usage**: Long usage sessions; No fixed pattern; Hedonic & Work	
Relevance	Getting the right results Fast results, Well-organized Advanced search options Objective, Complete, Simple	Wrong results Commercial adds To much results Privacy concerns
Information needs	Trusting the information Fast results, Simple, Trustworthy, Freely accessible	Limited specialized and technical information, Too much information Not relevant enough
Means and people	Free , Easy accessible	
Attitude	Environment positive, Innovative Positive experiences in past	

Table 4: Interview results Google Search

5.2 Google Health

Different interviewers conducted a total of 27 interviews which were collected in 2012. The experience among interviewees with ePHR was very limited.

Age	Amount
15-25	15
25-45	6
45+	6

Gender	Amount
Male	11
Female	16

Most users didn't know of Google Health prior to the interview and only one actually used Google Health. Privacy concerns emerged as the biggest threshold for users with 23 out of 27 noting the issue as a big concern. Out of all the interviews emerges a view that users consider health information as very personal with a commercial company like Google not trusted with this information.
The second threshold is usefulness of the e-commerce service. Despite some positive reactions, most of the interviewees failed to see the direct value of Google Health for themselves. Currently, they do not hold their own health information, so why would they need to in the future? This indicates a low compatibility with current practices. Additionally, they noted relative good health as a reason not to use such eHealth systems. When asked if they saw barriers to using Google Health, one participant noted:

> "...in addition to the fact that I don't have any information to put onto Google Health, I really would want privacy guarantees before putting my information into the system to prevent my information getting public on the internet"

This sentiment illustrates the general opinion emerging from the interviews.
The main problems, or objection points, are highlighted within the table below. Users do not see the relevance of Google Health with primarily negative attitude towards the product.

Google Health	Positive	Negative
Process		Time consuming Currently calling doctor to get medical information, almost no time in current efforts.
Relevance	*Maybe useful for other people*	No need Security concerns
Information needs	Simple looking Clear results	Only available in English Usage of medical terms Concerns about quality when filling in data yourself Current information enough
Means and people	Easy accessible Free	Support needed Privacy risks
Attitude	Trust Google More than Facebook	No trust, Privacy concerns No social pressure to use, No added value

Table 5: Interview results Google Health

5.3 Google Plus

Different interviewers conducted a total of 53 interviews during 2012. Every user had some experience with social media, varying between sometimes using YouTube to classifying themselves as being an expert. The most popular platform mentioned was Facebook, which was used by almost all interviewees. Users employed social media primary to stay in touch with friends both nearby and far away. Other goals include sharing study and work information and using it for fun or killing time.

Age	Amount
15-25	41
25-45	6
45+	6

Gender	Amount
Male	30
Female	23

Most interviewees (45 out of 53) had heard of Google Plus with only 4 using it. The main reason for this is that none of their friends are using Google Plus. Users that adopt Google Plus primary use it for work in the Internet industry like online marketing and programming. So it seems Google Plus has not realized widespread adoption, but a niche of users employ the product. When asking for the advantages of Google Plus, 24 users see advantages against 29 not seeing any advantages. The advantages found are primary the use of circles and the possibilities for video chat, but as many users noted, this is also possible with Facebook. The concept of circles has been received positively, while users like to separate, for example, work and friends. This indicates that their view of social relations is in line with the concept of circles. Users only see small differences with current social media available, which is an indicator of good compatibility. All users mention privacy concerns when using social media, this is not a reason to stop use, but a reason to be careful with what to share. Many users neither trust Google nor Facebook with their information, but 21 have a preference for Google compared to 8 having a preference for Facebook. Through all interviews there emerges a view of minor advantages against a big disadvantage in the form of a lack of friends on Google Plus. Looking at our success factors from literature, usefulness, information fit, social pressure, and trust, we see that Google Plus has a low usefulness due to a lack of critical mass, there is a bad fit with information needs while no friends are using Google Plus resulting in a lack of information about friends and no social pressure to use Google Plus. Only trust of Google emerges higher, which may result in a higher willingness to use.

