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- Master Thesis -

Is New Technology Clouding Your Judgment? How to Make Innovations Succeed

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Abstract

A lack of experience on online consumer behavior, and limited empirical work that captures positive and negative factors influencing consumers' technological adoption process, has led to a high failure rate of new innovations in cloud technology services. This dissertation develops a theoretical research model based on the Technology Acceptance Model (TAM) framework with the aim of understanding the drivers and inhibitors of business-to-consumer (B2C) cloud technology adoption. The model is composed based on constructs derived from cloud technology research in a business-to-business (B2B) setting. Furthermore, the consumer trend "Return On Time" is introduced as a new driver of attitude towards cloud technology and the perceived usefulness of an innovation. Results indicate that drivers and inhibitors of consumer adoption in the cloud share several characteristics with the B2B market. Perceived usefulness was the strongest driver of consumers' attitude, while return on time was the strongest influence on perceived usefulness. Security risk was shown to have a significant negative effect on attitude, inhibiting adoption. For companies, this information is vital to create successful innovations by strategically utilizing cloud technology characteristics and consumer trends to satisfy customer needs.

I. Introduction

In this introductory part, we present a brief overview of why our selected topic is an important area of research and how it affects researchers and practitioners, resulting in research objectives and the purpose of the study. Part II consist of a literature review of cloud computing, the technology acceptance model, the theory of innovation adoption and the consumer trend return on time. The literature review provides foundation for the empirical research model and hypotheses. In part III we present the methodology, hereunder the empirical method, data collection and data analysis; the results are presented in part IV. Part V includes a discussion of the findings along with managerial implications. Finally, limitations and directions for future research are offered in part VI.

1. Relevance of the Research

1.1 Innovation Adoption: What Do Consumers Really Want?

Global media have dubbed this millennium as the software age, and proclaimed that software is eating the world (Johnson 1998; Andreesen 2011). Some argue that the world is in fact becoming flat – with workflow software, uploading, outsourcing, and mobile digital devices connecting consumers and firms, and products and services around the globe (Friedman 2005). It has never been easier for companies or consumers to innovate and launch new products and services. However, research shows that between *70-90 percent* of new innovations are considered flops by management (Gourville 2006). Schneider and Hall (2011, 2) explain that one of the main reasons of failure is the lack of functionality of the innovation; *"if consumers can't quickly grasp how to use your product, it's toast."* Dredge (2011) cites a new Deloitte report where a staggering 80 percent of branded applications (i.e. "Lynx Stream") intended for smartphones have been downloaded *less than 1000 times.* In comparison, Rovio Mobile's game "Angry Birds" has been downloaded over 200 million times and the Apple's App Store, Google's Android Market and In Motion's BlackBerry App World generates 1.6 billion downloads *each month*. Consequently, one of the basic questions managers must ask themselves is *"what is my app for?"* According to Dredge (2011), the way forward is to release applications that have real functionality, which solves a problem or provide features that are genuinely meaningful. Apple's horde of loyal customers is an obvious example that functionality fueled by design, quality and

simplicity leads to increased adoption of new innovations. Bettencourt and Ulwick (2008) proclaim that people "hire" products and services to get a job done. Customers do not buy security systems and insurance, they buy peace of mind. They do not buy word-processing software they buy documents. Clayton Christensen, Harvard Business Professor, asks the following question: *"When customers engage your product (or service) to do a job, what is the job they really want done?"* (Andreassen 2011). Indeed, a problem of new-innovation adoption is the existence of *"a gaping mismatch between what innovators think consumers desire – and what consumers really want"* (Gourville 2006, 1).

1.2 An Old Idea Whose Time Has Come

Cloud computing *"represents a fundamental change in the way information technology (IT) services are invented, developed, deployed, scaled, updated, maintained and paid for"* (Marston et al. 2011, 176). Put succinctly, cloud computing enables a consumer to use different applications, platforms, or software infrastructure over a network and access it on one or more digital devices. Armbrust et al. (2009, 2) calls cloud computing *"an old idea whose time has come."* The hype of cloud computing has led Gartner Research to forecast the phenomenon to be a $150 billion business by 2014 (Marston et al. 2011). A recent consumer cloud computing study found that an overwhelming 143 million consumers took advantage of the free or low-cost cloud applications, a number that is expected to reach nearly 160.6 million by the end of 2015 (ABI Research 2010). IMS Research (2010) expects the growth of connected devices to reach 22 billion within the next decade, effectively increasing consumers' incentives to move to the cloud. Additionally, a recent American consumer cloud computing report states that cloud-based offerings for consumers are increasing, due to a confluence of market forces; more online devices, increased web connectivity, higher demand for mobility and convenience, in addition to a supply side desire for efficient and cost efficient delivery of content and services (Board 2011).

Certainly, as the digital habits of consumers have gone from "on premises" to "on demand" (Chorafas 2010; KPMG 2010), the needs for physical products and attributes are being overtaken by service driven software. Ofek and Wathieu (2010, 1) assert that trends of the digital revolution have led consumers to *"value offerings that provide instant gratification and help them multitask."* We know

that consumers hire productivity software (i.e. Microsoft Office) to do a job more efficiently – they buy time that can be saved and spent on other activities. In their research, "Trend Spotting: The Key to Innovation Success", Andreassen, Calabretta and Olsen (2012) find that one of the consumer trends leading to a higher probability of innovation success is the importance of product/services that optimizes consumers' "Return on Time". Return on time entails the importance of buying, spending and saving time when using new innovations, which affect people's attitude and behavior to adopt. The authors argue that new innovations flop due to a failing ability to convey enough value for consumers to give up an older solution. One of the premises of cloud computing is to free up capacity with more convenient and intuitive functional solutions that saves the consumer time and money. With this in mind, we are inclined to ask; given the inevitable business ultimatum of "innovate or die," should not market-oriented innovators focus on how consumers actually use new technology solutions and the motivation behind to create sustainable innovations?

1.3 Research Objectives, Purpose of the Study and Contribution

A fundamental issue in consumer behavior is choice (Taylor 1974). To reduce the uncertainty about the outcome and consequences, *the risk of a choice*, managers must diminish possible psycho/social and/or functional/economic losses felt by the consumer. The risk factor in adopting new technology is specifically high, *"since new technological products or services rapidly become obsolete in terms of being replaced with even newer products and services"* (Saaksjarvi 2003, 91). The increased use of cloud technology implicates unique possibilities to companies, *only* if they understand the underlying dynamics and rationale behind how consumers evaluate these services and why they choose to buy. Additionally, with the rise of application use on smartphones, tablets, laptops and other devices, firms are forced to offer cloud solutions to satisfy tech-savvy consumers' needs.

According to Low, Chen and Wu (2011, 1009), *"a theoretical model for cloud computing diffusion needs to consider the weaknesses in the adoption and diffusion (of) technological innovation."* Today, a large body of research and numerous surveys focused on B2B adoption of cloud technology conclude that certain characteristics determine the success and rate of adoption (Armbrust et al. 2010; Low, Chen and Wu 2011; Schewe et al. 2011). Consequently, researchers

have drawn attention to the lack of empirical knowledge on consumer behavior in the cloud, and called for extensive B2C exploration. However, in related fields, the TAM introduced by Davis (1986) has successfully been used in several studies to explain why individuals adopt new technology. TAM was originally developed to describe the user acceptance process of information systems in a work setting. Recent research has modified the original TAM and applied it to various consumer contexts, i.e. web retailing (O'Cass and Fenech 2003), consumer acceptance of handheld Internet devices (Bruner II and Kumar 2005) and adoption of Internet banking (Dash et al. 2011). Yoh et al. (2003) uses the theory of innovation adoption by Rogers (1995) to explain consumers' adoption of Internet apparel shopping. Several authors have integrated risk tolerance (Stern et al. 2008), perceived risk (Lee 2009; Thomas 2011), trust and risk (Pavlou 2003) in revised TAM models, and web security and privacy issues have been included in both TAM and the innovation adoption theory to explain adoption of technological innovations (Yoh et al. 2003; Lee 2009).

However, it is important to acknowledge the weaknesses of using these innovation adoption theories. Criticism has revolved around the lack of appropriateness, comprehensiveness and general opinion of the theories being too "*parsimonious and incomplete, more appropriate in an original context, deterministic, and tautological"* (López-Nicolás, Molina-Castillo and Bouwman 2008, 360). TAM studies that simply add a variable or a relationship are being criticized for lacking contribution. Still, Davis, Bagozzi and Warshaw (1989) and Davis (1993) have recommended incorporating more external variables to improve TAM in information systems research. The investigation of web user behavior using TAM in various consumer-focused contexts has been advocated by other researchers (Agarwal and Prasad 1997; O'Cass and Fenech 2003) and additional examination of TAM's antecedents and consequences when it comes to consumer motivations (Bagozzi, Davis and Warshaw 1987; Venkatesh and Davis 2000) encouraged. In their meta-analysis of TAM literature, Lee, Kozar and Larsen (2003) expressed the importance of incorporating more variables and exploring boundary conditions by studying more complex technologies, multi-user systems and - highly relevant in our setting - *Internet applications*. Additionally, Universities, surveys and articles stemming from leading companies and acclaimed journals and newspapers (i.e. Berkeley, Deloitte, Gartner Group, Wall Street Journal) indicate that issues

and challenges faced using cloud technology in the B2B market is similar to consumers' cloud experience. It is therefore highly interesting to investigate whether the B2B cloud characteristics are applicable in a B2C setting.

Based on the above discussion, we propose the following research objectives:

1. *To identify the drivers and inhibitors influencing consumers' adoption decisions regarding the use of cloud technology.*
2. *To investigate the current consumer trend return on time's influence on attitude towards and adoption of cloud technology.*
3. *To extend and fuse TAM and theory of innovation adoption in a cloud technology context.*

The purpose of this study is therefore to extend TAM and the theory of innovation adoption to study cloud computing in a B2C context and, through predominant cloud characteristics, identify drivers behind consumers' adoption of cloud technology. Additionally, the consumer trend return on time is used to investigate the motivation behind consumers' adoption of cloud technology innovations. Return on time, and security- and privacy risk will be manipulated in a simple experiment to investigate their effects on attitude and adoption. In doing so, we aim to contribute to and extend the on-going trend research, conducted at BI Norwegian Business School (Andreassen, Calabretta and Olsen 2012; Calabretta, Andreassen and Olsen Working Paper), as well as theoretically contributing to the research fields of online consumer behavior, technology adoption and cloud computing. Furthermore, our research seeks to identify information about attributes that reduce the perceived loss for consumers when choosing a cloud technology service. This information is intended to provide managers with valuable tools to improve their innovation success rate in the B2C market.

II. Literature Review

2. Defining Cloud Computing Technology

To understand consumers' motivation to adopt a certain technological product or service, we must first understand how the technology works. Defining cloud computing technology is not an easy task due to the vast array of nebulous terms, concepts and explanations which is constantly changing and evolving faster than most can keep up with (Chee and Franklin 2010; Marks and Lozano 2010). The term has been widely used in advertising and hyped in media, and it has been featured in expos, conference, journals and numerous articles since the late 2000's. The debate has also been fueled with some negative voices. Larry Ellison, Oracle's CEO, was quoted in the Wall Street Journal remarking: *"The interesting thing about Cloud Computing is that we've redefined Cloud Computing to include everything that we already do"* (Krangel 2008). Hewlett-Packard's Vice President of European Sales, Andy Isherwood, agreed: *"A lot of people are jumping on the [cloud] bandwagon, but I have not heard two people say the same thing about it"* (Armbrust et al. 2009, 3). A widely accepted definition, which we apply in this thesis, stems from a working paper composed by the Commerce Department's National Institute of Standards and Technology (NIST). NIST defines cloud computing as *"a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction"* (Mell and Grance 2011). NIST suggests three basic service models for cloud computing. Infrastructure as a service (IaaS), and platform as a service (PaaS) are outside the scope of this research. The focus is on the third suggested service model; SaaS – Software as a Service. The SaaS model allows customers to use various client devices through a thin client interface (i.e. web-browser, web-mail) to access an application that is hosted on a cloud infrastructure. The cloud infrastructure, uncontrolled by the customer, includes networks, servers, operating systems, storage and individual application capabilities – with the possible exception of limited user-specific application configuration settings (Mell and Grance 2011; Velte, Velte and Elsenpeter 2010).

3. Adoption of Technology Innovations

Most studies on adoption of information technologies are derived from TAM (Davis 1986) and the theory of innovation adoption (Rogers 1995). Wu and Wang (2005, 721) note the similarities between the two theories and assert, *"that the constructs employed in TAM are fundamentally a subset of the perceived innovation characteristics and, if integrated, could provide an even stronger model than either standing alone."* In addition to cloud computing, we have explored the fields of electronic commerce, such as mobile, banking, retailing and online shopping, which offer valuable insights to the adoption of similar services.

3.1 Technology Acceptance Model (TAM)

One of the major constituents of the TAM is the Theory of Reasoned Action (TRA). TRA aims to identify determinants of behavior that is consciously intended by an individual (Davis, Bagozzi and Warshaw 1989). It consists of three explaining constructs: 1) Behavioral intention 2) attitude 3) subjective norm. A person's behavioral intention is the sum of the attitude related to that specific action and his or hers subjective norm (Behavioral intention = Attitude + Subjective norm). Behavioral intention is a measure of the strength of intention to perform a given task. Attitude is a set of beliefs and feelings relating to an action. These beliefs are formed through information processing of external stimuli, and are an expression of a person's evaluation of the likelihood that an action will lead to a specific outcome. Attitude is defined as *"a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object"* (Fishbein and Ajzen 1975, 6). This definition evolves around three components that bring ambiguity into the interpretation of the concept. (1) Attitudes are learned; (2) attitudes are predispositions and (3) consistency (consistently favorable or unfavorable). Fishbein and Ajzen (1975, 11) suggest a way to deal with the conceptual ambiguity in this definition of attitude by measuring it in a procedure that *"locates the subject on a bipolar affective or evaluative dimension vis-à-vis a given object."* The term subjective norm refers to a person's perception of the influence from a significant individual or group regarding the action, and his or hers motivation to follow these expectations. TAM is "*capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified"* (Davis, Bagozzi and

Warshaw 1989, 985*)*. TAM's ability to explore the external variables that influence internal beliefs, attitudes and intentions underscores its applicability for this study through its aptitude to understand the reason behind a certain behavior (Davis 1986). Internal beliefs in TAM consist of perceived usefulness and ease of use. With everything else equal, ease of use is expected to influence perceived usefulness, and perceived usefulness is also expected to influence behavioral intention to use along with attitude, which differs from TRA.

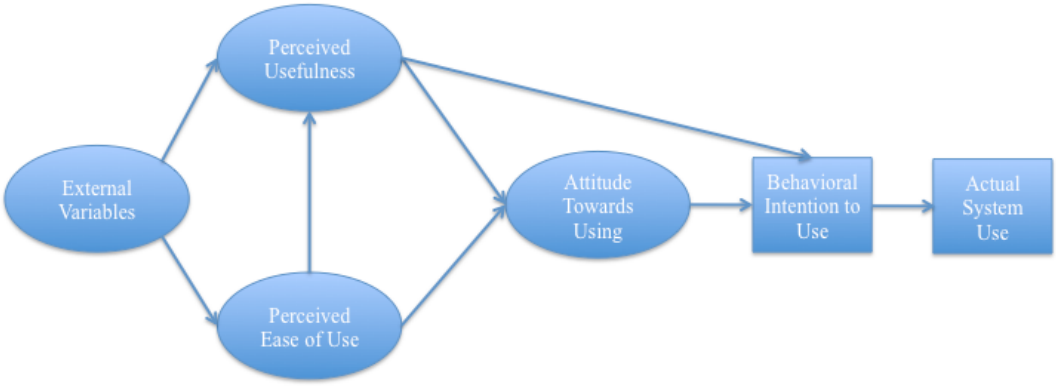

Figure 1: The Original TAM model (Davis 1986)

3.2 The Theory of Innovation Adoption

According to Rogers (1995, 12), *"an innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption."* The author identifies five characteristics of innovations and explains how individuals' perceptions of these characteristics predict the adoption rate of innovations. Rate of adoption is defined as *"the relative speed with which an innovation is adopted by members of a social system"* (Rogers 1995, 221). According to the author's Adoption of Innovation framework, 49 to 87 percent of the variance in the adoption rate of innovations is explained by the following attributes: relative advantage, compatibility, complexity, trialability, and observability. The framework has been used to predict the adoption of apparel shopping on the Internet (Yoh et al. 2003), consumer adoption of technological innovations (Saaksjarvi 2003), adoption of mobile commerce (Wu and Wang 2005; Chong, Chan and Ooi 2012), and the adoption of cloud computing in a business perspective (Low, Chen and Wu 2011). In this study, we utilize Rogers' attributes to develop the constructs in the proposed research model, with the exception of observability and compatibility, as these are deemed not relevant for the purpose of this research in accordance with Chong, Chan and Ooi (2012).

4. Constructs

The following constructs constitute our proposed research model, and are derived from TAM, theory of innovation adoption, return on time and a review of cloud technology characteristics. Hypotheses are proposed at the end of each section.

4.1 Ease of Use (EOU)

Ease of use is *"the degree to which a person believes that using a particular system would be free of effort"* (Davis 1989, 320). Even if a potential customer is convinced of the usefulness of an application, he may choose not to use it since *"the performance benefits of usage are outweighed of the effort of using the application"* (Davis 1989, 320). That a benefit is outweighed by effort has close ties to the cost-benefit paradigm. Additionally, judgments on how well a person is able to use the system as described through self-efficacy theory, is closely related to ease of use. These are judgments regarding ones own competence, and are distinguished from outcome judgments, which are represented through perceived usefulness. O'Cass and Fenech (2003) refer to Davis, Bagozzi and Warshaw (1989), and Bajaj and Nidumolu (1998) whose results showed that consumers abnegated use of an available computer system, even if it generates significant performance gains. The complexity of the system and its usability, thus, holds important explanatory power in understanding consumer's evaluation of whether or not to adopt an innovation. *"Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use"* (Rogers 1995, 257). Typical early adopters of new technology are hobbyist or individuals with a fascination of technology. Individuals with less technological expertise will perceive high complexity as negative, consequently hindering the adoption rate.