To reach a widespread user adoption Google needs user information, while user adoption seems necessary to get this user information. To become a success Google needs to find an answer to this causality dilemma, otherwise Google Plus will follow Google Health in its early retirement.

Google Plus	Positive	Negative
Process	Keeping in touch with friends Just for fun Sharing study and work information Ability to separate work and friends Google plus almost the same as currently used Facebook	Social media in general distracting from normal activities
Relevance	Option for group video Ordering relations in groups Good usability Integration with other Google products	Copy of Facebook Options also available on Facebook Not enough advantages to switch
Information needs	Same possible information as Facebook	No information because of lack of friends

	Tech information available	
Means and people	Easy accessible Free	Risks of bad privacy
Attitude	Trust Google More than Facebook	No social pressure to use Only using when friends use it Don't see really big advantages

Table 4: Interview results Google Plus

Discussion

The value of **compatibility** as a success factor was supported. Google Search fits well with current work practices that often included working many hours behind a computer. Further users were already familiar with the way the search engine works and presents results. In the case of Google Health, low compatibility prevailed as users currently didn't administer their own Health information and didn't see the value of doing so. Current practices included calling the doctor, which was less time consuming. Keeping an ePHR is seen as a task for medical specialist, and accordingly, Google Health seems incompatible with existing practices (Rogers, 1983). In the case of Google Plus, compatibility seemed positive. While there were not big differences with existing social media, the concept of circles was in line with their view of social relationships. A higher compatibility increases the perceived usefulness of a service (Karahanna, Agarwal, & Angst, 2006) (Hernández-García, Iglesias-Pradas, Chaparro-Peláez, & Pascual-Miguel, 2010), this is both supported by the literature and our study.

The **usefulness** of the service is in line with literature and demonstrated an important success factor. The usefulness of the services differs with all seeing Google Search as useful, or even essential, and viewing Google Health as of limited usefulness. Participants do not currently retain their personal health information and fail to see added value in doing so. The alternative to Google Health, calling the doctor seems easy and fast. By comparison, the difficult and time-consuming alternative to Google Search necessitates visiting a library. Hence, users considered the functionality of Google Plus similarly useful and easy to use, but the overall usefulness of Google Plus as a service emerged as low because of a lack of friends who use Google Plus, an essential part of social media. . In that context the relative advantage construct of Rogers (1983) seems more appropriate than the perceived usefulness construct of TAM (Venkatesh V. A., 2000). The usability of all three services was viewed favorably by interviewees.

Information needs align closely with usefulness of the e-commerce service as usefulness of services rests in providing the right information. Users expressed positive sentiments about the information provided by Google Search classifying it as reliable, simple, and fast. Users of Google Health, however, saw providing their own information as unreliable with usage of medicinal terms complicated. Not all interviewees deemed the information provided by and use of Google Health negatively, but were failing to see the relevance for their own situation, which resulted in a bad fit with their own situation. This result supports the theory saying that the better the fit between information needs and information provided by the e-commerce service, the higher the user adoption of the service.

Our analysis of Google Plus revealed the service lacked information. While users like to receive updates from friends, many were not Google Plus users.

Consistent with the theory of planned behavior (TPB) (Ajzen, 1991), sufficient means implies external controls influence both intention to use and actual use. All services saw no restrictions to use the service with the Internet and computers readily available and requisite knowledge sufficient, resulting in users making little to no use of customer support. With wide acceptance of the Internet "means" no longer restricts to use Google products. Also **system quality** was considered good, all services where fast and no problems with unavailability of Google was mentioned. Only

internet problems at home or at work were mentioned, but these problems were not related to Google.

Our literature search found that the **social pressure** of using a service will increase the likelihood the user consistently uses the service. Our interviews showed that there was an absence of social pressure to use Google Health, while Google Search saw significant pressures. In the case of Google Plus, there is a lack of social pressure in the absence of a critical mass of friends using the service.