Usability is a concept that closely parallels ease of use, and has been widely applied in technology adoption and B2B and B2C cloud technology research (Katzan 2009; Rimal et al. 2010; Behrend et al. 2011; Leng et al. 2011). Usability is suited to narrow down the definition of ease of use to a cloud technology setting by describing how manageable the application is for consumers. Katzan (2009, 257) defines the concept as *"the requirement that the service is easy and convenient to use – regardless of the complexity of the underlying infrastructure."* This is a twofold explanation. Firstly, it addresses the user interface, which should be easy to understand to facilitate adoption (Rogers 1995; Davis 1989). Secondly,

it refers to the fact that *"technological innovations are more complex than other innovative products or services and thus require a great deal of consumer learning"* (Saaksjarvi 2003, 91). As cloud services are often delivered through mobile applications or the Internet in a browser window, end users are not exposed to the more complex details of the technology, such as software and hardware management (Sultan 2010). Hence, we hypothesize:

H1a: Ease of use will have a positive, direct impact on attitude towards cloud technology.

H1b: Ease of use will have a positive, indirect impact mediated by perceived usefulness, on attitude towards cloud technology.

4.2 Perceived Usefulness (PU)

According to Davis (1989, 320), perceived usefulness is "*the degree to which a person believes that using a particular system would enhance his or her job performance."* The author's theoretical foundation was the cost–benefit paradigm, self-efficacy theory, channel disposition model and research within the MIS field. As opposed to ease of use, he did not find clear parallels in the theory of adoption of innovations to perceived usefulness. Davis argues that relative advantage has been dealt with too broadly in the literature, which has made it difficult to interpret. However, within cloud technology, this generality and lack of specification is easier to deal with. Chong, Chan and Ooi (2012) note that in the scope of mobile commerce, relative advantage parallels perceived usefulness. Relative advantage pertains to *"the degree to which an innovation is perceived as being better than the idea it supersedes"* (Rogers 1995, 229). Kleijnen, Ruyter and Wetzels (2004) refer to James (2001), noting that ubiquity, in the form of availability anywhere, anytime, is one of the most obvious relative advantages of mobile services. Scalability is identified in B2B cloud literature as a major characteristic influencing the appeal of the technology and is, along with availability, included as predictor variables for perceived usefulness in our research. Thus, we propose the following hypothesis:

H2a: Perceived usefulness will have a positive, direct impact on attitude towards cloud technology.

4.3 Scalability

Scalability relates to the degree to which consumers may tailor a service to suit their needs, and has been identified in previous research as an important attribute of cloud computing in a B2B setting (Tsai, Sun and Balasooriya 2010; Katzan 2009; Buyya et al. 2009). Ahmed et al. (2011, 711) defines it as *"how well the solution to some problem will work when the size of the problem increase."* Marston et al. (2011, 178) argues that services using the cloud *"can be shared by different end users, each of whom might use in in very different ways."* The goal is therefore to be able to scale services up and down based on demand. "Drop Box", a cloud storage service, illustrates the importance of scalability for both service providers and consumers. Customers can choose an initial 2GB of online storage for free, then different prices are subject to the amount of GB the customers needs. The possibility to try something for free is similar to what Rogers (1995, 16) explains as "trialability"; the *"degree to which an innovation may be experimented with on a limited basis."* Trialability is positively related to the rate of adoption. This is similar to a *freemium business model*. Katzan (2009) explains it in terms of the long tail and with the absence of marginal costs to reach your clients. Providers need only a fraction of clients to respond to advertising in the free version, and Katzan (2009, 259) refers to Anderson (2006), who points out that "*In the free sample product model, you give away 1 % of your product to sell the additional 99 %, whereas in the freemium model, you give away 99 % to sell 1 %."* NIST identified scalability as one of five essential characteristics of cloud computing (Mell and Grance 2011). They coined the term *rapid elasticity*, which refers to the rapid and elastic provision of capabilities. This closely parallels other scalability definitions and explanations. As Rogers (1995) notes, the perceived relative advantage of an innovation is often economical, and with scalability as an attribute, consumers do not pay for unused capacity. Therefore, we hypothesize:

H2b: Scalability will have a positive effect on the perceived usefulness of cloud technology.

4.4 Availability

Availability relates to accessibility of files across devices, and also the fact that these files are now available, in geographic terms, everywhere. From a B2B perspective, Tsai, Sun and Balasooriya (2010) argues that among the advantages

of cloud computing technology are location independency and device independency. NIST highlights broad network access as an essential characteristic of cloud computing. This concept is similar to availability, and explained; "*capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms*" (Mell and Grance 2011, 2). Moreover, Katzan (2009) notes that availability is one of the cloud-based applications' strongest features. Rosenthal et al. (2010) stipulates that cloud computing represents a new business paradigm more than it does a new technical paradigm. Cloud vendors provide access to hardware and software infrastructure, and/or applications, eliminating the need for physical products. Regarding the B2C market, using Drop Box as an example, stored documents are available on computers, smartphones and tablets regardless of where you are in the world. Underscoring this and fueling the importance of availability, "Always on the go" is by Andreassen, Calabretta and Olsen (2012) identified as another important consumer trend. Being "on the go" has become more convenient and people are moving from place to place for professional or personal reasons. Convenient for many means cheaper, easier and faster travelling. With the possibility to connect and perform work or leisure activities anywhere and anytime, the perceived cost of travelling is driven further down, underscoring availability's consumer influence. Armbrust et al. (2009) suggest that services will be drawn towards cloud technology exactly because they need to be available for consumers at all times. Interactive applications available through mobile devices may respond and communicate in real time. The applications are aware of the consumers' location and environment, and these functionalities are gradually being incorporated into the applications' value proposal (Marston et al. 2011). Based on the above reasoning, we hypothesize:

H2c: Availability will have a positive effect on the perceived usefulness of cloud technology.

4.5 Return on Time

Andreassen, Calabretta and Olsen (2012) and Calabretta, Andreassen and Olsen (Working Paper) identified return on time as one of seven consumer trends, whose understanding is proposed to be of vital importance of the success or failure of innovations. Time is a scarcity for many individuals, inclining them to delve for

the best possible time allocation. In order to free more time for self-fulfilling activities, return on time is optimized. This entails finding the desired balance between quality and quantity of experiences. Return on Time is a three-dimensional construct, consisting of ways to save, buy and spend time. These concepts are what individuals relate to when they aspire to use their time in a satisfactory way, i.e. achieve the highest return on time.

4.5.1 Time Buying

Time is a concept that has been widely studied in consumer behavior. Berry (1979) introduced the "time-buying" consumer as a result of consumers wanting to preserve time due to a perception of time scarcity in the society. A time-buying consumer would focus on reducing *nondiscretionary time* – the time they feel obligated to spend (i.e. work, transport, household tasks, food preparation etc.). Purchasing or "hiring" products or services (dishwashers, microwave ovens) can free up nondiscretionary time (Nickols and Fox 1983; Bettencourt and Ulwick 2008). Feldman and Hornik (1981) describe time in an absolute sense as finite, not acquirable and not storable. While you may not be able to buy five minutes at the grocery store, it is certainly easy to use monetary resources to free up time. The term fast food was not coined by accident, possibly reflecting the desire to spend time on tasks and behaviors that is perceived to be more rewarding than food preparation. A magnitude of the products and services available today share this attribute, being easily available and faster than its predecessors which provides consumers with the possibility of freeing up time. Berry (1979) suggested that the development of a time buying consumer was influenced strongly, but not exclusively by time scarcity. Additionally, a shift in what people wanted to spend their time on, more "me-time" is also an important influence.

4.5.2 Time Saving

According to Feldman and Hornik (1981, 407), "*the term "saving time" really means the reallocation of time from one activity to another activity to achieve greater efficiency."* Efficiency in performing a task carries with it a fortunate side effect. Freeing up time allows consumers to undertake their choice from a wide range of activities intended to increase the well being of the individual; activities they may not otherwise have had the time to perform. Another way to free up time is by reorganizing the current weighting of time spent on or choosing between tasks. Prioritizing through reducing time spent on one activity and shifting

workload to others in the family or hired help are commonly used strategies (Nickols and Fox 1983). Anderson (1971) coined the term *convenience oriented consumption* and suggested that convenience could release time for alternative use. Relating this to cloud technology, it is likely that convenient solutions may be attractive for users that perceive time to be a scarce resource.

4.5.3 Time Spending

Due to the perishable nature of time, a natural goal is to use the freed timeslots created by the reallocation of time in a satisfactory way to enhance the quality of life (Berry 1979). The basic premise of the consumer trend "Quality information faster" underscores the importance of time allocation when consumers search and choose services and/or products (Andreassen, Calabretta and Olsen 2012). The opportunity to filter and organize information to one's preferences is an important prerequisite for maximizing return on time. Firms can therefore improve the quality of information services by tailoring content to consumers' interests to optimize their time allocation. As mentioned previously, the shift towards less focus on material goods, and increased importance of me-time underscores the relevance of time spending in consumer evaluations of whether or not to adopt a product. Numerous applications are designed to entertain, and an understanding of consumers' preferences with regards to how they spend time they have otherwise acquired is thus important in order to resonate with potential customers.

To summarize, Andreassen, Calabretta and Olsen (2012) and Calabretta, Andreassen and Olsen (Working Paper) explain that people seek the optimal balance of both quality and quantity of experiences when optimizing return on time. Quality of experiences can be optimized by efficiently allocating time to activities that provide the consumer with the greatest value in terms of self-fulfillment, efficiency and pleasure. Optimizing the number of self-fulfilling experiences per unit of time can maximize the quantity of experiences. Therefore, time-trapped customers will perceive an innovation that increases their return on time as offering added value and consequently being more attractive. Grounded on the above discussion, we hypothesize:

H3a: Return on time will have a positive effect on the attitude towards cloud technology.

H3b: Return on time will have a positive, indirect impact mediated by perceived usefulness, on attitude towards cloud technology.

4.6 Perceived Risk and Trust: Security and Privacy

Perceived risk theory has been used to explain consumer decision-making in various contexts, from telephone shopping (Cox and Rich 1964), to e-services (Featherman and Pavlou 2003) and consumers' behavior (Sheth and Venkatesan 1968; Mitchell 1999; Lim 2003; Lee 2009). Chong, Chan and Ooi (2012) assert that users in mobile commerce environments are exposed to higher privacy and security risks. Most scholars refer to perceived risk as multi-dimensional construct including six components: Financial, performance, social, physical, privacy and time-loss (Wu and Wang 2005; Lee, 2009). Pavlou (2003) refer to Grewal, Gotlieb and Marmorstein (1994), which describe performance risk as the possibility of product malfunction and failure to perform in accordance with promised benefits. The author asserts that security systems are an important part of such performance. Another widely studied factor affecting consumers' risk perception is trust. Mallat (2007, 417) refer to Grabner-Kräuter and Kaluscha (2003) and state, *"the importance of trust is highlighted in electronic and mobile commerce because of the spatial and temporal separation between buyer and seller when buyers are required to give delicate personal information such as telephone number or credit card number to the seller."* Trust has been empirically validated to be one of the predictors of intended website use by online shoppers (Gefen, Karahanna and Straub 2003). Within cloud computing services, winning the trust of customers over the issues of security and privacy represents the main concerns for service providers. Therefore, in our context, security and privacy issues constitutes the main risk of using a cloud technology service.

4.6.1 Security Risk

In their literature review of cloud computing challenges, Schewe et al. (2011) concluded that security risk in the form of loss of control and insufficient contractual guarantees are major concerns. One of the main reasons criminals target cloud computer providers is the relative weak registration system, which facilitates anonymity and limited fraud detection capabilities (Cloud Security Alliance 2010). From a B2B perspective, Cloud Security Alliance (2010) asserts that loss of indirect control; malicious insiders, data loss or leakage, and account or service hijacking are top threats. "LinkedIn", the professional networking site,

conducted a survey of small business owners for Bloomberg-Business Week where 75 percent of the 65 respondents cited security as their biggest concern over cloud-based applications (Conway 2011). Another recent survey of 169 corporate data center managers conducted by Gartner Group underscores LinkedIn's findings, 85 percent of the respondents cited security as a prohibiting factor when deciding to launch cloud-based applications (Conway 2011). Moreover, several reports conclude that security and reliability are two of the leading arguments against entering the cloud (Deloitte 2009; Chorafas 2010; KPMG 2010).

Regarding the B2C market, lack of visibility and transparency seems to be the Achilles heel of cloud technology services. *"End users lack the necessary resources and security education to investigate the data practices of cloud storage providers"* (Sachdeva, Kumaraguru and Capkun 2011, 1). Within SaaS applications, network- and data security, data breaches, authentication and backup are key security issues (Subashini and Kavitha 2011). According to Harauz, Kaufman and Potter (2009), users of cloud technology services are mainly concerned about data storage security. The SaaS model entails storing consumers' data outside the personal boundary, at the SaaS vendor's location. A malicious user or vendor can exploit and bypass security checks and access protected user data. However, Amazon is an example of a cloud service provider who has taken certain steps to counteract security breaches. Their "Elastic Cloud Computing" service prevents their administrators from having access to customer data and log in privileges to the Guest OS. Users can also encrypt their data before uploading it to Amazon S3 (Simple Storage Service), preventing any unauthorized third parties from accessing or tampering with the data (Subashini and Kavitha 2011). Due to the potential vast amount of user data stored in one cloud, the value of that particular cloud might attract breaching attempts. So-called "Botnets" constitute a major threat for clients and vendors. Criminals control these "dark clouds" with goals of extracting sensitive information, spreading viruses or causing system meltdowns (Haugen 2012). Subashini and Kavitha (2011) conclude that the lack of proper security measures scares away a lot of potential users and prohibits users to leverage the advantages of the disruptive technology. Thus, we hypothesize:

H4: Security risk will have a negative effect on the attitude towards the use of cloud technology.

4.6.2 Privacy Risk

Pavlou (2003) describes privacy risk as a part of the uncertainty dimension of perceived risk: Behavioral *"because of the opportunity to disclose private consumer information"* and environmental *"because of the possibility of theft of private information or illegal disclosure"* (Pavlou 2003, 77). As most of the computation and management tasks are performed by an external server when storing data in the cloud, the protection and confidentiality of sensitive data is critical for cloud computing's success (Lu 2011). In the B2B market, Armbrust et al. (2009) identifies data confidentiality as a main obstacle and Cloud Security Alliance (2010) state abuse and nefarious use of private information in various cloud computing platforms as a top threat. Some of the reservations companies hold include how the service provider will use the data and whether or not it will be exposed to third parties (Svantesson and Clarke 2010; KPMG 2010).

Regarding the B2C market, Hoffman, Novak and Peralta (1999, 82) found that *"almost 95 % of web users have declined to provide personal information to web sites at one time or another when asked,"* yet when using online social networks, *"users are generally unaware of who has access to their private information"* (Krishnamurthy and Wills 2008). The Norwegian Consumer Council has, in collaboration with the American Consumer Association, released a report that questions if personal rights are maintained when sensitive information is stored in the cloud. The report concludes that the key issue for the success of consumers adopting cloud services is perceived safety of use and trust in the system (Solhaug 2010). For example, in his study about Internet chatting addiction, Thomas (2011, 289) explains that privacy risk is the major component of perceived risk, and that *"perceived fears of divulging personal information and feelings of insecurity have a negative influence on Internet services use."* It is usual for cloud storage services to not offer any service guarantees, to assume no liability for any data loss, and to reserve the right to disable accounts without reason or prior notification (Sachdeva, Kumaraguru and Capkun 2011). It is difficult to assess how many consumers are actually aware of these terms. Svantesson and Clarke (2010, 396) assert that most users of Google Docs *"agree to a range of terms that may have serious consequences. The legality of some of those terms is questionable."* Similarly, Itani, Kayssi and Chehab (2009) point to severe privacy concerns arising from storing and processing sensitive data on remote machines,

offering little control to the end user. Ryan (2011, 36) analogously notes, *"cloud computing raises privacy and confidentiality concerns because the service provider necessarily has access to all the data, and could accidentally or deliberately disclose it or use it for unauthorized purposes."* Furthermore, Andreassen, Calabretta and Olsen (2012) suggest that privacy has become a trend among consumers, and that the threat of the involuntary disclosure of information such as credit card numbers, social security numbers, transaction history etc. is being amplified by cloud technology. Consequently, we hypothesize:

H5: Privacy risk will have a negative effect on the attitude towards the use of cloud technology.

4.7 Attitude Towards the Use of Cloud Technology

According to Thomas (2011, 289), *"attitude is viewed as the degree to which an individual's is favorably or unfavorably disposed towards using the system."* Karahanna and Straub (1999) combine innovation diffusion theory and attitude theories to examine differences in pre-adoption and post-adoption beliefs and attitudes of information technology adoption. They found that pre-adoption attitudes are, among others, based on perceptions of usefulness, ease of use and trialability. In the TAM framework, attitude is considered as a mediator between beliefs (perceived ease of use and perceived usefulness) and intentions (Liao and Tsou 2009). Attitude towards using is determined by consumers' degree of these two beliefs (O'Cass and Fenech 2003), which in turn impacts the actual use of a technology based service, i.e. adoption or non-adoption. Liao and Tsou (2009, 4598) refer to Yang and Yoo (2004) who empirically tested *"that a direct link between attitude and system use rather than via behavioral intention supported this correlation, and showed that a user's tendency to certain specific object had a direct effect on system usage."* In the current body of adoption literature, there exists an ambiguity connected to attitude as a construct. Some argue that beliefs influence behavior via attitudes, others view beliefs and attitudes as co-determinants of behavioral intentions, while some see attitudes as antecedents to beliefs (Davis 1989). In light of this ambiguity, this research follows the practice from researchers in related fields, where attitude is hypothesized and shown to have a direct link with actual use and adoption (O'Cass and Fenech 2003 and Bruner II and Kumar 2005). Accordingly, we hypothesize:

H6: Attitude towards the use of cloud technology will have a positive effect on consumers' adoption of cloud technology.

4.8 Between Groups Comparison

Following the purpose of this study, return on time, and security and privacy risk are manipulated to investigate the effect on attitude and adoption. This will be elaborated on in the methodology section, and we hypothesize:

H7: Return on time will have a significantly stronger effect on attitude towards cloud technology in the treatment group.

H8: Security risk will have a significantly stronger negative effect on attitude towards cloud technology in the treatment group.

H9: Privacy risk will have a significantly stronger negative effect on attitude towards cloud technology in the treatment group.

5. Empirical Model and Hypotheses Summarized

Our proposed research model can be viewed in figure 2, and research hypotheses are summarized in table 1. The model should be read left to right, and the logic is as follows: Links between constructs visualize the intended positive or negative relationship and the hypothesis number. For example, scalability is hypothesized to positively influence perceived usefulness while security risk negatively influences attitude towards cloud technology.

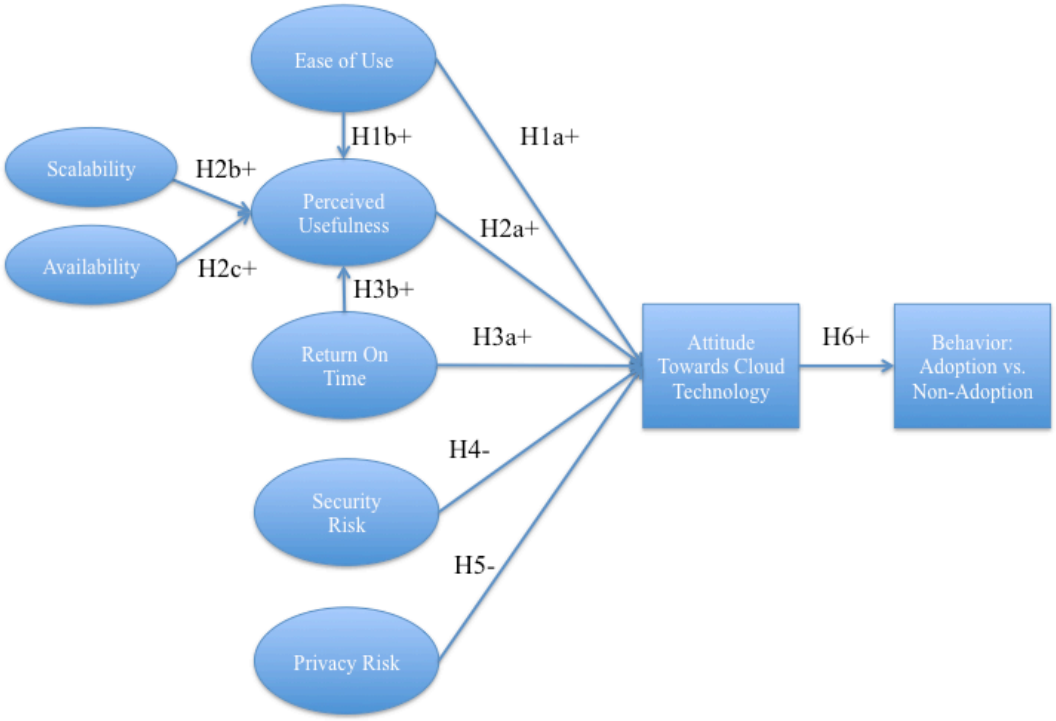

Figure 2: The Proposed Research Model

Hypotheses
H1a: Ease of use will have a positive, direct impact on attitude towards cloud technology.
H1b: Ease of use will have a positive, indirect impact mediated by perceived usefulness, on attitude towards cloud technology.
H2a: Perceived usefulness will have a positive, direct impact on attitude towards cloud technology.
H2b: Scalability will have a positive effect on the perceived usefulness of cloud technology.
H2c: Availability will have a positive effect on the perceived usefulness of cloud technology.
H3a: Return on time will have a positive effect on the attitude towards cloud technology.
H3b: Return on time will have a positive, indirect impact mediated by perceived usefulness, on attitude towards cloud technology.
H4: Security risk will have a negative effect on the attitude towards the use of cloud technology.
H5: Privacy risk will have a negative effect on the attitude towards the use of cloud technology.
H6: Attitude towards the use of cloud technology will have a positive effect on consumers' adoption of cloud technology.
H7: Return on time will have a significantly stronger effect on attitude towards cloud technology in the treatment group.
H8: Security risk will have a significantly stronger negative effect on attitude towards cloud technology in the treatment group.
H9: Privacy risk will have a significantly stronger negative effect on attitude towards cloud technology in the treatment group.

Table 1: Research Hypotheses Summarized

III. Methodology

6. Data Collection

6.1 Subjects, Design and Context

A thorough understanding of the links of the basic TAM components between the exogenous and endogenous variables in this study has been established by previous research (O'Cass and Fenech 2003; Bruner II and Kumar 2005; Liao and Tsou 2009 and Chong, Chan and Ooi 2012). We employed an exploratory research design. Through secondary data analysis we identified the underlying cloud technology characteristics driving or inhibiting adoption of the innovations (Malhotra 2010). The complete set of constructs was then adapted to our proposed research model. To make inferences about the factors we are investigating, collection of extensive information from a large enough sample is necessary; hence a quantitative approach was chosen. To quantify the relative salience of the adoption factors, we developed a descriptive, self-completed online survey questionnaire (Appendix 1). To test the effects of return on time, and privacy and security risks, a two-group posttest-only randomized experimental design was used (Trochim 2006). In this form of simple experiment, *"half the participants (the treatment group) receive a treatment, whereas the other half (the no-treatment group) receive no treatment"* (Mitchell and Jolley 2010, 336).

Our treatment comes in the form of a scenario, in which two different aspects were manipulated (Appendix 2). In short, to incorporate cloud characteristics and the consumer trend return on time, a fictitious application ("app") based on a real Starbucks app (Starbucks 2012) was described. Respondents were asked to imagine a situation in which they consumed coffee, tea, or baked goods daily. The app allowed the consumer to order coffee, tea or other baked goods that the fictitious national coffee bar chain "KaffeLarsen" offered. The free app could be downloaded and used on any device supporting apps regardless of operating system. It existed in two versions, one standard with commercials, and one premium that required a small one-time fee, featured no commercials and offered exclusive daily discounts and offerings to the user. The main differential aspects subjected to the treatment group were: 1) The app requested the user to provide his or hers payment information (increasing security and privacy risk) 2) the app was given the functionality of providing alternate store locations and estimated

travel time if the waiting time exceeded ten minutes. The customer could then either wait for the original selected order, or transfer the order to save time. Upon arrival, having already paid for their selected products through the app, users could instantly pick up the order (increasing return on time). To isolate the treatment's effect and infer any significant differences between the groups, all participants were given one link by the Qualtrics Survey software, which allowed respondents to independently assign themselves randomly to either the "no-treatment" or "treatment" scenario. The fictitious coffee bar chain "KaffeLarsen" was selected to avoid any consumer bias towards a well-known brand name. We utilize regression analysis to investigate the descriptive aspects of the sample data, and structural equation modeling (SEM) to make causal inferences about the proposed relationships in the model and hypotheses. Subsequently, the manipulation will allow us to compare means, using independent samples t-test, between the two groups to make some grounded comparisons.

In line with Andreassen, Calabretta and Olsen's (2012) research, segmentation based on the family life cycle model originally designed by Wells and Gubar (1966) was chosen to develop a deeper understanding of the different preferences of a specific customer group. We chose the segment named *"young, free and simple"* – young individuals aged approximately between the age of 20 and 30, who are working, studying or living on their own (or with a partner), with no kids (Andreassen, Calabretta and Olsen 2012). The segment was preferred mainly due to expected knowledge of the scenarios and general experience with today's level of technology. According to the Norwegian Central Bureau of Statistics (SSB), a rough estimate of our target segment population amounts to approximately some 465 000 consumers (Appendix 3). According to Mitchell and Jolley (2010, 285), a *"required sampling size is a function of population size and desired accuracy (within 5%, 3% or 1%) at the 95% confidence interval."* Minimum sample size required using random sampling when the size of the population is between 100 000 and 1 000 000, with a sampling error of 5 %, is 384 (Mitchell and Jolley 2010). However, we chose a nonprobability convenience sampling technique, largely due to considerations of feasibility, time and economic constraints (Pedhazur and Schmelkin 1991; Malhotra 2010). Hair et al. (2010) asserts that when using SEM, minimum recommended sample size should be approximately 500 respondents for models with large numbers of constructs, lower

communalities (below 0.45) and/or multiple underidentified constructs. However, as SEM research has matured, lenience on previous strict guidelines regarding sample size is often exercised (Hair et al. 2010) and sample sizes around 200 are seen as a current goal (Kenny 2012). In addition, with no underidentified constructs, a total sample size between 200-300 respondents is deemed sufficient to produce a stable and replicable solution.

Convenience sampling often yields biased answers because of volunteering respondents (Mitchell and Jolley 2010). However, we chose a large number of respondents by randomly disseminating the survey link through social media: Facebook, Twitter, blogs and discussion forums. We also utilized the snowball sampling technique by urging respondents to recruit more subjects within the target segments in their own network (Malhotra 2010). Although convenience sampling often does not register people without the time or desire to respond to surveys, by testing a specific demographic segment we ensure that our sample can be compared to the total target segment population. The sample is not confined only to students; it also includes respondents with various occupations. This increases its representativeness for the selected target segment, enhancing the external validity. Convenience sampling is often used in exploratory research, however, limitations exists regarding how representative the sample is to a population. We should therefore be careful when interpreting the results and exhibit caution when generalizing to a larger population.

6.2 Operationalization of the Variables

All items are based on previous research and they have been modified to fit the context and purpose of this study (Appendix 1). Fields of investigation in operationalizing the constructs include e-commerce, m-commerce, cloud computing and the adoption of handheld devices. In Chong, Chan and Ooi's (2012) study on consumer adoption of mobile services, the authors assert the importance of including demographic variables due to their significant influence on Internet usage activities. As mentioned, we focus on the segment "young, free and simple" and therefore include the control variables gender, age, marital status, and children. The applied survey method is a structured data collection with fixed alternative questions. A 7-point Likert scale using strongly disagree/agree measured all items. The only exception is adoption, measured using highly

probable/improbable. For the TAM constructs ease of use, perceived usefulness and attitude, some modification was necessary. The wording was changed in line with previous research to remove the emphasis on technology and IS systems in a work setting, to focus on consumer behavior (Davis 1989; Venkatesh et al. 2003: Wang and Benbasat 2005; Lee 2009; Liao and Tsou 2009). Regarding return on time, we used information and received guidance from the researchers currently working on the subject (Andreassen, Olsen and Calabretta 2012; Calabretta, Andreassen and Olsen Working Paper). The constructs privacy risk and security risk is based on research on perceived risk and trust in a TAM setting, closely related to our study, and the modifications needed were minimal (O'Cass and Fenech 2003; Featherman and Pavlou 2003; Kim, Ferrin and Rao 2008; Lee 2009; Saya, Pee and Kankanhalli 2010; Thomas 2011). Questions relating to availability were derived from a wide range of previously used constructs in technology research settings such as m-commerce, mobile wireless technology adoption and cloud computing (Åkesson 2007; López -Nicolás, Molina-Castillo and Bouwman 2008; Kim and Garrison 2009; Saya, Pee and Kankanhalli 2010; Board 2011). There were some challenges with finding good questions for scalability; these needed more work to be adapted into the study. The questions were based on Saya, Pee and Kankanhalli (2010) and items relating to trialability (Rogers 1995). All questions are based on English research and to make sure that the meaning was intact after we translated them to Norwegian, we asked colleagues to translate them back to English. This was done twice in order to reach satisfying results, and to check the robustness of the different items (Brislin 1980). Finally, our model is based on the idea that *"latent constructs cause the measured variables and the error results in an inability to fully explain these measured variables"* (Hair et al. 2010, 701). This is called a reflective measurement theory, as we draw the arrows from latent constructs to measured variables.

6.3 Validity and Reliability

Validity is the "*extent to which a measure or set of measures correctly represents the concept of study – the degree to which it is free from any systematic or nonrandom error"* (Hair et al. 2010, 3). Internal validity refers to whether the manipulation of the independent variables or treatments actually caused the observed effects on the dependent variables. According to Mitchell and Jolley (2010), there are three important challenges to appertain to when making causal

inferences. Firstly, covariance needs to be present. Secondly, the cause must precede the effect in time, and thirdly, one needs to isolate the cause of the effect to the treatment variable and exclude other possible factors. The first challenge may be met by measuring the variables using appropriate statistics. The second challenge is faced by creating two scenarios, with random appointment of respondents to each scenario. The third is confronted by instructing all respondents to use the scenario as a basis for their answers, to reduce the impact of individual differences. With everything else kept alike in the scenarios and random assignment, this design is intended to increase the internal validity and the strength of the causal inferences made in this study. Construct validity *"addresses the question of what construct of characteristic the scale is, in fact, measuring"* (Malhotra 2010, 320). This is a matter of the operationalization of the constructs in our study, and to what degree inferences can be made to the theoretical constructs on which the operationalization was based. Two important aspects of construct validity is convergent and discriminant validity. This relates to whether constructs that should relate to each other, are observed to do so, and constructs that are not supposed to relate to each other, are observed not to do so. To observe this, we examine the reliability of the constructs, average variance extracted and the correlation coefficient in a construct correlation matrix. Hair et al. (2010, 125) assert, *"Reliability is an assessment of the degree of consistency between multiple measurement of a variable."* Reliability indicates whether the proposed items of a construct actually measure the same thing. This is referred to as internal consistency reliability, and allows us to evaluate the consistency of results across related items. All constructs included in this thesis have at least three items, which is within the recommended range regarding statistical identification.

6.4 Pre-Test

We conducted a total of four pre-tests to validate if the two versions of the scenario were realistic and understandable. By allowing respondents to complete a feedback form (Appendix 1), any problems with the wording or meaning of the different items in the questionnaire were tested. We assigned 10-15 respondents in each scenario per pre-test, and made incremental improvements based on the feedback received. Pre-tests were conducted both at BI Norwegian Business School, and by dissemination of a link using various social media sites. In the first two pre-tests, respondents had problems imagining that they were a daily

consumer of coffee, and thought that ordering just coffee did not save them a lot of time. Alterations were made to include tea and other baked goods in addition to coffee, and to specify clearly in the beginning of the scenarios that the respondent consumed these products *daily* – as well as reminding the respondent throughout the survey to answer according to this situation. Item SC1 and SC2 were subject to some confusion in the early pre-tests, and were rephrased based on comments by respondents. Originally, the two different scenarios of the application were separated by a restriction of number of purchases allowed per week and a limited selection of services. After feedback of lack of realism, as most branded utility applications on todays market are free to download and offer unlimited selection and purchases, a change to "standard" and "premium" scenarios with commercials and rewards as separators were made in line with such services as "Spotify" and GPS applications. Lastly, cosmetic changes to wording and phrasing were conducted, and respondents indicated a completion time of 7-10 minutes.

IV. Results

7.1 Descriptive Statistics

7.1.1 Characteristics of the Sample

Using *Qualtrics* survey software to distribute our questionnaire, a total of 653 respondents were recorded in which 348 were completed. Malhotra (2010) asserts that response rates for e-mail and online surveys are usually low to very low, making our response rate of 53 % deemed satisfactory. Incomplete surveys were disregarded and unusual cases were deleted. Out of the total respondents, 238 were within the target segment "young, free and simple". Scenario 1 yielded 124 valid respondents and Scenario 2 yielded 114. In our final sample size of 238 respondents, 44.1 percent were male and 55.9 percent were female. 52.9 percent were between the age of 20-25, and 47.1 percent were between 26-30. 57.1 percent were single, and 42.9 percent were cohabiting. Naturally, no one in our sample was married or had children (Appendix 4). Regarding missing values, only item AN3 included a "do not know" option, in which 46 respondents out of 238 (19.3 percent) checked. Hair et al. (2010) asserts that when missing data ranges from 10-20 percent, ordinary least squares regression is one preferred method to impute missing values. We therefore utilized this method to *"adjust for nonresponse by assigning the characteristic of interest to the nonrespondents based on the similarity of the variables available for both nonrespondents and respondents"* (Malhotra 2010, 421) (Appendix 5).

7.1.2 Outliers

Outliers are *"observations with a unique combination of characteristics identifiable as distinctly different from the other observations"* (Hair et al. 2010, 64). A total of 12 extreme cases were found, mostly related to the items AN3 (respondent 78, 92, 147), EOU4 (66, 117, 140) and AV2 (21, 69, 113, 114) (Appendix 6). These can be naturally explained, as it is not unusual to download an application, but use it few times (AN3), and respondents might have reacted to the unusual wording "mental effort" (EOU4). Regarding AV2, a plausible explanation could be that these respondents believe it is useful that the application is accessible anywhere and from any device, but do not believe/think that KaffeLarsen is open "anytime". Out of the twelve extreme cases, respondent 72 (EOU1 and 2) and 114 (AV1 and 2) were subject for outlier designation.

However, a thorough check of the rest of the respondent's responses revealed no abnormalities, which led us to believe that their answers were sincere and valuable. Finally, we specifically compared the original mean for all the items with the new 5 % trimmed mean to see if the extreme scores were having a lot of influence on the mean. As these comparisons were very similar, it is not necessary to investigate these data points any further (Pallant 2011).