Only in the case of Google Plus **enjoyment** is mentioned as a reason to use the service. In that context the enjoyment is closely related to the usefulness and information quality of the service, while the enjoyment comes from contact with friends. The data of the interviews were not sufficient to draw conclusions regarding the influence of enjoyment on user adoption.

A balance between **trust** and **risk** is necessary. The results of our interviews support this theory. Despite users trusting Google with their search queries, they are very reticent to share personal health information, as users considered this information far more personal and privacy-sensitive. In other words, the perceived risks of Google Health are higher than the perceived risks associated with Google Search. The most plausible explanation lies in a negative correlation between trust and risks, with other words trust should be in balance with risk. Google Health carries higher risks necessitating greater trust. Conversely Google Plus users expressed privacy concerns, but trusted Google more than Facebook, which they already used. So in the case of Google Plus, trust seems sufficient. Many studies used trust as a success factor, but few studies recognize the relationship to risk. Our study showed evidence that trust can't be seen as an isolated factor, but should be viewed as inseparably couple. In situations of high risk, high trust is necessary as trust can mitigate specific risks.

	Google Search	Google Health	Google Plus
Service quality	?	?	?
Information quality	✓	✗	✗
System quality	✓	✓	✓
Trust	✓	✗	✓
Perceived usability	✓	✓	✓
Perceived risks	Low	High	Medium
Perceived usefulness	✓	✗	✗
Perceived enjoyment	?	?	?
Social and personal influence	✓	✗	✗
Perceived compatibility	✓	✗	✓

Table 6:Success factors in literature with findings at Google

The success of Google Search

To unravel the success of Google Search we need to look at a combination of success factors. At the time the search engine was not the first, users already where familiar with searching using keywords and the presentations of results, which made using Google easy. The results presented by Google where better and compatible with work practices. Looking for information in for example the library costs a lot of more time. Further, the risks of using Google Search where low and users trusted Google with their search queries. This combination of success factors made Google Search a success

The failure of Google Health

Users don't see the value in using Google Health. Google is not trusted with their health information while risks are too high. Currently the doctor keeps their health information which makes doing it themselves incompatible and information provided unreliable. This combination of factors resulted in a failure of Google Health. To come to a succesfull ePHR these problems should be overcome. This could be done by providing an ePHR by an organization users trust and involve the doctor as main administrator of the health data. Such an ePHR would be more compatible with current practices, have better balanced trust with risks and probably a higher usefulness. By involving doctors and hospitals social pressure would be higher.

The future of Google Plus

Users considered the functionality Google Plus as an application useful and easy to use, many users liked the concept of circles and video chat, furthermore Google was considered more trustworthy than Facebook. Despite this Google Plus seems to suffer from low user adoption, this can be explained from a bigger perspective looking at Google in its competitive environment. Comparing Google Plus with Facebook the advantages were not considered so big while suffering from a lack of users resulting in a low information quality, low usefulness, no intention to use, and no social pressure to use Google Plus. To reach widespread user adoption Google needs user information, with user adoption seems necessary to get this user information. Google Plus should more radically innovate to offer bigger advantages or find other ways to offer information value. Without action, Google Plus will suffer the same destiny as Google Health.

To be successful Google Plus should find a way to show information about friends and thereby increase perceived usefulness. For Google this is a chicken and the egg story, because for user adoption Google needs to be useful and to be useful Google needs user adoption. The way Google Plus copes with this is trying to start a fast massive adoption of Google Plus which seems to have failed. A solution could be to find other sources of user information, for example by integrating existing services like Facebook and Twitter into Google Plus. Hereby Google Plus could get useful without a wide user adoption. The practical feasibility of such solution remains unknown.

Prima validation

The usefulness of the Prima method for measuring the user adoption of e-commerce is confirmed. As expected most success factors are covered by the interview, but more explicit measurements of trust and service quality would be desirable. Reformulating interview questions for the specific application of e-commerce would be desirable.

On the macro level the Prima method covers influence of the surrounding, in the case of consumer systems this macro level is not an organization, but rather the social surrounding of the user. Improvements could be made to make the interview method better fitted for this goal.