7.1.3 Means and Frequencies

An examination of *means* and *frequencies* (Appendix 7) suggests that the respondents value ease of use, availability and scalability. Questions relating to adoption of the service scores relatively poor, indicating that most respondents would download the application, but are unsure of how often they would use it. Furthermore, the majority of the respondents view the application as useful, giving them a relatively high return on time, resulting in a favorable attitude. Results are varying for the constructs privacy and security risk with mean scores exhibiting tendencies towards the "neither/nor" alternative. Item SR1, *"The security systems built into the application are not strong enough to protect my sensitive information"*, yielded a 39.5 percent response rate of neither agree nor disagree (Appendix 8). This indicates that respondents might not have enough information or knowledge about the security systems of applications in general, or in this specific situation. Another explanation might be that SR1 is poorly specified and hard to judge, thus being a candidate for deletion in further analysis.

7.1.4 Skewness and Kurtosis

Skewness is *"the tendency of the deviations from the mean to be larger in one direction than in the other"* and kurtosis *"a measure of the relative peakedness or flatness of the curve defined by the frequency distribution"* (Malhotra 2010, 488). Skewness values are recommended to be within the range of +1/-1. Values outside this range indicate a noticeably skewed distribution (Hair et al. 2010). 9 of the items in our analysis have a noticeably skewed distribution. 10 items indicate a peaked distribution and 24 items indicate a flattened distribution (Appendix 7). However, these effects are usually negligible for sample sizes over 200 respondents. An additional test using Kolmogorov-Smirnov statistic revealed significant results, indicating a violation of the assumption of distribution normality. However, significant results are common in larger samples, and closer

inspection of the normal probability plots reveals reasonably straight lines, suggesting normal distribution (Pallant 2011). Kolmogorov-Smirnov and normal probability plots are not attached due to large and illegible outputs.

7.1.5 Multicollinearity

To assess multicollinearity, we computed the mean score from all items relating to one construct and created a factor matrix with each of the independent variables (Malhotra 2010) (Appendix 9). Most constructs show correlations below 0.5, except for return on time and perceived usefulness, with a coefficient of 0.75. We did expect these to be distinct, although related, which is why we hypothesized that return on time would influence perceived usefulness. There is also a high correlation between privacy risk and security risk (0.807). Multicollinearity refers to a situation were three or more variables correlate, which may reduce a variable's predictive power. This does not seem to pose a problem in this data set.

7.2 Exploratory Factor Analysis (EFA)

EFA is an interdependence technique that can be employed to determine attributes that influence consumer choice or identify consumer characteristics (Malhotra 2010). Due to our research's exploratory nature some of these constructs are measured in a new setting; our objective is to use EFA to best define the underlying structure among our variables in the analysis (Hair et al. 2010). Pallant (2011, 183) asserts that the recommended sample size to conduct an EFA is ca. 300, but concedes that samples above 150 are sufficient when *"solutions have several high loading marker variables (above 0.8)."*

The initial EFA was run in SPSS using varimax rotation and principal component as the extraction method to identify dimensions that could represent a set of items. When the factors were extracted based on eigenvalues greater than one, a six-factor solution was provided. However, our a priori theoretical foundation indicated that our items should reflect nine factors. As the eigenvalues were close to one for the remaining three factors, we determined the number of variables to be extracted to nine and ran another EFA (Appendix 10). Through Bartlett's test of sphericity we conclude that overall results when testing the correlations are significant, meaning that significant correlations exist for an adequate number of variables. Additionally, the Kaiser-Meyer-Olkin measure for sampling adequacy

is 0.895, which exceeds the recommended value of 0.6 (Pallant 2011). Factor loadings in the rotated component matrix are significant if they load above 0.40 on only one factor. To account for more than one-half of the variance on a single factor, the loading should ideally be over 0.7 (Hair et al. 2010). The Item AN3 does not load significantly on the same factor as AN1 and AN2, but exhibits a high loading on factor eight, as the only item loading on this factor. Using other extraction and rotation methods indicates the same results, and in one case, the item was non-significant to any factors and exhibited communality values below 0.45 (0.161). This indicates that the item *"does not fit in well with the other items in its component"* (Pallant 2011, 198), and *"as not having sufficient explanation"* (Hair et al. 2010, 119), thus warranting deletion in this situation.

Subsequently, we ran another EFA without AN3 (Appendix 11). The EFA exhibited satisfactory Kaiser-Meyer-Olkin (0.896), significant Bartlett's test of sphericity statistics and communalities high above 0.45. When we specify additional factors in the EFA, we expect that several sets of items will cross load or load on the same factor. Normal practice is then to sort items to factors where the items have the highest cumulative loadings. In our case, both the perceived usefulness and attitude items exhibit high loadings (>0.8) on factor one. This is not surprising, as TAM literature has both theoretically and empirically established the relationship between perceived usefulness and attitude (Davis, Bagozzi and Warshaw 1989; Wu and Wang 2005; Chong, Chan and Ooi 2012). Both security risk and privacy risk items also exhibit high loadings (>0.7) on factor two, however this is also not surprising as theory and empiric research shows that privacy and security relates to overall perceived risk (Pavlou 2003; Lee 2009; Thomas 2011). Regarding cross loadings, the adoption items cross load on factor one and eight, loading the strongest on factor eight. The items related to return on time cross loads on both factor one and four, the strongest on factor four. The item SR1 cross loads on both factor two and nine as the only one of all the security risk and privacy risk items, and is also the only item with a significant loading on factor nine. As SR1 already has been questioned as either hard to judge or poorly specified (section 7.1.3), the item is removed from the analysis (Hair et al. 2010). Consequently, another EFA without SR1 was completed (Appendix 12), which exhibited satisfactory statistics and improved loadings. However, item EOU4 exhibits significant cross loadings on both factor four and nine, as the only

one of the ease of use items, and is the only significant loading on this factor. After several analyses using different extraction and rotation methods, the result persisted, and in one case the item exhibited a low communality of 0.328, warranting deletion (Hair et al. 2010). A reliability test of the ease of use items revealed that if item EOU4 is deleted, cronbach's alpha for the construct would increase. The item-to-total correlation of 0.48 is below the threshold of 0.5, weakening the internal consistency of the construct (Hair et al. 2010). This indicates that EOU4 is not a sufficient measure for ease of use in our context; we discard it from the analysis (Appendix 13).

Finally, another EFA without EOU4 was undertaken (Appendix 14), exhibiting satisfactory statistics, communality values and improved loadings. This solution demonstrated several high loadings on marker variables (above 0.8), thus validating our sample size (Pallant 2011). Still, factor loadings of the security risk and privacy risk items loaded only on factor two. The best way to appraise if these items belong to two distinct factors is through evaluating the discriminant validity by conducting confirmatory factor analysis (CFA). Finally, the loadings of AV3 and SC1 exhibit higher factor loadings on factor seven than the respective factors of the other availability and scalability items. However, opting for a maximum likelihood extraction method diminishes this result. Although this is a concern, theory dictates distinct differences between availability and scalability (Katzan 2009; Tsai, Sun and Balasooriya 2010), thus we proceed to conduct CFA.

7.3 Confirmatory Factor Analysis (CFA)

We use CFA to investigate the factor structure of the indicators included in the research. An evaluation of the measurement model's fit and reliability/validity estimates is necessary. The LISREL output statistics including syntax and path diagram with factor loadings is attached in appendix 15.

7.3.1 Measurement Model Fit

We first examine the goodness-of-fit statistics from the CFA output. The P-value is non-significant (0.00 < 0.05). The Chi-Square test is rejecting the model and suggests that the model fits the data poorly. However, this measure is often quite dependent on the sample size, and with sample sizes below 250 non-significant p-values should be expected (Hair et al. 2010). Generally, a Chi-square / degrees of

freedom ratio of 3:1 or less are associated with better-fitting models (when sample size < 750). The Chi-square value for our model is within the recommended levels, 729.03/398 = 1.83. This alone does not give a sufficient indication on the model's fit, and three other fit indices will be used in the assessment; (1) goodness-of-fit index (GFI) (2) comparative fit index (CFI), and (3) root mean square error of approximation (RMSEA). GFI is the ratio between the minimum of the fit function after the model has been fitted and the fit function before any model has been fitted. Values over 0.9 indicate a good fit. Our GFI = 0.7 indicates poor model fit and that the model does not come sufficiently close in replicating the observed correlation matrix. CFI is an incremental fit measure that assesses how well the estimated model fits relative to the baseline model. CFI assumes that all latent variables are uncorrelated, and compares the sample matrix with the estimate. The CFI is 0.98, which indicates a good model fit. Additionally, the RMSEA show a good value (0.059 < 0.7) and is within the acceptable threshold levels. All in all, the fit statistics are ambiguous, and the model does not show a clear and excellent fit. However, it depicts signs of predictive power with strong values in recommended indicators for model fit. Therefore the measurement model shows acceptable levels of fit and is regarded as appropriate for further exploration and structural equation modeling.

7.3.2 Construct Validity and Reliability

High loadings on factors indicate convergence on the latent construct. Ideally, loadings should be 0.7 or higher (Hair et al. 2010). Only AV3 and SC3 show loadings below 0.7 (0.63 and 0.67). This is not unnatural due to the exploratory nature of the research, and well above the rule of thumb on low-boundary values (0.5). A construct's average variance extracted (AVE) is a summary indicator of a construct's convergence, and a commonly used validity measure. Shown in table 2, all values are well above the rule of thumb of 0.5 or 50 percent. Less than 50 percent indicates that the explained variance in the item is lower then the error variance (Hair et al. 2010). Scalability measures worse than the other constructs, and shows weaker loadings, but within the recommended values.

Constructs	AVE
Adoption	74.45 %
Ease of Use	77.45 %
Perceived Usefulness	81.05 %
Availability	74.03 %
Scalability	53.15 %
Return on Time	90.74 %
Security Risk	76.30 %
Privacy Risk	75.08 %
Attitude	86.54 %

Table 2: Average Variance Extracted

Construct Reliability is an indicator of convergent validity. Reliability is necessary, but not sufficient for a valid measurement model (Malhotra 2010). We include both Cronbach's alpha and construct reliability as reliability measures. As depicted in table 3 below, all values are well within the recommended ranges (above 0.7) (Hair et al. 2010).

Construct Reliability	
Adoption	0.85
Ease of Use	0.91
Perceived Usefulness	0.95
Availability	0.89
Scalability	0.77
Return on Time	0.98
Security Risk	0.91
Privacy Risk	0.94
Attitude	0.96

Cronbach's Alpha	
Adoption	0.796
Ease of Use	0.824
Perceived Usefulness	0.931
Availability	0.81
Scalability	0.676
Return on Time	0.976
Security Risk	0.89
Privacy Risk	0.923
Attitude	0.953

Table 3: Construct Reliability and Cronbach's Alpha

Checking whether the proposed constructs are distinct from each other tests discriminant validity. In the EFA, security risk and privacy risk loaded on the same construct. This is not surprising with risk as the general theme in both measures. However, as they are theoretically distinct, we chose to keep them separate. To determine if this is a problem, we compare the squared correlation between the two proposed constructs with their average variance extracted. The squared correlation is 0.64, which is less than both constructs' AVE. Thus, the constructs show sufficient signs of discriminant validity (Hair et al. 2010).

Modification indices indicate that paths between availability to indicators for scalability, and vice versa, should be freed. The strongest decrease in Chi-square

would follow from freeing the path from availability to SC1. These constructs may overlap since respondents may interpret scalability from a free version to a paid version with more features, as availability of a free version. The constructs then become more linked to each other. Some form of similarity between the two is not surprising, and they are both hypothesized to be indicators of perceived usefulness, but only availability show significant results. This does not represent a validity problem, as their correlation does not show problematically high value (0.404), and there are no other indicators of lack of discriminant validity.

7.4 Structural Equation Modeling (SEM)

We now shift our focus to the relationships between constructs. LISREL output statistics including syntax and path diagram of the estimated structural model can be viewed in appendix 16. When assessing the validity of the estimated structural model, we need to look at the fit, compare the proposed structural model with competing models and test the structural relationships and hypotheses (Malhotra 2010). As SEM models are normally used in nonexperimental situations where *"the exogenous constructs are not experimentally controlled variables"*, it limits our ability to draw causal inferences (Hair et al. 2010, 644). However, if *covariation, sequence, nonspurious covariation and theoretical support* are reflected in the structural model, we can treat dependence relationships as causal. *Covariation* is tested in section 7.4.3 by examination of the covariance (correlation) in the structural relationships between constructs. We manipulate the variables return on time, and security- and privacy risk to test *sequencing*. We use well-established empirical research as *theoretical support* to provide cause-and-effect relationships. *Nonspurious covariance* tests if we have spurious relationships in our model, i.e. false or misleading relationships between constructs. Here, *"a lack of collinearity among the predictors is desirable"* (Hair et al. 2010, 645). We confirmed no problems with multicollinearity in section 7.1.5, and in section 7.4.4 we test for spurious relationships by investigating mediating effects. Finally, we need to specify if the structural model is recursive or nonrecursive. Our structural model is recursive, meaning that the *"paths between constructs all proceed only from the antecedent construct to the consequences (outcome construct). No construct is both a cause and an effect of any other single construct"* (Hair et al 2010, 691).

7.4.1 Structural Model Fit

A recursive structural model has either fewer or an equal number of relationships than the measurement model, which means that comparatively less parameters are estimated. Therefore, a recursive structural model cannot have a better fit, because the Chi-square has to be higher than the measurement model. Consequently, *"the fit of the measurement model provides an upper bound to the goodness of fit of a structural model"* and *"the closer the fit of a structural model is to the fit of a measurement model, the better"* (Malhotra 2010, 737). Our structural model is found to have reasonably good fit, as Chi-square = 739.48, Chi-square / degrees of freedom ratio = 1.8, p-value = 0.00, GFI = 0.70, RMSEA = 0.058, and CFI = 0.98. This is just slightly below the values of the measurement model, indicating a very small difference between the measured and structural model. When comparing the standardized estimates from the structural model (Appendix 16) with the measurement model (Appendix 15), we find no differences larger than 0.05, ergo there exists no inconsistencies between the two models (Malhotra 2010).

7.4.2 Comparison with Competing Models

Here, the objective is to check that the proposed model performs better than an alternative model. After examining the modification indices in the LISREL output, we ran two different versions of the model that proposed the biggest decrease in Chi-Square and improvement of model fit. First, a path was added from ATT1 to perceived usefulness. Second, we added an error covariance between ATT3 and AN1. One should be careful when interpreting the modification indices, as these are not based on theory, and in our case, they did not make theoretical sense. This is not a big issue for this model however, as none of the changes yielded results that showed significant improvement of model fit. To significantly improve model fit, the Chi-square should decrease by more than 3.84 (Hair et al. 2010). The reduction in Chi-square for the two new models, were 3.11 and 0.93 respectively. These changes did not alter the parsimony normed fit index (PNFI) of 0.85. The PNFI is used to compare models and the highest value indicates the most supported model (Hair et al. 2010). Based on these findings we conclude that competing models do not perform better than the structural model.

7.4.3 Structural Relationships and Hypotheses

The next step is to examine if the individual parameter estimates that represent each specific hypothesis are statistically significant and in the predicted direction (Hair et al. 2010). For a positive relationship, the parameters should be greater than zero and less than zero for a negative relationship. LISREL specifies that any t-value smaller than 1.96 in magnitude will be deemed non-significant. We will also examine the variance-explained estimates for the endogenous constructs, using the R^2 values of the structural equations.