Concluding the Prima method can be of great value, by looking at both the innovation product as the innovation process and coverage of both the user domain as the information technology domain, the method allows for detailed analysis of user adoption. The method could be made more suitable by rewriting the interview questions specific for the e-commerce domain.

Strengths and weaknesses of study

The number of qualitative studies in the area of e-commerce user adoption is limited. The combination of an extensive literature search with a qualitative analysis using interviews of potential Google users is unique. The qualitative method allows us to see relationships between success

factors which would be unknown using a quantitative approach. The study explains the user adoption of Google Search and the failure of Google Health. Last but not least the study shows the causes of a lacking adoption of Google Plus.

Our research has several limitations. The population of users is restricted Dutch Students between the ages 15 and 25. Testing our results in a group of older users did not yield significantly different results. Regardless, geographical and social restrictions may apply making the results not representative to the larger population. Furthermore, the interviews were conducted by different interviewers. Despite giving these interviewers the same protocols, our interviewers may have biased the results.

The subject of our interviews, Google products, restricts our findings to a single firm of which only three products were selected to research. The products researched were free to use with information the primary value, potentially resulting in a close relation between information quality and usefulness. This doesn't neglect the value of the method used.

The widespread adoption of Google Search resulted in sample of users familiar with the product, with this knowledge possibly influencing interview results.

6. Conclusion and implications

This study combined an extensive literature search with a total of 127 interviews among potential users of Google Search (46), Google Health (27) and Google Plus (54) to come to an overview of success factors associated with successful e-commerce user adoption at Google. Factors found in the literature include service quality, information quality, system quality, perceived usefulness, perceived usability, perceived enjoyment, trust, perceived risks, in addition to social and personal influences.

Analyzing these success factors in our interview the following findings arise. First perceived compatibility proved a good indicator of user adoption at Google and can be used to explain while certain innovations are considered useful while others are not. Second there should be a fit between information supplied and the information needs of the user. The better the fit between information needs and information provided by the e-commerce service, the higher user adoption of the service. In this case it is important to know which information users expect to get from a service and meet these expectations. Third our study showed that perceived usefulness is not only a subjective perception, but also a relative perception. E-commerce ventures should not be studied as a closed system, but in the context of its competitive environment. Fourth findings suggest that risks should be in balance with trust for successful adoption of e-commerce projects. Further findings show that social pressure of using a service increases the likeliness of using the service. Google search saw some pressure, Google health no pressure and Google plus still lacks social pressure. In the case of Google Plus this social pressure is closely related to the usefulness of the service, which makes it hard to isolate the effect from social pressure from the effect of usefulness on user adoption.

With current results Google Plus is deemed to fail. A solution has to be found to overcome a lacking information quality and usefulness resulting from a lacking user adoption. Possible solutions include more radical innovations or inclusion of friends data from external sources.

Looking at the interviews no single success factor on its own can explain the success or failure of a service. A service which scores high on all success factors, but is not compatible with current values and work practices will probably not be successful. The right balance of success factors is necessary for a service to be successful. Results show no significant differences in age, experience or gender supporting the generalizability of the results.

Rather than drawing on a single model or adapting a selection of success criteria, services should be evaluated based on all success criteria. The used PRIMA method is proven valuable, but could be adjusted to more explicitly measure our e-commerce success factors in a voluntary user environment. Our list of success factors could be translated in a PRIMA interview for e-commerce services by selecting different success measures for each of the individual factors. Such a list could be

used to evaluate a service from the user perspective and would increase success rates of new e-commerce startups.
The user adoption of e-commerce is a widely debated topic, and our study showed a wide variety of success factors all partially explaining the adoption of e-commerce. That said, the complete answer remains hidden. Till that time rather than to draw on a single model our collection of success factors can serve as a valuable guideline both for research as practice.

7. Future research

In general current research fails to incorporate a sense of time, while user perceptions like usefulness and intention to use may change over time. Despite theories like Rogers Innovation Diffussion Theory (1983) incorporating a staged innovation-decision process, this theory didn't got much attention in studies addressing the user adoption of e-commerce. More attention should be for this changing user perception.

Furthermore, existing models explore adoption of innovations as an isolated event, while the Internet constitutes a social happening with different influences including competitors, new technologies, and users among other external factors. The models use a single user as unit of analysis, in some cases using a group of users as unit of analysis may be more appropriate. Models like TAM may be over simplified for adoption of complex technologies like the Internet, but are used in most research addressing the user adoption of e-commerce. services. Finally, no single article within our literature study included all factors associated with successful user adoption of e-commerce in a single model. Future research might study if and how factors relate to each other.
Finally our study illustrated the value of qualitative efforts in the area of e-commerce adoption. The Prima model should be adjusted for e-commerce specific applications and could be used in more studies. This would allow for a more detailed understanding of user motivations behind e-commerce user adoption.

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9. Appendix A: Literature study

	Service quality	Information Quality	System quality	Trust	Perceived usability	Perceived Risks	Perceived usefulness	Perceived enjoyment	Social & personal influence	Perceived compatibility
Ahn et al,2004	X	X	X		X		X		X	
AlGahtani, 2011				X	X	X	X		X	
Bhatia, 2002	X	X	X							
Bhattacherjee, 2000					X		X		X	
Chang, et al, 2004	X			X	X	X	X			
Chen et al,2002					X		X		X	
Chen & Tan, 2004	X	X		X	X		X		X	X
Chien et al, 2012				X	X		X		X	
Ching & Ellis, 2004					X		X		X	X
Chiu, et al,2009				X	X		X		X	
Crespo, 2008					X	X	X		X	X
DeLone & Mc Lean, 2003	X	X	X				X			
Eastin, 2002					X	X	X		X	X
Gao, 2009					X		X	X	X	
Garrity, et al, 2005			X		X		X			
Gefen et al, 2003				X	X		X		X	
Gide & Wu, 2006	X	X	X	X	X					X

Green&Pearson,2011		X	X	X	X	X	X					
Hanafizadeh et al,2012				X		X						
Hernández et al,2010					X		X			X	X	
Heijden, 2004					X		X	X				
Hsu & Chiu, 2004				X		X	X	X	X			
Hung et al, 2011						X	X				X	
Hwang & Lee, 2012)				X						X		
Hwang & Lee, 2004					X		X	X	X			
Pavlou, 2003				X	X	X	X					
Karahanna et al, 2006				X		X					X	
KimJ.B2012				X	X		X			X		
Kim et al,2012	X	X	X					X				
Kim,2012				X								
Kong, 2005		X	X	X								
Koufari et al, 2004				X	X		X					
Klopping et al, 2004					X		X					
Lee, et al,2011					X		X			X		
Loiacono et al, 2007			X	X	X		X	X		X		
Lee , 2009				X	X	X	X			X		
Lee et al,2001				X	X	X	X					
Lingyun,2008				X	X		X	X		X		
Liu &	X	X	X	X	X							

Arnett, 2000											
McKinney et al 2002			X	X							
Molla &Licker, 2001	X		X	X	X			X			
Sait et al,2004				X	X			X			X
Shang et al 2005						X		X	X	X	
Shih, 2004	X		X	X	X	X		X			X
Shin, 2010					X						X
Suh, 2003				X	X						
Sung, 2006	X		X	X	X	X					
Thorleuchter et al, 2012			X	X	X	X					
Treiblmaier et al,2010			X			X		X	X		
Wang et al, 2008	X		X	X							
Wang et al, 2003					X	X		X			X
Zhou et al,2007											X
Zhou et al,2009			X		X	X		X			
Zhou, 2012					X	X		X	X	X	

Research Reflection

PERSONAL NOTES AND INFORMAL INSIGHTS

PREFACE

In this self-reflection, I wish to present my personal notes on the research and give more informal insights into the process leading to the results described in the paper. I will start with a description of the process, explaining the steps made and lessons learnt during this process. Subsequently, I will present my personal notes on the existing literature. Finally, I will present my personal notes concerning Google and the research results in particular.