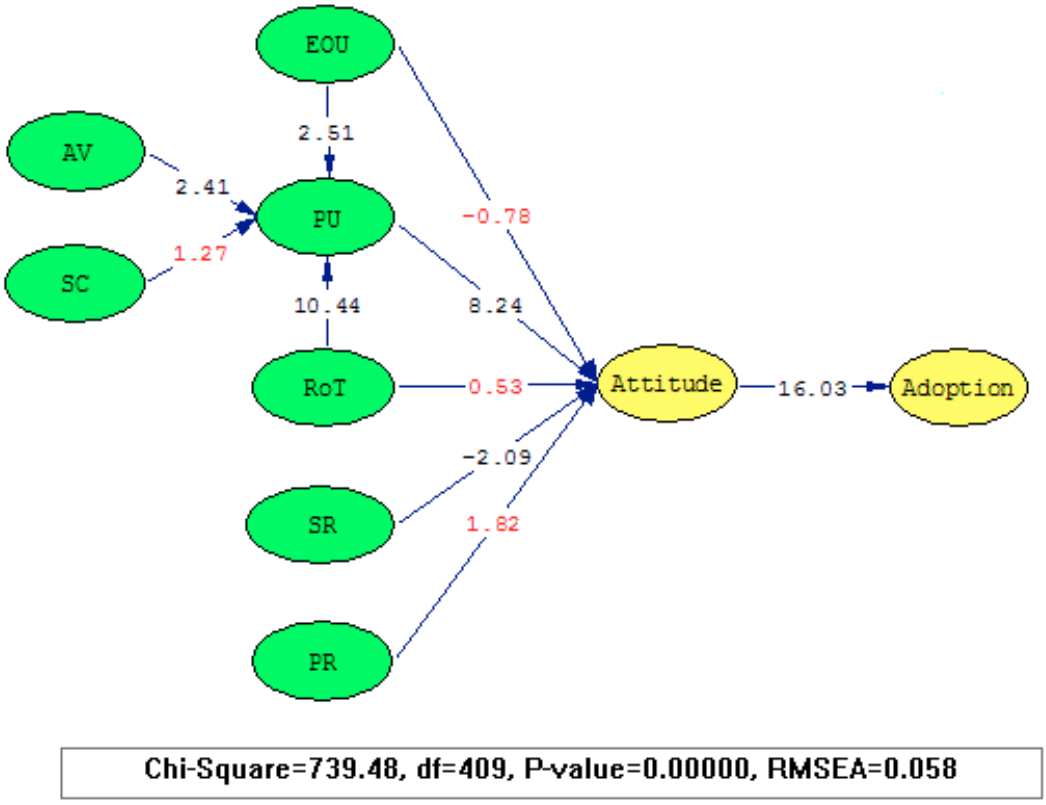

Figure 3: Path Diagram Structural Model – T-Values

Paths	Parameter Estimates	T-Values	Significance
EOU ⇒ ATT	-0.05	-0.78	Non-Significant
EOU ⇒ PU	0.13	2.51	Significant
AV ⇒ PU	0.17	2.41	Significant
SC ⇒ PU	0.11	1.27	Non-Significant
ROT ⇒ PU	0.65	10.44	Significant
PU ⇒ ATT	0.80	8.24	Significant
ROT ⇒ ATT	0.05	0.53	Non-Significant
SR ⇒ ATT	-1.11	-2.09	Significant
PR ⇒ ATT	0.97	1.82	Non-Significant
ATT ⇒ AN	0.76	16.03	Significant

Table 4: Structural Model Relationship Values

Presented in figure 3 and table 4, the relationship between ease of use and attitude display a negative parameter close to zero and non-significant t-value, leaving H1a not confirmed. This is contradictory to most other studies using TAM, and could indicate that consumers are becoming more tech-savvy and used to what was before regarded as complex systems. Ease of use, availability and return on time are all positive, significant drivers of perceived usefulness, confirming H1b, H2a and H3b. An easy-to-use app with superior availability, which yields a high return on time, increases the application's perceived usefulness. The positive relationship between scalability and perceived usefulness is non-significant, thus H2b is not supported. Perceived usefulness and security risk are positive and negative significant drivers of attitude respectively, confirming H2c and H4. The relationship between return on time and attitude proved, although marginally positive, to have a non-significant t-value, thus H3a is not confirmed. This suggests that return on time does not directly influence our attitude when using the utility app in our experiment. An explanation could be attributed to the vast amount of outlets offering coffee, tea and/or baked goods in Norway, as large supplies in convenient locations may lead to a general perception of short waiting time. The path between privacy and attitude reveals another interesting value; its parameter estimate is positive and its t-value just below the significant value of 1.96. Although H5 is not supported, the path is positive, which contradicts the hypothesis. A conceivable explanation could be that consumers are either not aware of the current privacy risks or has yet to experience viruses/malicious attacks or exploitation of their private data using cloud technology. Finally, the relationship between attitude and adoption/non-adoption exhibits a high positive parameter estimate and highly significant t-value, confirming H6.

Structural Equations	Errorvar.	R^2
Adoption = 0.76*Attitude	0.42	0.58
Perceived Usefulness = 0.13*Ease of Use + 0.17*Availability + 0.11*Scalability + 0.65*Return on Time	0.29	0.71
Attitude = 0.80*Perceived Usefulness - 0.050*Ease of Use + 0.051*Return on Time - 1.11*Security Risk + 0.97*Privacy Risk	0.16	0.84

Table 5: Structural Equations Values

From table 5, we observe that the model accounts for 58 percent of the variation in adoption, and that attitude is a strong driver of the likelihood of consumer

adoption. The model explains 71 percent of the variation in perceived usefulness where, interestingly, return on time is the strongest driver. Availability and ease of use seems to be about equally important. The model accounts for 84 percent of the variation in attitude. Of the significant drivers, security risk is the strongest negative driver, followed by perceived usefulness as the strongest positive. This indicates that the lower the perceived security risks and higher the perceived usefulness of the application, the higher the attitude toward the service is, and the more likely it is that consumers will adopt the innovation.

7.4.4 Mediating Effects

Hair et al. (2010, 766) assert, *"A mediating effect is created when a third variable/construct intervenes between two other related constructs*." Based on the structural relationships and underlying theoretical assumptions in our SEM, we find it interesting to examine the following three relationships: 1) whether privacy risk has an indirect effect on attitude mediated by security risk, 2) whether privacy risk has an indirect effect on attitude mediated by perceived usefulness, and 3) whether scalability has an indirect effect on perceived usefulness mediated by availability. Baron and Kenny (1986) propose a set of three steps, analyzing the coefficients and equations for the relationships where mediation effects are suspected to be present (Appendix 17). In relationship 1), both the independent variable and the mediator variable became insignificant indicating no mediating effects. Both relationship 2) and 3) did not exhibited mediating effects due to unchanged significant values. Additionally, we hypothesized that both ease of use and return on time should be mediated by perceived usefulness. This was vindicated by our mediation analysis. As the estimated relationships between constructs remained unchanged when adding a mediating variable, we deem the relationships as nonspurious, adding causal power to our model (Hair et al. 2010).

7.5 Comparison Between Groups

To compare means between the treatment and no-treatment group, we utilized independent-samples t-test in SPSS. Firstly, Levene's test was applied to check for equality in the two groups (Appendix 18). The test was not significant, indicating homogeneity in the variance. This is assumed in the t-test, and therefore an important prerequisite to further interpret the findings. Return on time was manipulated in the second scenario to provide what was expected to be more

desirable rewards for using the application. However, the difference was not significant. The mean is higher for the treatment group, but as the difference is not significant at a 95 % confidence interval, we cannot prove that this is due to the treatment and not chance. Therefore H7 is not supported; return on time does not have significantly stronger influence on attitude in the treatment group. Privacy- and security risk were also manipulated in the second scenario. By asking the respondents to provide more sensitive information, the perceived risks seemed larger, and the results were significant in a 95 % confidence interval. Based on these findings, H8 and H9 are supported. Privacy and security risks have significantly stronger negative effects on attitude in the treatment group.

7.6 Main Findings Summarized

Hypotheses	Result
H1a: Ease of use will have a positive, direct impact on attitude towards cloud technology.	Not Supported
H1b: Ease of use will have a positive, indirect impact mediated by perceived usefulness, on attitude towards cloud technology.	Supported
H2a: Perceived usefulness will have a positive, direct impact on attitude towards cloud technology.	Supported
H2b: Scalability will have a positive effect on the perceived usefulness of cloud technology.	Not Supported
H2c: Availability will have a positive effect on the perceived usefulness of cloud technology.	Supported
H3a: Return on time will have a positive effect on the attitude towards cloud technology.	Not Supported
H3b: Return on time will have a positive, indirect impact mediated by perceived usefulness, on attitude towards cloud technology.	Supported
H4: Security risk will have a negative effect on the attitude towards the use of cloud technology.	Supported
H5: Privacy risk will have a negative effect on the attitude towards the use of cloud technology.	Not Supported
H6: Attitude towards the use of cloud technology will have a positive effect on consumers' adoption of cloud technology.	Supported
H7: Return on time will have a significantly stronger effect on attitude towards cloud technology in the treatment group.	Not Supported
H8: Security risk will have a significantly stronger negative effect on attitude towards cloud technology in the treatment group.	Supported
H9: Privacy risk will have a significantly stronger negative effect on attitude towards cloud technology in the treatment group.	Supported

Table 6: Main Findings Summarized

V. Discussion and Managerial Implications

8.1 Discussion

This thesis is written in response to the need of consumer related research to cloud technology services. Our primary contribution is therefore to integrate constructs previously applied and empirically verified in a B2B cloud technology research setting, and for the first time test these in a B2C context. These cloud characteristics along with the consumer trend return on time, grounded in Andreassen, Calabretta and Olsen (2012) and Calabretta, Andreassen and Olsen's (Working Paper) research investigating trend spotting and innovation, are proposed as antecedents to the well-known TAM constructs attitude and adoption. The proposed model is structured consistently with prior theory and research on attitude and adoption/non-adoption and their antecedents. Consequently, our research contributes to the extension and fusion of TAM and the theory of innovation adoption in a cloud technology setting. As previously explained, we test for causal relationships in this study, and as a result of the findings in the SEM analysis, dependence relationships will be treated as causal. The findings in this research demonstrate that the much-used TAM is applicable in a B2C setting to explain adoption of innovations in the cloud. The original constructs of TAM however are not enough, and we are only at the starting point of revealing the complicated dynamics within consumer behavior in cloud computing technology.

The results show that perceived usefulness is the strongest driver of attitude towards a cloud technology service, increasing the service's adoption rate. In line with current research (Dredge, 2011), focus on customer-centric approaches (Bettencourt and Ulwick 2008) and current consumer trends (Andreassen, Calabretta and Olsen 2012) have revealed functionality, simplicity and timesaving, as corner stones of what consumers really want. Consequently, when consumers hire products or services to do a job, perceived usefulness determines their general opinion, positive or negative. Moreover, security risk exhibits a significant relationship with attitude and as hypothesized, an inverse relationship. This indicates awareness among consumers that there are challenges in storing information in a secure manner. The findings of security risk as an inhibitor of adoption are in line with Lee's (2009) findings in his research on online banking. In that context security is obviously crucial, but our findings indicate that

concerns about fraud and identity theft are present in this research's context as well. With this in mind, it is somewhat surprising to find a non-significant relationship between privacy risk and attitude. A plausible explanation could be that while consumers are aware that there are risks, they are not overly concerned with, or convinced, that this will have negative consequences for them. There is little knowledge about what the "terms of use" are for many applications (Svantesson and Clarke 2010; Sachdeva, Kumaraguru and Capkun 2011), and that they may ask for access to personal details such as your contact list. While consumers recognize that there are risks, they may take for granted that they are protected. On this note, Wu and Wang (2005) argued that the effects of perceived risk might be mitigated by advantages with the proposed technology. Low price, convenience, and experience with apps, may all contort users' judgments of the risks associated with applications, or give them incentive enough to ignore them.

Ease of use, availability and return on time are all positive, significant drivers of perceived usefulness. Ease of use has been proven to influence perceived usefulness countless times before, interesting in this context is that the relationship directly to attitude is not significant. Lee (2009) found similar results where perceived usefulness mediated the effects of ease of use. A possible explanation for this may be the improved user interface of smartphones, which was a crucial determinant in explaining their rapid diffusion, and made the technology possible to use for people with less insight in technological development and gadgets. Ease of use then becomes less of a concern. Additionally, products tend to emulate each other, reducing the effort needed to understand different formats and new upgrades, leading consumers to become increasingly competent in using them (i.e. companies imitating Apple's iPhone).

Availability has been one of the major drivers for B2B cloud technology, and that consumers appreciate the possibility to use online applications on more than one device regardless of location is not surprising. More interesting is the less researched construct return on time, which was actually the strongest predictor of consumers' perceived usefulness towards the application. With a more dynamic society where stress and time constraints become more and more pressing, utility applications allow consumers to perform tasks which it was previously necessary to be at work or home with stationary computers to perform, at any time. These

applications cater to a need in consumers to make the most of their time to ultimately spend it in a more preferable way. Another important attribute in the B2B cloud market is scalability. The insignificant result here was surprising, and could indicate that the application used as an example was less suited to represent the value this characteristic may actually provide consumers. Additionally, this feature is more prominent in the professional market, where small changes in costs on storage and up-time for servers may yield great economic savings and scale advantages in the management of comprehensive IT structures.

The relationship between attitude and adoption was also shown to be significant. Not all products and categories have this relationship, and consumers may be very positive to a service without acquiring it due to price, inconvenience or other factors. For applications however, the price is normally around 7 or 14 NOK (1 or 2 $), which is not a major obstacle, and they are easy to download. Respondents in our segment are young and urban, they are expected to be quite tech-savvy, and the majority already uses smartphones. This may further reduce any potential inhibitions to download the application. In TNS Gallup's survey, it was shown that 57 percent of Norway's population owned a smartphone at the end of 2011, which was an 11 percent increase from the beginning of the year (Sørum 2012).

8.2 Managerial Implications

In the introduction we noted that the number of consumers to use low-cost applications is forecasted to reach 160.6 million by 2015 (ABI Research 2010), and the growth of connected devices is expected to reach 22 billion within the next decade (IMS Research 2010). Coupled with increased demand for mobility and convenience (Board 2011), consumers' incentives to move to the cloud and use applications anywhere, anytime and on any device are vastly increasing. Therefore, companies wishing to ride this wave of innovation are depending upon research to avoid flops. We challenged market-oriented innovators to focus on how consumers actually use new technological solutions and the motivation behind to create sustainable innovations. To best achieve this, our research suggests the following managerial implications for marketers, managers and manufacturers that whish to effectively target the segment *young free and simple.*

First, a positive attitude towards the innovation is strongly related to adoption. To increase the likelihood that the attitude of consumers is positive, the management should ensure that the innovation is perceived useful and that security risks are perceived as minimal. Second, to achieve high perceived usefulness, companies should focus on improving consumers' perception of return on time, the higher the better. Although it is fair to assume that the target segment is relatively tech-savvy users, an application that is perceived to be easy to use will elevate perceived usefulness. Applications should also be available anytime, anywhere on any device, catering to the need of flexibility, convenience and mobility. This means that applications should feature easy to use attributes such as information of the fastest way to achieve a goal and technology that syncs all data instantly to more devices without any configuration or other obstacles for the consumer. This should be presented in an intuitive interface, tailor made for both novice and experienced technology users. Both our "inspiration application" by Starbucks and Spotify's application for tablets, smartphones and PC are excellent examples of said attributes. Usefulness and functionality that provide return on time increases our attitude towards the application. Therefore, in accordance with Dredge (2011), companies should seek to introduce innovations that solve a problem or provide genuinely meaningful features. By focusing on how consumers actually use new technology and the motivation behind, companies should realize that in our context, our application is not simply a coffee, tea or baked goods application, it is an application providing freedom of choice for breakfast, lunch, a break or a date, freeing up time that could be better spent elsewhere. Moreover, although privacy risk and scalability were insignificant predictors of perceived usefulness and attitude, current trends and research still underscore their importance, and need to be regarded by management. From these results it is reasonable to conclude that consumer's likelihood of adopting a new innovation using cloud technology is strongly influenced by the level of availability, return on time and ease of use constituting the total perceived usefulness of the application. Furthermore, in addition to having strong and secure systems to protect the application, the security measures must be clearly communicated to reassure the consumers. To conclude, the above factors are needed to transform the cognitive perceptions of consumers into tangible actions leading to actual adoption and use of the application.

VI. Limitations and Future Research

8.1 Limitations

As we test a customized and modified TAM in a new technology context specified for consumers, this thesis contains limitations that should be addressed and evaluated in relation to the results and managerial implications. Consistent with the majority of other TAM studies, our study has a self-reporting usage limitation. As the scenarios are fictitious, albeit based on a real application, our study could be subject to the common method bias, because we cannot assume that self-reported usage will reflect actual usage. This could distort and/or exaggerate the causal relationships in our model (Lee, Kozar and Larsen, 2003). Another limitation is that we have only examined one type of cloud technology and one specific utility application offering certain goods and services. Although our sample is relatively heterogeneous within the target segment selected, the respondents were asked to evaluate one single task at a single point of time. Furthermore, the relatively low sample size (N=238) is below the recommended sample size of 300-500 (Hair et al. 2010). Due to time and economic constraints, we also utilized a convenience sampling technique using social media, inferring self-selection biases of the subjects. Moreover, the sample is restricted to Norwegian respondents, concentrated in urban areas, providing a skewed distribution. As all of the scales utilized in this study are derived from English written research, some items might have lost their meaning when translating them to Norwegian. Taken together, this means that our findings are mostly applicable to our context and our selected target group, decreasing generalizability.

Using scenarios also poses limitations. Although we pre-tested the scenarios on both respondents and scholars, it still exists possibilities that the scenarios should have been reformulated or changed. The two-group experimental design utilized is susceptible to social interaction threats, we do not know if participants have interacted with each other, learning the different conditions of the scenarios. This could result in the diffusion or imitation of treatment, compensatory rivalry, resentful demoralization or compensatory equalization of treatment, threatening internal validity (Trochim, 2006). Another concern relates more specifically to our individual constructs. Return on time is a construct developed by Andreassen, Calabretta and Olsen (2012) and Calabretta, Andreassen and Olsen (Working

Paper), the latter currently being a work in progress without substantial empirical evidence. Moreover, we do not know if our respondents have a high or low risk threshold, as we do not measure the risk tolerance of our respondents (Stern et al. 2008). Finally, the availability and scalability constructs exhibited cross loadings, indicating that the items could be changed or applied in different settings to obtain more accurate measures. Consequently, further research is needed.

8.2 Future Research

Similar to Lee (2009), conclusions of this study is based on cross-sectional data and thus our model represents a snapshot in time. To stricter test our hypotheses, a longitudinal experiment will allow researchers to investigate our model in different time periods and make subsequent comparisons, providing a deeper understanding for application adoption. Pavlou (2003) notes that novice consumers rely more on brand names and reputation when choosing to adopt a new service, whereas experienced users rely on other factors. Since our constructs, especially ease of use, perceived usefulness and risk, could be influenced by experience; future research should examine different real or fictitious brand names with varying reputation to see if differences between novice and experience exist. Furthermore, future studies should test our model in different contexts, using a "real" fictitious app to observe participants actual, not self-reported use. Other services using cloud technology could also be tested, for example Drop Box, Google Docs, Apple's iCloud or non-utility applications. Additionally, cultural dimensions could be investigated using cross-cultural segments, and other segments represented in the family life cycle could be tested to gain a deeper insight into consumers' cloud technology adoption. Lastly, other constructs than return on time and risk could be manipulated and other adoption factors and different consumer trends included and tested in the model. Consumer cloud technology research are still in its infancy compared to studies conducted in a B2B setting, advocating more investigation of TAM and cloud computing in various consumer-focused contexts (Agarwal and Prasad, 1997; O'Cass and Fenech, 2003; Armbrust et al. 2010; Low et al., 2011; Schewe et al. 2011).