THE PROCESS

My master thesis started when I visited Dr. Ton Spil while searching for a research project in the area of e-commerce. Dr. Ton Spil had interviews available concerning user experiences with Google Search and Google Health, which could be used to determine why Google Search was successful and Google Health not. My leading research question was: "Which factors resulted in e-commerce success and failure at Google?" In order to acquaint myself with the research field, I started by looking for literature. At that point, I was focused on e-commerce success in general, resulting in the use of the main search term 'e-commerce success' to find relevant papers. The papers found dealt with diverse subjects: from the successful adoption of information technology in companies, to user acceptance of consumer websites. I realized that more focus was necessary to obtain a comprehensive overview of the research field. Both e-commerce as well as success required a more precise definition. Definitions of e-commerce in academic literature range from the very precise: "...the buying and selling of information, products and services via computer networks" (Kalakota, 1997); to the very broad: "...the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks." (Zwass, 1996). In order to focus on the transactional part of e-commerce, I chose to adopt the precise definition proposed by Kalakota and Whinston (1997). While looking for papers on e-commerce success, I realized my search needed a smaller scope, since the number of papers found was too high and the success factors found too broad. To narrow the scope, I tried to categorize the factors found, which resulted in a broad categorization on different levels of analysis, ranging from the organizational level to software architecture. In the PRIMA model the focus was on the user and the information technology domain, therefore the analysis should also focus on these domains, resulting in a definition of success as an outcome best summarized by 'user adoption' or 'user acceptance'. The new research question was formulated as follows: "What factors result into user adoption of Google products?" Despite taking a lot of time and having to read many articles that are not stated in the research paper, this first literature search and redefinition of the research question proved very valuable, by giving direction and focus to the research.

With this new focus, an extensive literature search was initiated, resulting in an overview of different success factors. The difficulty at this stage was bundling different formulations of the same phenomenon (for example usability and ease of use) and sub-factors in a broader success factor (for example subjective norms and

attitude). Furthermore, a superficial description of their relationships was given in several article, but the conclusions regarding the relationships were sometimes different. For example, usability proved to influence intention to use (Bhattacherjee, 2000), but other studies show weak or no support for a direct effect on intention to use (Chen & Tan, 2004) (Klopping & McKinney, 2004) (Crespo, 2008). This illustrated that in the academic world there is also much debate and disagreement among researchers. The difficulty as a researcher is not to become prejudiced by your own beliefs and to stay as objective as possible, something which may be easy in theory, but difficult in practice. To experience this in practice was very valuable.

After the literature search, it was time to process the interview data of Google Search and Google Health. The data was provided as part of an academic course, both raw interview data as well as a summary of the data were available. I chose to use the raw material to overcome possible interviewer bias resulting from the data having been summarized. There were tools available to process the interview data, but I chose to process the interviews manually, as this facilitated a better and more detailed understanding of user motivations and familiarization with the subject. The individual interviews were read and classified, using the success factors from the literature. The manual processing was more time-consuming than processing with the help of tools, but was important for acquiring new insights. The quality of the interviews was dual; some interviews were of a poor quality and not usable as part of academic research, while other interviews were very helpful. Part of the problem was the use of a not adapted for the task version of the PRIMA (also known as USE IT) (Spil, Schuring, & Michel-Verkerke, 2004) interview method. The PRIMA method was very usable while it is based on a large body of knowledge including TAM (Venkatesh V. A., 2000), the Information System Success Model of Delone and McLean (2003) and the innovation diffusion model of Rogers (1983). PRIMA has its origins in the organizational (healthcare) context in which software use and changes are non-voluntary. The quality of the interviews could be improved by adapting the interview questions more to a voluntary user environment, while the products of Google were aimed at end-users who voluntarily chose to use or not to use a product. A large difference in this context is resistance. Users in a big organization may oppose change which is imposed from above and views of an innovation may be different on different levels of the organization. In the user environment, the decision to use a product has to come from the user itself or social pressure from one's surroundings. In this context, there is no formal hierarchy which makes usage more voluntary. Furthermore, the user has to be aware of an innovation to be able to use it and see the value of an innovation to be persuaded, while in the organizational context the innovation may be imposed from above. An example of a question which was not very helpful in the end-user context included: "Can you mention another innovation project on which this organization is working?" Adapting the interview questions for the task, but staying close to the theory behind the model is necessary to get more detailed insights in user motivations. This is also recommended in the paper.

In the case of Google Plus interviews were not available yet, which made it possible to adapt the interview questions. To improve the quality of the interviews, Google Plus's questions focused more on the usage of social media, while trying to adhere to the PRIMA (Spil & Michel-Verkerke, 2012). interview model. The new interview questions were valuable, giving a better insight into user motivations. This shows that adapting the interview based on the project to be researched is recommended. For e-commerce there could be developed a general template which would cover e-commerce specific factors like customer service quality and trust. This would allow for a more detailed understanding of user motivations. A teaching point was that it is valuable to first test

the questions, in the case of Google Plus some questions proved to be ambiguous, which could have been overcome by testing the interview questions using test interviews.

Based on earlier success factors from literature, the conclusions could be drawn by analyzing the influence of these success factors on the actual success. This showed me that it is hard to generalize relationships. Despite giving good insights in what caused the failure and success of specific Google Products, it was harder to generalize these results. For example, for Google Plus social pressure can have a bigger influence on adoption, because of the social nature of the product, than on other Google Products. This makes it hard to draw conclusions that are universally-applicable.

Despite these limitations, I think this paper gives a unique combination of a literature overview and qualitative analysis of e-commerce adoption; the combination of not adopting a single model with the qualitative research approach gives a unique contribution to the existing body of knowledge concerning e-commerce adoption. The paper could be used to adjust the PRIMA model for the application of e-commerce. Such an interview method would be very valuable to both practice as academic research.

LIMITATIONS OF CURRENT LITERATURE

In most scientific literature, models such as TAM and UTAUT are used as the basis for the research. Despite their validity having been proved,, the models may be oversimplified and have a limited practical attribution. For example, the relation between usefulness and intention to use is proven in many research papers, but also seems self-evident. The same can be said about the relation between usability and usefulness. When something is difficult to use, it seems obvious that the perceived usefulness also decreases. This means these papers provide little benefits to practical reality; it would be more useful to develop universal measures. For example, regarding information quality, which information should be available on a website and how this information should be presented could be researched. Regarding the issue of trust, how trustworthiness can be increased and how risks can be decreased by developing a universal checklist could be studied. Research such as this would be more valuable both to practice as well as to academic knowledge.

Furthermore, current models may be oversimplified; as stated in the paper, most models treat user perceptions as something static, but in practice perceptions may change over time. Currently, users may not see the value of managing their own health information, but this perception may change over time. This could result in classifying an innovation as unsuccessful, while a different view could emerge several years later. For example, ordering products on the internet was not very common 10 years ago, the perceived risks were high and trust in online shops was low; today, ordering on the internet is much more common and perceived risks are lower. A similar concept, such as a webshop selling groceries online, may be successful today, but a failure 10 years ago. This makes current models primary usable to explain current success or failure of services, while predicting the future success of a service would be desirable.

Another shortcoming of the models, is treating users as separate individuals acting in isolation. As Bagozzi (2007) states: *much of human behaviour is not best characterized by an individual acting in isolation*; humans are social creatures influenced by each other. I believe the primary reason why Google Plus is not considered useful is not to be explained by e-commerce success factors, but by ethnology. To be successful, Google should attract a big group of users in a short time. A major shortcoming of current models is not incorporating the behaviour of

groups. By interviewing individual users and weighing every user as having the same influence, current models may neglect social mechanics behind successful adoption. One user may have a bigger influence on other users than the other.

Furthermore, success factors could be specified in more detail, for example usefulness is a very broad term and very closely related to other factors. For example, an application should be usable and be compatible with the work process in order to be useful. Many research papers do not give detailed descriptions of the success factors, making it difficult to distinguish what exactly is being researched. Even within the same research model (for example TAM), different explanations of the variables are adopted by different studies.