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VIII. Appendices

Appendix 1 – The Survey

Format adapted from Thomas (2011). A seven-point likert scale is used (strongly disagree-agree). Other scales are specified in brackets if used. Norwegian translation of the items is specified in italics under "Scale Items".

Construct	Item No	Scale Items	Source
Ease of Use (Reflective)	EOU1	Learning to use this application would be easy to me. *For meg ville det være lett å lære seg denne applikasjonen.*	Adapted from Davis 1989; Venkatesh et al. 2003; Lee 2009; Liao and Tsou 2009.
	EOU2	It is easy to get this application to do what I want it to do. *Det er lett å få denne applikasjonen til å gjøre hva jeg vil den skal gjøre.*	
	EOU3	It is easy to understand how to use this application. *Det er lett å forstå hvordan jeg kan bruke denne applikasjonen.*	
	EOU4	Using this application does not require a lot of mental effort. *Å bruke denne applikasjonen krever ikke mye mental anstrengelse.*	
Perceived Usefulness (Reflective)	PU1	Using this application would be helpful. *Å bruke denne applikasjonen vil være hjelpsomt.*	Adapted from Venkatesh et al. 2003; Wang and Benbasat 2005; Lee 2009; Liao and Tsou 2009.
	PU2	By using this application I will become more effective when purchasing coffee, tea and/or bakeries. *Ved å bruke denne applikasjonen, vil jeg bli mer effektiv når jeg kjøper kaffe, te og/eller bakervarer.*	
	PU3	Using this application would make it easier for me to purchase coffee, tea and/or bakeries. *Å bruke denne applikasjonen vil gjøre det lettere for meg å kjøpe kaffe, te og/eller bakervarer.*	
	PU4	Overall, using this application is useful. *Alt i alt, å bruke denne applikasjonen er nyttig.*	
Availability (Reflective)	AV1	It is useful that the application is accessible from anywhere. *Det er nyttig at applikasjonen er tilgjengelig hvor som helst.*	Adapted from Åkesson 2007; López-Nicolás, Molina-Castillo and Bouwman 2008; Kim and Garrison 2009; Saya, Pee and Kankanhalli 2010; Board 2011.
	AV2	It is useful that the application is accessible anytime. *Det er nyttig at applikasjonen kan brukes når som helst.*	
	AV3	It is useful that the application is accessible from any device. *Det er nyttig at applikasjonen kan brukes fra forskjellige elektroniske plattformer.*	

Scalability (Reflective)	SC1	It is useful that I can increase or decrease my usage of the application based on what fits my needs. *Det er nyttig at jeg kan øke eller redusere min bruk av applikasjonen etter hva som passer mine behov.*	Adapted from Rogers 1995; Saya, Pee and Kankanhalli 2010 and based on literature review.
	SC2	It is useful that the application allows me to chose a standard or premium version according to my needs and preferences. *Det er nyttig at applikasjonen lar meg velge en standard- eller premiumversjon basert på mine egne behov og preferanser.*	
	SC3	It is useful that the amount I pay for the application reflect my usage. *Det er nyttig at beløpet jeg betaler for applikasjonen reflekterer mitt bruk.*	
Return on Time (Reflective)	ROT1	This application would help me get more out of my time. *Denne applikasjonen vil hjelpe meg å få mer ut av tiden min.*	Adapted from Calabretta, Andreassen and Olsen Working Paper.
	ROT2	This application would help me manage my time better. *Denne applikasjonen vil hjelpe meg med å administrere tiden min bedre.*	
	ROT3	By using this application I will save time that I may spend on other activities. *Ved å bruke denne applikasjonen vil jeg spare tid som jeg kan bruke på andre aktiviter.*	
	ROT4	By using this application I would be able to optimize the use of my time. *Ved å bruke denne applikasjonen vil jeg være i stand til å optimalisere tidsbruken min.*	
Security Risk (Reflective)	SR1	The security systems built into the application are not strong enough to protect my sensitive information. *Sikkerhetssystemene til applikasjonen er ikke sterke nok til å beskytte min sensitive informasjon.*	Adapted from O'Cass and Fenech 2003; Featherman and Pavlou 2003; Kim, Ferrin and Rao 2008; Lee 2009; Saya, Pee and Kankanhalli 2010, and based on literature review.
	SR2	I am worried about using this application because this application might loose my sensitive information. *Jeg er bekymret for å bruke denne applikasjonen fordi applikasjonen kan miste min sensitive informasjon.*	
	SR3	I am worried about the security of my sensitive information because it is not stored on my device. *Jeg er bekymret over sikkerheten til min sensitive informasjon ettersom den ikke er lagret på mitt elektroniske apparat.*	
	SR4	I do not feel safe providing sensitive information about myself to the application. *Jeg føler meg ikke trygg på å oppgi sensitiv informasjon om meg selv til denne applikasjonen.*	
Privacy Risk (Reflective)	PR1	I am worried that the owner of this application could provide my sensitive information to other companies without my consent. *Jeg er bekymret over at eieren av denne applikasjonen kan gi*	Adapted from Featherman and Pavlou, 2003;

		min sensitive informasjon videre til andre firmaer uten min autorisasjon.	Kim, Ferrin and Rao 2008; Thomas, 2011.
	PR2	I am worried that the owner of this application could use my sensitive information for other purposes without my authorization. *Jeg er bekymret over at eieren av denne applikasjonen kan bruke min sensitive informasjon til andre formål uten min autorisasjon.*	
	PR3	There is a chance that using the application will cause me to lose control over my sensitive information. *Det er en sjanse for at bruk av denne applikasjonen vil føre til at jeg mister kontrollen over min sensitive informasjon.*	
	PR4	Internet hackers (criminals) might take control of my sensitive information if I use this application. *Internetthackere (kriminelle) kan ta kontroll over min sensitive informasjon hvis jeg bruker denne applikasjonen.*	
	PR5	I am worried about using the application because other people may be able to access my sensitive information. *Jeg er bekymret for å bruke applikasjonen fordi andre mennesker kan være i stand til å få tilgang til min sensitive informasjon.*	
Attitude (Reflective)	ATT1	Using this application is a good idea. *Det er en god ide å bruke denne applikasjonen.*	Adapted from Bruner II and Kumar 2005; Lee 2009; Liao and Tsou 2009; Thomas 2011.
	ATT2	My attitude towards this application is positive. *Min holdning til denne applikasjonen er positiv.*	
	ATT3	It would be beneficial to use this application. *Det vil være gunstig å bruke denne applikasjonen.*	
	ATT4	In my opinion, it is desirable to use this application. *I min mening er det ønskelig å bruke denne applikasjonen.*	
Adoption vs. Non-adoption	AN1	I intend to use this application. (Highly improbable/probable) *Jeg kommer til å bruke denne applikasjonen. (Svært usannsynslig/sannsynlig)*	Adapted from literature review.
	AN2	I intend to upgrade to the premium version of this application. (Highly improbable/probable) *Jeg kommer til å oppgradere til premiumversjonen av denne applikasjonen. (Svært usannsynslig/sannsynlig)*	
	AN3	Based on the scenario, how often would you use this application? (Daily, three times or more a week, less than three times a week, do not know) *Basert på historien, hvor ofte ville du brukt denne applikasjonen? (Daglig, tre eller flere ganger per uke, færre enn tre ganger per uke, vet ikke)*	
Control Questions	CQ1	Age? (under 20, 20-25,26-30, over 30) *Alder? (under 20, 20-25,26-30, over 30)*	Adapted to fit the segment "Young free and simple"

	CQ2	Sex? (male, female) *Kjønn? (mann, kvinne)*	(Andreassen, Calabretta and Olsen 2012).
	CQ3	Do you have kids? (yes, no) *Har du barn? (ja, nei)*	
	CQ4	Marital status? (single, cohabiting, married) *Sivilstatus? (singel, samboer, gift)*	
Pre-test Questions	PT1	The situation described in the scenario is realistic. *Situasjonen beskrevet i historien er realistisk.*	Manipulation checks and feedback questions.
	PT2	I had no problems imagining myself in the situation described in the scenario. *Jeg hadde ingen problemer med å se meg selv i situasjonen som er beskrevet i historien.*	
	PT3	Did you clearly understand what you were supposed to answer in the survey? If not, why? (Open-ended) *Forstod du tydelig hva du skulle svare i spørreundersøkelsen? Hvis ikke, hvorfor? (Åpent)*	
	PT4	Did you wonder about anything when you answered the survey? If yes, What? (Open-ended) *Var det noe du lurte på når du svarte på spørreundersøkelsen? Hvis ja, hva da? (Åpent)*	
	PT5	Was the scenario clear and understandable? If not, why? (Open-ended) *Var historien klar og forståelig? Hvis ikke, hvorfor? (Åpent)*	
	PT6	Was the step-by-step description of how the app works logical and understandable? If not, why? (Open-ended) *Var den stegvise beskrivelse av hvordan appen fungerer logisk og forståelig? Hvis ikke, hvorfor? (Åpent)*	
	PT7	Approximately how long time did it take to answer the survey? (Open-ended) *Omtrent hvor lang tid tok det å gjennomføre spørreundersøkelsen? (Åpent)*	
	PT8	Do you have any other comments? (Open-ended) *Har du noen andre kommentarer? (Åpent)*	

Appendix 2 – The Scenario

Norwegian Version

Sett deg selv inn i denne situasjonen og besvar alle spørsmål som om du er en daglig kjøper av kaffe, te og/eller bakervarer.

Tenk deg følgende:

Du har akkurat lastet ned en applikasjon ("App") på smarttelefonen din. Appen er gitt ut av KaffeLarsen, et firma som eier en landsdekkende kjede av kaffebarer i Norge. Appen lar deg bestille kaffe, te og/eller andre bakervarer som KaffeLarsen tilbyr.

Appen har følgende egenskaper:

1. Appen kan brukes på alle elektroniske apparater (PC, nettbrett, smarttelefoner, etc.) som støtter applikasjoner uavhengig av plattform (Apple, Android, etc.). ***(Availability, Usefulness)***

2. Appen lastes ned gratis. I standardversjonen av appen kan du velge fritt fra hele drikke-og bakervaremenyen til KaffeLarsen, i tillegg blir du eksponert for reklame. Velger du å oppgradere til en premiumversjon, koster dette et mindre engangsbeløp. I premiumversjonen forekommer det ingen reklame, og du vil daglig få tilgang til spesielle rabatter og tilbud. ***(Scalability, Usefulness)***

3. Appen bruker standard kryptering for lagring av din sensitive informasjon og brukermønster på egne eksterne servere. ***(Security and Privacy risk)***

4. Appen lar deg kommunisere med andre sosiale nettsteder (Facebook, Twitter osv.), har menyer som er brukervennlige og kan brukes overalt i Norge hvor du er tilkoblet internett eller mobilnett. ***(Ease of use, Perceived usefulness, Availability)***

Appen fungerer slik: (Versjon I – No-treatment group)

Steg 1: Du oppretter din egen brukerprofil ved å 1) legge inn personlig informasjon (navn, alder, kjønn, e-post og adresse) og 2) skape et brukernavn og et passord. ***(Security and Privacy risk - low)***

Steg 2: Du bestiller det du ønsker fra menyen til KaffeLarsen. Du kan også forhåndsbestille til et ønsket tidspunkt. (***Ease of use, Perceived usefulness, Return on time)***

Steg 3: Du velger en kaffebar og registrerer din bestilling. Om du ønsker, viser appen deg den raskeste veien til din valgte kaffebar. (***Ease of use, Perceived usefulness, Return on time - low)***

Steg 4: Du betaler på vanlig måte når du kommer for å hente din bestilling. (***Return on time – low)***

Appen fungerer slik: Versjon II – Treatment group)

Steg 1: Du oppretter din egen brukerprofil ved å 1) legge inn personlig informasjon (navn, alder, kjønn, e-post og adresse), 2) skape et brukernavn og et passord og 3) legge inn din bankkortinformasjon. ***(Security and Privacy risk - high)***

Steg 2: Du bestiller det du ønsker fra menyen til KaffeLarsen. Du kan også forhåndsbestille til et ønsket tidspunkt. (***Ease of use, Perceived usefulness, Return on time)***

Steg 3: Du velger en kaffebar og registrerer din bestilling. (***Ease of use, Perceived usefulness)***

Steg 4: Appen viser hvor lang tid det tar før din ordre er ferdig. Ved ventetid på mer enn ti minutter foreslår appen andre kaffebarer med antatt avstand i tid, og du kan velge om du vil vente eller overføre bestillingen din. (***Ease of use, Perceived usefulness, Return on time - high)***

Steg 5: Appen bruker bankkortinformasjonen din for å behandle bestillingen, slik at du bare kan hente bestillingen når du kommer frem. (***Return on time – high)***

English Version

Imagine yourself in the following situation and answer <u>all</u> questions as if you are a <u>daily</u> consumer of coffee, tea, and/or other baked goods.

<u>Imagine the following:</u>

You have just downloaded and installed a new application (”App”) on your smartphone. KaffeLarsen, who owns a national chain of coffee shops makes the app. The app allows you to order coffee, tea and/or other bakery products from their menu.

<u>Characteristics of the application:</u>

1. The app may be used on all types of electronic devices (PC, pad, smartphone etc.) that support application, regardless of platform (Apple, Android, etc.). ***(Availability, Perceived usefulness)***

2. The app is free to download. In the standard version you may freely select items from KaffeLarsen’s menu, and you will be exposed to advertising. For a one-time fee you may upgrade to the premium version, where there is no advertising, and you will have daily access to special offers and discounts. ***(Scalability, Perceived usefulness)***

3. The app applies a standard encryption for storage of you sensitive information and user patterns on their external servers. ***(Security and Privacy risk)***

4. The app allows you to communicate with other social networks (Facebook, Twitter etc.), have a user-friendly interface, and can be used all over Norway when you are connected to the Internet or a mobile network***. (Ease of use, Perceived usefulness, Availability)***

<u>The App works as follows: (Version I – No-treatment group)</u>

Step 1: You create a user account by 1) providing personal information (name, age, sex, e-mail and address) and 2) generating your own username and password. ***(Security and Privacy risk - low)***

Step 2: You place an order from KaffeLarsen's menu. You may pre-order to a specified time. (***Ease of use, Perceived usefulness, Return on time)***

Step: 3 You choose a KaffeLarsen store, and the app then shows you the quickest route to the selected store. (***Ease of use, Perceived usefulness, Return on time - low)***

Step 4: You pay for the items when you arrive to pick up your order. (***Return on time - low)***

The App works as follows: (Version II – Treatment group)

Step 1: You create a user account by 1) providing personal information (name, age, sex, e-mail and address), 2) generating your own username and password and 3) register payment information. ***(Security and Privacy risk - high)***

Step 2: You place an order from KaffeLarsen's menu. You may pre-order to a specified time. (***Ease of use, Perceived usefulness, Return on time)***

Step 3: You choose a KaffeLarsen store and register your order. (***Ease of use, Perceived usefulness)***

Step 4: The app shows how much time that remains until your order is ready. If the waiting time exceeds ten minutes, alternate store locations and estimated travel time will be suggested. You will be given the option to either wait, or transfer your order. (***Ease of use, Perceived usefulness, Return on time - high)***

Step 5: The app uses your registered payment information to process your order, which allows you to pick up your order upon arrival at the coffee bar. (***Return on time – high)***

Appendix 3 – Calculation of "Young, Free and Simple" Segment in Norway

Population: Approx. 653 000 women and men between the age of 20 and 30.

- Approx. 123 000 are married.
- Approx. 58 000 unmarried with kids.
- Estimated number of singles with kids: approx. 5 000. (No source).

= **Roughly estimated population: 465 000.**

Source: Statistisk Sentralbyrå. 2012. *Befolkningsstatisikk*. Retrieved June 1st 2012. http://www.ssb.no/emner/02/01/10/folkemengde/ and http://www.ssb.no/familie/tab-2011-04-07-12.html.

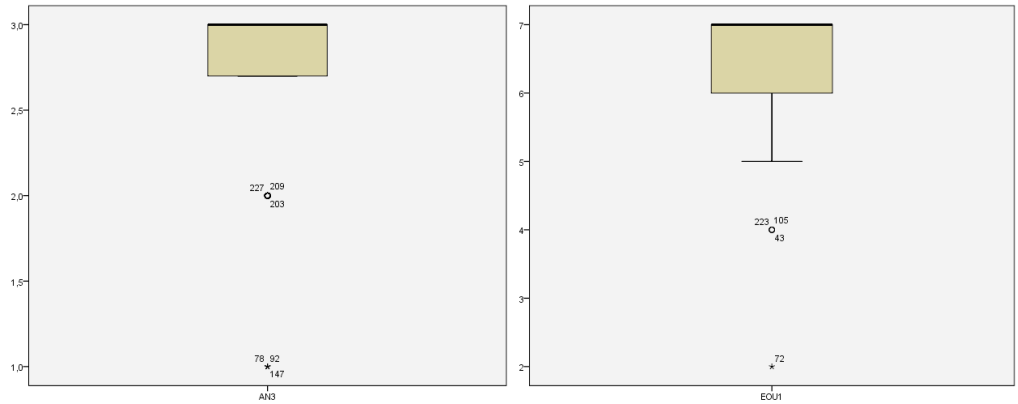
Appendix 4 – Descriptive Statistics: Frequencies

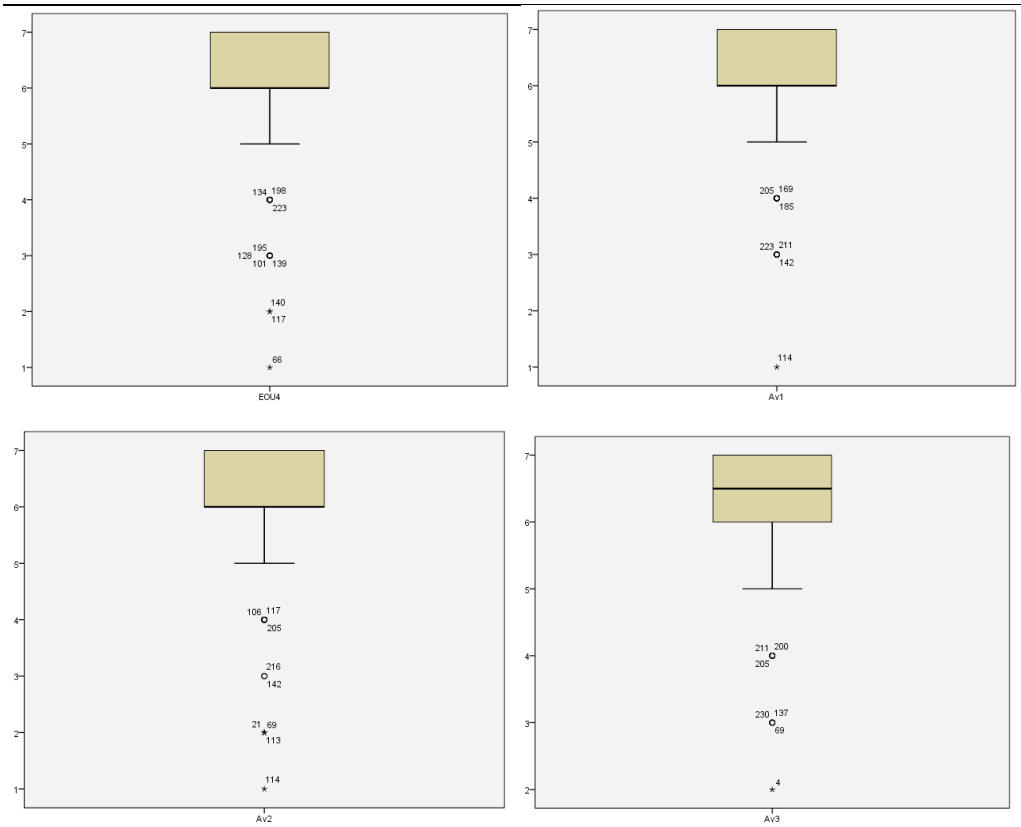
Age					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	20-25	126	52.9	52.9	52.9
	26-30	112	47.1	47.1	100
	Total	238	100	100	
Gender					
	Mann	105	44.1	44.1	44.1
	Kvinne	133	55.9	55.9	100
	Total	238	100	100	
Kids					
	Nei	238	100	100	100
Marital Status					
	Singel	136	57.1	57.1	57.1
	Samboer	102	42.9	42.9	100
	Total	238	100	100	

Appendix 5 – Frequency AN3

AN3					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	1	3	1.3	1.3	1.3
	2	39	16.4	16.4	17.6
	2.7	27	11.3	11.3	29
	2.8	19	8	8	37
	3	150	63	63	100
	Total	238	100	100	

Appendix 6 – Outliers





Appendix 7 – Means and Frequencies

Construct	N	Mean	Std. Deviation	Variance	Skewness	Kurtosis
Adoption/Non-Adoption						
AN1	238	4.05	1.755	3.081	-0.311	-1.184
AN2	238	3.1	2.013	4.054	0.533	-1.067
AN3	238	2.762	0.414	0.171	-1.899	3.234
Ease of Use						
EOU1	238	6.56	0.683	0.466	-2.313	9.25
EOU2	238	6.09	0.928	0.861	-1.081	1.347
EOU3	238	6.39	0.695	0.483	-1.071	1.28
EOU4	238	6.2	1.088	1.183	-1.997	4.572
Perceived Usefulness						
PU1	238	4.95	1.506	2.267	-0.564	-0.134
PU2	238	5.04	1.508	2.273	-0.534	-0.415
PU3	238	4.71	1.608	2.586	-0.299	-0.712
PU4	238	4.63	1.624	2.638	-0.347	-0.74
Availability						
Av1	238	6.13	1.047	1.096	-1.474	2.734
Av2	238	6.19	1.04	1.082	-1.86	4.831
Av3	238	6.22	0.969	0.939	-1.348	1.972
Scalability						
Sc1	238	6	1.065	1.135	-0.895	-0.024
Sc2	238	5.63	1.591	2.53	-1.361	1.243

Sc3	238	5.54	1.503	2.258	-1.188	0.988
Return on Time						
RoT1	238	4.32	1.481	2.194	-0.296	-0.501
RoT2	238	4.13	1.528	2.336	-0.143	-0.709
RoT3	238	4.04	1.519	2.307	-0.137	-0.67
RoT4	238	4.05	1.527	2.33	-0.157	-0.546
Security Risk						
SR1	238	3.87	1.339	1.793	0.017	-0.17
SR2	238	3.72	1.618	2.617	0.199	-0.967
SR3	238	3.87	1.519	2.308	0.055	-0.696
SR4	238	3.68	1.515	2.294	0.113	-0.717
Privacy Risk						
PR1	238	3.95	1.686	2.841	-0.043	-1.035
PR2	238	3.99	1.652	2.73	-0.042	-0.971
PR3	238	3.91	1.518	2.304	-0.003	-0.834
PR4	238	3.58	1.507	2.27	0.278	-0.523
PR5	238	3.63	1.455	2.116	0.208	-0.61
Attitude						
ATT1	238	4.64	1.476	2.18	-0.643	-0.248
ATT2	238	4.83	1.54	2.371	-0.554	-0.445
ATT3	238	4.51	1.437	2.065	-0.4	-0.433
ATT4	238	4.23	1.684	2.837	-0.235	-0.945
Demographics						
Age	238	2.47	0.5	0.25	0.119	-2.003
Gender	238	1.56	0.498	0.248	-0.238	-1.96
Kids	238	2	0	0	.	.
Marital Status	238	1.43	0.496	0.246	0.291	-1.932

Appendix 8 – Frequency SR 1

SR1					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Helt uenig	8	3.4	3.4	3.4
	Ganske uenig	36	15.1	15.1	18.5
	Litt uenig	34	14.3	14.3	32.8
	Verken/ eller	94	39.5	39.5	72.3
	Litt enig	40	16.8	16.8	89.1
	Ganske enig	19	8	8	97.1
	Helt enig	7	2.9	2.9	100
	Total	238	100	100	

Appendix 9 – Multicollinearity

Correlations						
	EOU	AV	SC	RoT	SR	PR
EOU	1	.278	.306	.126	-.129	-.088
AV	.278	1	.404	.287	.037	.078

SC	.306	.404	1	.431	-.112	-.108
RoT	.126	.287	.431	1	-.151	-.146
SR	-.129	.037	-.112	-.151	1	.876
PR	-.088	.078	-.108	-.146	.876	1

Appendix 10 – Exploratory Factor Analysis with Nine Specified Factors

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.895
Bartlett's Test of Sphericity	Approx. Chi-Square	7378.877
	df	561
	Sig.	.000

Communalities		
	Initial	Extraction
AN1	1.000	.787
AN2	1.000	.773
AN3	1.000	.913
EOU1	1.000	.744
EOU2	1.000	.771
EOU3	1.000	.738
EOU4	1.000	.618
PU1	1.000	.740
PU2	1.000	.748
PU3	1.000	.791
PU4	1.000	.829
Av1	1.000	.856
Av2	1.000	.855
Av3	1.000	.686
Sc1	1.000	.677
Sc2	1.000	.798
Sc3	1.000	.785
RoT1	1.000	.875
RoT2	1.000	.903
RoT3	1.000	.911
RoT4	1.000	.910
SR1	1.000	.642
SR2	1.000	.777
SR3	1.000	.793
SR4	1.000	.806
PR1	1.000	.870
PR2	1.000	.850
PR3	1.000	.725
PR4	1.000	.775
PR5	1.000	.811
ATT1	1.000	.825
ATT2	1.000	.840
ATT3	1.000	.857
ATT4	1.000	.837

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.213	32.980	32.980	11.213	32.980	32.980	8.489	24.967	24.967
2	6.155	18.102	51.082	6.155	18.102	51.082	6.482	19.065	44.033
3	2.813	8.273	59.355	2.813	8.273	59.355	2.725	8.015	52.047
4	1.670	4.911	64.267	1.670	4.911	64.267	2.354	6.924	58.971
5	1.557	4.579	68.846	1.557	4.579	68.846	2.192	6.447	65.419
6	1.184	3.484	72.330	1.184	3.484	72.330	1.649	4.849	70.268
7	.914	2.689	75.018	.914	2.689	75.018	1.216	3.576	73.844
8	.848	2.494	77.512	.848	2.494	77.512	1.043	3.067	76.911
9	.763	2.245	79.757	.763	2.245	79.757	.968	2.846	79.757

Extraction Method: Principal Component Analysis

Rotated Component Matrixa									
Component	1	2	3	4	5	6	7	8	9
AN1	.630	-.026	.112	.101	.029	-.005	.584	.138	-.074
AN2	.430	-.040	.100	.149	.017	.114	.714	.175	.030
AN3	-.276	.029	-.020	-.033	-.045	-.046	-.154	-.897	-.028
EOU1	.048	.018	.833	.130	.035	-.030	.167	-.011	.010
EOU2	.126	-.030	.858	.000	.051	.056	.107	-.006	-.016
EOU3	.143	-.118	.824	.061	-.027	.034	-.054	-.041	.117
EOU4	.183	-.076	.584	.174	-.117	.202	-.326	.217	-.008
PU1	.807	-.022	.207	.063	.131	.142	-.003	.058	-.012
PU2	.804	-.014	.093	.048	.239	.098	-.094	.119	-.015
PU3	.815	.058	.102	.112	.248	.089	-.080	.143	.066
PU4	.868	-.039	.102	.145	.139	.112	.057	.038	.081
Av1	.286	.058	.122	.862	-.057	.047	.071	.038	-.034
Av2	.323	.043	.023	.855	-.004	.099	.025	-.030	-.078
Av3	.027	.082	.197	.648	.252	.070	.098	.037	.375
Sc1	.233	-.074	.254	.421	.206	.255	-.092	.137	.492
Sc2	.263	-.053	.063	.197	.126	.806	.054	-.107	.058
Sc3	.233	-.040	.080	.019	.057	.836	.018	.143	.009
RoT1	.670	-.077	.003	.035	.622	.152	.044	.069	-.043
RoT2	.671	-.085	-.047	.100	.651	.092	.036	.021	-.019
RoT3	.627	-.073	.042	.030	.706	.079	.019	.026	.067
RoT4	.596	-.080	-.021	.062	.724	.109	.005	.000	.091
SR1	-.065	.725	-.048	.092	.002	-.051	-.093	.093	-.286
SR2	-.118	.845	-.020	.045	.059	-.020	-.043	.024	-.201
SR3	-.044	.849	-.102	.047	-.002	-.016	.012	.017	-.240
SR4	-.034	.886	-.052	-.006	-.001	.036	.066	.074	-.082
PR1	-.002	.836	-.004	-.023	-.125	-.050	.062	-.060	.380
PR2	-.030	.818	.035	.018	-.119	-.063	-.011	-.024	.400
PR3	-.063	.825	.007	.028	.023	-.090	-.004	-.025	.174
PR4	-.137	.862	-.035	-.019	-.008	.030	-.021	-.094	.014
PR5	-.046	.889	-.022	-.030	-.084	.023	-.031	-.068	.062

ATT1	.875	-.110	.060	.156	.083	.034	.098	.024	.034
ATT2	.840	-.172	.143	.183	-.054	.127	.178	.000	.029
ATT3	.882	-.156	.038	.115	.067	.123	.141	.007	.010
ATT4	.856	-.115	.019	.130	.020	.067	.251	.073	.010

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Appendix 11 – Exploratory Factor Analysis without AN3

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.896
Bartlett's Test of Sphericity	Approx. Chi-Square	7317.383
	df	528
	Sig.	.000

Communalities		
	Initial	Extraction
AN1	1.000	.804
AN2	1.000	.822
EOU1	1.000	.764
EOU2	1.000	.782
EOU3	1.000	.734
EOU4	1.000	.602
PU1	1.000	.752
PU2	1.000	.759
PU3	1.000	.781
PU4	1.000	.828
Av1	1.000	.913
Av2	1.000	.917
Av3	1.000	.799
Sc1	1.000	.772
Sc2	1.000	.772
Sc3	1.000	.785
RoT1	1.000	.877
RoT2	1.000	.908
RoT3	1.000	.919
RoT4	1.000	.929
SR1	1.000	.748
SR2	1.000	.795
SR3	1.000	.795
SR4	1.000	.804
PR1	1.000	.893
PR2	1.000	.872
PR3	1.000	.737
PR4	1.000	.771
PR5	1.000	.809
ATT1	1.000	.834

ATT2	1.000	.835
ATT3	1.000	.858
ATT4	1.000	.837

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.076	33.564	33.564	11.076	33.564	33.564	8.312	25.188	25.188
2	6.149	18.633	52.197	6.149	18.633	52.197	6.482	19.644	44.832
3	2.812	8.522	60.719	2.812	8.522	60.719	2.676	8.111	52.942
4	1.669	5.057	65.776	1.669	5.057	65.776	2.206	6.686	59.628
5	1.526	4.624	70.400	1.526	4.624	70.400	1.870	5.667	65.295
6	1.167	3.536	73.936	1.167	3.536	73.936	1.638	4.963	70.258
7	.858	2.600	76.536	.858	2.600	76.536	1.534	4.649	74.908
8	.792	2.399	78.935	.792	2.399	78.935	1.267	3.840	78.748
9	.756	2.290	81.225	.756	2.290	81.225	.817	2.477	81.225

Extraction Method: Principal Component Analysis

Rotated Component Matrixa

	Component								
	1	2	3	4	5	6	7	8	9
AN1	.627	-.027	.103	.042	.090	-.006	-.007	.624	.025
AN2	.434	-.037	.080	.006	.074	.106	.130	.770	-.008
EOU1	.033	.021	.842	.060	.138	-.023	.042	.158	-.054
EOU2	.116	-.028	.865	.069	.014	.062	-.006	.097	-.027
EOU3	.149	-.114	.814	-.048	-.001	.026	.167	-.054	-.042
EOU4	.216	-.080	.569	-.174	.071	.199	.213	-.223	.234
PU1	.815	-.025	.194	.118	.020	.135	.087	.036	.089
PU2	.817	-.018	.082	.220	-.003	.094	.098	-.042	.128
PU3	.820	.059	.103	.252	.083	.097	.112	-.046	.018
PU4	.864	-.035	.099	.152	.123	.115	.106	.074	-.047
Av1	.259	.059	.146	-.002	.877	.065	.204	.078	-.010
Av2	.288	.042	.047	.059	.885	.116	.170	.026	.013
Av3	.066	.090	.139	.122	.323	.018	.790	.149	.039
Sc1	.284	-.061	.201	.075	.106	.215	.762	-.037	-.045
Sc2	.245	-.050	.054	.127	.146	.797	.173	.059	-.007
Sc3	.234	-.038	.087	.066	.026	.845	.026	.024	-.002
RoT1	.658	-.080	.004	.633	.016	.156	.057	.061	.075
RoT2	.653	-.087	-.043	.668	.083	.097	.079	.042	.040
RoT3	.613	-.071	.046	.718	.001	.085	.114	.011	-.027
RoT4	.576	-.076	-.012	.746	.043	.117	.117	-.016	-.070
SR1	-.031	.706	-.085	-.079	-.002	-.086	.061	-.011	.474
SR2	-.107	.833	-.036	.024	.012	-.036	-.011	-.003	.293
SR3	-.044	.837	-.105	-.003	.074	-.021	-.117	.041	.244
SR4	-.031	.881	-.054	-.004	-.001	.034	-.047	.082	.116
PR1	-.013	.854	.010	-.091	-.010	-.036	.084	-.002	-.382
PR2	-.035	.836	.050	-.093	.018	-.048	.125	-.069	-.371
PR3	-.069	.833	.016	.040	.035	-.083	.048	-.041	-.156
PR4	-.147	.863	-.033	.004	-.001	.029	-.035	-.039	-.010

PR5	-.051	.891	-.021	-.074	-.014	.023	-.022	-.048	-.046
ATT1	.879	-.109	.047	.079	.119	.027	.110	.119	.006
ATT2	.831	-.169	.143	-.026	.198	.129	.035	.175	-.081
ATT3	.868	-.153	.046	.109	.156	.133	-.022	.132	-.087
ATT4	.848	-.112	.023	.055	.156	.076	-.007	.258	-.072

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Appendix 12 – Exploratory Factor Analysis without SR1

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.896
Bartlett's Test of Sphericity	Approx. Chi-Square	7136.258
	df	496
	Sig.	.000

Communalities		
	Initial	Extraction
AN1	1.000	.805
AN2	1.000	.861
EOU1	1.000	.757
EOU2	1.000	.799
EOU3	1.000	.748
EOU4	1.000	.692
PU1	1.000	.753
PU2	1.000	.803
PU3	1.000	.824
PU4	1.000	.830
Av1	1.000	.910
Av2	1.000	.909
Av3	1.000	.764
Sc1	1.000	.765
Sc2	1.000	.768
Sc3	1.000	.828
RoT1	1.000	.878
RoT2	1.000	.908
RoT3	1.000	.919
RoT4	1.000	.928
SR2	1.000	.751
SR3	1.000	.775
SR4	1.000	.818
PR1	1.000	.843
PR2	1.000	.827
PR3	1.000	.740
PR4	1.000	.772
PR5	1.000	.812
ATT1	1.000	.839
ATT2	1.000	.879