To explore these social and time restrictions of current models, more qualitative research could be valuable. The qualitative method allows for more detailed input and the unravelling of motivations behind adoption; currently the usage of quantitative models seems both overrepresented as well as overvalued. In that light an adjustment of PRIMA / Use IT for specific e-commerce applications could be very valuable.

In conclusion, there does not seem to be a universal model to explain e-commerce success and failure from the user perspective. Rather than to rely on a single model, I would recommend using the single success factors as a guideline for e-commerce projects. For every project service quality, information quality, system quality, trust, perceived usability, perceived risks, perceived usefulness, perceived enjoyment, social & personal influence and perceived compatibility should be valued according to perceived importance for a certain project and evaluated accordingly by test users. This could lead to a universal checklist which would allow for evaluation by users and awareness concerning possible improvements.

Success Factor	Possible questions
Service quality	How important is customer service quality to you? How would you classify response times of the helpdesk? How would you classify the answer of the helpdesk? How would you rate the friendliness of the helpdesk? …
Trust	How trustworthy would you rate the service? Would you trust the service with your information?
Risks	Which risks do you encounter when using the service? How high are the risks of using the service for you? …
…	…

Table 7: Example of how a user checklist may look like

Personal notes on Google

Google Search is one of the most successful internet ventures, if not the most successful. Research results show that almost everybody uses Google and considers Google Search as very useful and usable. Personally, I think

Google's most important success factor is usefulness in combination with good timing. When Google was introduced, most people were already familiar with search engines, but results were not that good allowing for easy manipulation of results. I still remember using Ilse to search for websites. The introduction of Google was not too innovative, but innovative enough to want to switch. Results were better and presentation was just as good as Ilse. Therefore, Google was the right thing at the right time.

Regarding Google Health, the innovation was rather large, perhaps too large at the time. The adoption of ePHR was low and familiarity with the concept was low as well. This in combination with a low perceived usefulness resulted in a low broad adoption of Google Health. This does not mean that in the future a comparable project will not be successful. Personally, I think people are not ready (yet) to maintain their own health information on the internet. I think in the future there will be a need for a simple version of ePHR with a low threshold, which will enable health information-sharing with healthcare providers and online appointments. The adoption of this technology, by both consumer and professional health organizations, is important. I can imagine a system which makes it possible for me to review my diagnosis at home after visiting a doctor, to acquire extra information about my medical condition, to place my own comments on the diagnosis and to send the information to the hospital to make a new appointment. For me personally, such a system would be of great value. Only putting my own health information in an online tool is not of any value. Therefore, adoption of the technology by professional organizations would be a very important factor for its success. For this, both broad support of users and health organizations is necessary. In that context, I think Google will be too controversial to facilitate broad support; an independent, non-profit organization would be preferable. I think the likelihood of success would be highest if the concept is initiated and supported by government, insurance companies and health organizations. In that context, Google could acquire the role as supplier of information technology, but not as owner of the project and corresponding data.

Regarding Google Plus, the website in general and its options are quite good. Before starting with my research, I used Google Plus for a while, but a social website without friends or other social contacts is rather useless. This also seems to be the conclusion based on the interviews by other users. Despite many people not even having heard of Google Plus, many think the ideas are good and useful. Also the reputation concerning privacy is better than the big opponent, Facebook. But Facebook seems to have such a large market share, making it difficult to change from social media platform. Currently I can see that Google is integrating Google Plus is popular applications like Youtube. I think this may lead to more users creating an account, but not to people really using Google Plus. Personally, I think the best option for Google would be to integrate existing platforms such as Facebook and Twitter into Google Plus, allowing updates from friends to be seen on these other platforms. This would make it easier for users to make a gradual switch. The question is if Facebook and Twitter would allow such a move. Another option would be to offer bigger advantages than Google Plus currently does; the circles idea is considered as nice, but not that big of an advantage to cause an exodus from Facebook to Google Plus. Which innovation would cause such an exodus is a matter of speculation.

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