ATT3	1.000	.891
ATT4	1.000	.846

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.011	34.410	34.410	11.011	34.410	34.410	7.779	24.309	24.309
2	5.735	17.921	52.331	5.735	17.921	52.331	6.010	18.783	43.091
3	2.809	8.778	61.110	2.809	8.778	61.110	2.739	8.560	51.651
4	1.669	5.215	66.325	1.669	5.215	66.325	2.600	8.124	59.776
5	1.525	4.767	71.091	1.525	4.767	71.091	1.894	5.919	65.695
6	1.167	3.647	74.738	1.167	3.647	74.738	1.618	5.056	70.751
7	.841	2.629	77.367	.841	2.629	77.367	1.553	4.852	75.603
8	.775	2.421	79.788	.775	2.421	79.788	1.213	3.790	79.393
9	.712	2.224	82.011	.712	2.224	82.011	.838	2.618	82.011

Extraction Method: Principal Component Analysis

Rotated Component Matrixa

	Component								
	1	2	3	4	5	6	7	8	9
AN1	.634	-.028	.079	.115	.094	-.001	-.010	.606	-.075
AN2	.442	-.038	.019	.076	.071	.088	.139	.791	-.003
EOU1	.038	.025	.035	.840	.132	-.025	.062	.151	.059
EOU2	.121	-.028	.059	.877	.016	.082	.004	.057	-.011
EOU3	.157	-.113	-.044	.817	.002	.043	.176	-.088	.041
EOU4	.176	-.084	-.114	.491	.090	.155	.184	-.090	.571
PU1	.782	-.025	.208	.171	.033	.127	.073	.071	.203
PU2	.761	-.018	.318	.040	.011	.065	.081	.041	.327
PU3	.773	.065	.335	.064	.083	.063	.119	.025	.284
PU4	.844	-.030	.226	.084	.119	.103	.121	.087	.110
Av1	.265	.062	.004	.139	.875	.061	.204	.070	.021
Av2	.284	.040	.072	.038	.881	.110	.171	.028	.038
Av3	.044	.087	.140	.144	.355	.031	.753	.142	-.027
Sc1	.257	-.060	.115	.181	.121	.206	.758	-.010	.135
Sc2	.222	-.048	.151	.027	.141	.776	.189	.100	.158
Sc3	.230	-.038	.090	.098	.031	.867	.026	-.016	-.052
RoT1	.588	-.082	.697	.002	.027	.148	.049	.094	.077
RoT2	.588	-.090	.726	-.033	.092	.098	.074	.050	-.009
RoT3	.548	-.069	.767	.059	.005	.085	.121	.013	-.029
RoT4	.514	-.072	.786	.006	.043	.120	.132	-.027	-.077
SR2	-.143	.825	.053	-.053	.053	-.038	-.085	.055	.171
SR3	-.068	.832	.022	-.116	.106	-.021	-.179	.081	.114
SR4	-.045	.882	.008	-.069	.016	.023	-.078	.123	.106
PR1	.032	.863	-.137	.026	-.054	-.037	.167	-.062	-.205
PR2	.006	.845	-.137	.062	-.025	-.050	.205	-.124	-.176
PR3	-.057	.839	.016	.030	.024	-.078	.073	-.075	-.123
PR4	-.149	.864	-.009	-.036	.000	.025	-.036	-.029	.010
PR5	-.045	.894	-.079	-.026	-.017	.019	-.016	-.045	.013

ATT1	.871	-.113	.160	.060	.126	.049	.104	.077	-.053
ATT2	.850	-.169	.033	.169	.194	.162	.050	.095	-.154
ATT3	.873	-.152	.171	.070	.148	.159	-.003	.064	-.139
ATT4	.857	-.109	.115	.040	.151	.092	.008	.207	-.106

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Appendix 13 – Reliability Test of the EOU Items

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.786	.813	4

Inter-Item Correlation Matrix				
	EOU1	EOU2	EOU3	EOU4
EOU1	1.000	.643	.589	.380
EOU2	.643	1.000	.645	.412
EOU3	.589	.645	1.000	.460
EOU4	.380	.412	.460	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
EOU1	18.68	4.885	.642	.470	.724
EOU2	19.15	3.952	.672	.529	.691
EOU3	18.86	4.722	.691	.499	.703
EOU4	19.04	4.015	.480	.241	.824

Appendix 14 – Exploratory Factor Analysis without EOU4

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.896
Bartlett's Test of Sphericity	Approx. Chi-Square	7051.892
	df	465
	Sig.	.000

Communalities		
	Initial	Extraction
AN1	1.000	.823
AN2	1.000	.863

EOU1	1.000	.775
EOU2	1.000	.803
EOU3	1.000	.755
PU1	1.000	.775
PU2	1.000	.857
PU3	1.000	.829
PU4	1.000	.833
Av1	1.000	.910
Av2	1.000	.911
Av3	1.000	.766
Sc1	1.000	.784
Sc2	1.000	.770
Sc3	1.000	.818
RoT1	1.000	.880
RoT2	1.000	.926
RoT3	1.000	.928
RoT4	1.000	.939
SR2	1.000	.774
SR3	1.000	.823
SR4	1.000	.772
PR1	1.000	.873
PR2	1.000	.855
PR3	1.000	.741
PR4	1.000	.783
PR5	1.000	.811
ATT1	1.000	.838
ATT2	1.000	.868
ATT3	1.000	.888
ATT4	1.000	.848

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.927	35.250	35.250	10.927	35.250	35.250	7.428	23.963	23.963
2	5.735	18.499	53.748	5.735	18.499	53.748	6.009	19.384	43.347
3	2.562	8.265	62.014	2.562	8.265	62.014	2.864	9.238	52.585
4	1.655	5.338	67.351	1.655	5.338	67.351	2.360	7.613	60.198
5	1.510	4.870	72.222	1.510	4.870	72.222	1.913	6.170	66.368
6	1.159	3.739	75.960	1.159	3.739	75.960	1.615	5.209	71.577
7	.822	2.651	78.611	.822	2.651	78.611	1.526	4.924	76.501
8	.773	2.494	81.106	.773	2.494	81.106	1.383	4.460	80.961
9	.677	2.185	83.291	.677	2.185	83.291	.722	2.330	83.291

Extraction Method: Principal Component Analysis

Rotated Component Matrixa

	Component								
	1	2	3	4	5	6	7	8	9
AN1	.574	-.028	.135	.101	.109	-.002	-.032	.669	.064

AN2	.393	-.037	.048	.073	.076	.093	.135	.815	-.045
EOU1	.057	.022	-.001	.850	.127	-.016	.089	.120	-.097
EOU2	.121	-.031	.055	.879	.021	.087	.009	.062	.029
EOU3	.165	-.117	-.041	.816	.009	.051	.175	-.075	.081
PU1	.807	-.028	.182	.182	.030	.138	.101	.065	-.145
PU2	.816	-.021	.254	.067	-.003	.082	.136	-.007	-.310
PU3	.804	.063	.305	.080	.078	.078	.153	.007	-.208
PU4	.844	-.033	.234	.086	.125	.111	.126	.113	-.031
Av1	.248	.060	.020	.131	.879	.063	.205	.090	.013
Av2	.272	.039	.081	.036	.884	.115	.175	.038	-.018
Av3	.042	.085	.130	.135	.346	.026	.763	.138	.027
Sc1	.280	-.063	.095	.183	.113	.212	.775	-.024	-.014
Sc2	.227	-.049	.140	.033	.139	.786	.203	.081	-.100
Sc3	.217	-.038	.104	.085	.036	.862	.017	.008	.077
RoT1	.574	-.081	.703	.005	.029	.152	.055	.102	-.110
RoT2	.552	-.088	.763	-.041	.101	.097	.060	.088	.000
RoT3	.518	-.068	.795	.053	.013	.084	.108	.044	.007
RoT4	.478	-.071	.821	-.001	.052	.117	.113	.010	.047
SR2	-.097	.826	-.015	-.037	.032	-.036	-.033	-.012	-.278
SR3	-.023	.883	-.029	-.057	.005	.026	-.048	.085	-.169
SR4	-.137	.864	-.026	-.030	-.004	.025	-.027	-.049	-.042
PR1	-.011	.862	-.068	.012	-.032	-.042	.112	.005	.330
PR2	-.032	.844	-.070	.047	-.003	-.054	.152	-.059	.324
PR3	-.070	.839	.036	.025	.031	-.083	.054	-.053	.132
PR4	-.040	.833	-.024	-.105	.091	-.021	-.142	.038	-.212
PR5	-.038	.894	-.082	-.025	-.017	.018	-.015	-.047	.012
ATT1	.846	-.116	.200	.047	.140	.047	.085	.144	.128
ATT2	.817	-.173	.079	.152	.211	.157	.022	.172	.203
ATT3	.833	-.155	.230	.052	.169	.153	-.038	.148	.200
ATT4	.814	-.112	.171	.023	.169	.088	-.022	.287	.157

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Appendix 15 – Confirmatory Factor Analysis – Output Statistics Including Syntax and Path Diagram

Output Statistics Including Syntax

PRELIS SYNTAX: KaffeLarsen
Observed Variables
AN1 AN2 EOU1 EOU2 EOU3 PU1 PU2 PU3 PU4 AV1 AV2 AV3 SC1 SC2 SC3 ROT1 ROT2 ROT3 ROT4 SR2 SR3 SR4 PR1 PR2 PR3 PR4 PR5 ATT1 ATT2 ATT3 ATT4

Latent Variables
'Adoption' 'Ease of Use' 'Perceived Usefulness' 'Availability' 'Scalability' 'Return on Time' 'Security Risk' 'Privacy Risk' 'Attitude'

Correlation Matrix from File KaffeLarsen_corr.pcm
Asymptotic Covariance Matrix from File KaffeLarsen_asym.acm

Sample size = 238

Relationships
AN1 = 'Adoption'
AN2 = 'Adoption'
EOU1 = 'Ease of Use'
EOU2 = 'Ease of Use'
EOU3 = 'Ease of Use'
PU1 = 'Perceived Usefulness'
PU2 = 'Perceived Usefulness'
PU3 = 'Perceived Usefulness'
PU4 = 'Perceived Usefulness'
AV1 = 'Availability'
AV2 = 'Availability'
AV3 = 'Availability'
SC1 = 'Scalability'
SC2 = 'Scalability'
SC3 = 'Scalability'
ROT1 = 'Return on Time'
ROT2 = 'Return on Time'
ROT3 = 'Return on Time'
ROT4 = 'Return on Time'
SR2 = 'Security Risk'
SR3 = 'Security Risk'
SR4 = 'Security Risk'
PR1 = 'Privacy Risk'
PR2 = 'Privacy Risk'
PR3 = 'Privacy Risk'
PR4 = 'Privacy Risk'
PR5 = 'Privacy Risk'
ATT1 = 'Attitude'
ATT2 = 'Attitude'
ATT3 = 'Attitude'
ATT4 = 'Attitude'

Method of Estimation = Maximum Likelihood

Path Diagram
End of Problem

Sample Size = 238

PRELIS SYNTAX: KaffeLarsen

Goodness of Fit Statistics

Degrees of Freedom = 398
Minimum Fit Function Chi-Square = 2102.87 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 1572.75 (P = 0.0)
Satorra-Bentler Scaled Chi-Square = 729.03 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 331.03
90 Percent Confidence Interval for NCP = (259.18 ; 410.71)

Minimum Fit Function Value = 8.87
Population Discrepancy Function Value (F0) = 1.40
90 Percent Confidence Interval for F0 = (1.09 ; 1.73)

Root Mean Square Error of Approximation (RMSEA) = 0.059
90 Percent Confidence Interval for RMSEA = (0.052 ; 0.066)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.014

Expected Cross-Validation Index (ECVI) = 3.90
90 Percent Confidence Interval for ECVI = (3.60 ; 4.24)
ECVI for Saturated Model = 4.19
ECVI for Independence Model = 81.63

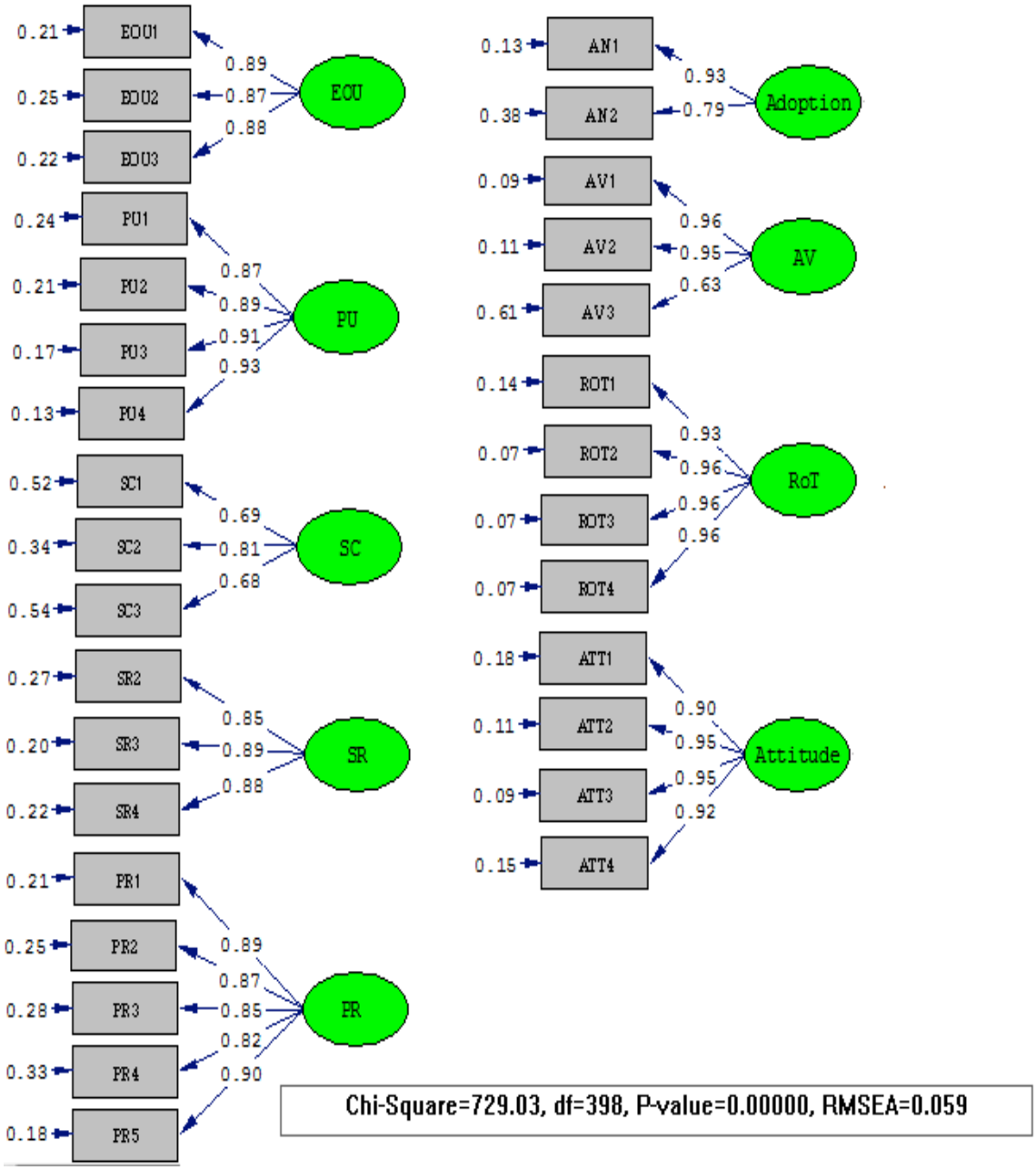
Chi-Square for Independence Model with 465 Degrees of Freedom = 19285.46
Independence AIC = 19347.46
Model AIC = 925.03
Saturated AIC = 992.00
Independence CAIC = 19486.10
Model CAIC = 1363.31
Saturated CAIC = 3210.25

Normed Fit Index (NFI) = 0.96
Non-Normed Fit Index (NNFI) = 0.98
Parsimony Normed Fit Index (PNFI) = 0.82
Comparative Fit Index (CFI) = 0.98
Incremental Fit Index (IFI) = 0.98
Relative Fit Index (RFI) = 0.96

Critical N (CN) = 152.67

Root Mean Square Residual (RMR) = 0.051
Standardized RMR = 0.051
Goodness of Fit Index (GFI) = 0.70
Adjusted Goodness of Fit Index (AGFI) = 0.63
Parsimony Goodness of Fit Index (PGFI) = 0.56

Path Diagram Measurement Model



Appendix 16 – Structural Equation Modeling – Output Statistics Including Syntax and Path Diagram

Output Statistics Including Syntax

PRELIS SYNTAX: KaffeLarsen
Observed Variables
AN1 AN2 EOU1 EOU2 EOU3 PU1 PU2 PU3 PU4 AV1 AV2 AV3 SC1 SC2 SC3 ROT1 ROT2 ROT3 ROT4 SR2 SR3 SR4 PR1 PR2 PR3 PR4 PR5 ATT1 ATT2 ATT3 ATT4

Latent Variables
'Adoption' 'Ease of Use' 'Perceived Usefulness' 'Availability' 'Scalability' 'Return on Time' 'Security Risk' 'Privacy Risk' 'Attitude'

Correlation Matrix from File KaffeLarsen_corr.pcm
Asymptotic Covariance Matrix from File KaffeLarsen_asym.acm

Sample size = 238

Relationships
AN1 = 'Adoption'
AN2 = 'Adoption'
EOU1 = 'Ease of Use'
EOU2 = 'Ease of Use'
EOU3 = 'Ease of Use'
PU1 = 'Perceived Usefulness'
PU2 = 'Perceived Usefulness'
PU3 = 'Perceived Usefulness'
PU4 = 'Perceived Usefulness'
AV1 = 'Availability'
AV2 = 'Availability'
AV3 = 'Availability'
SC1 = 'Scalability'
SC2 = 'Scalability'
SC3 = 'Scalability'
ROT1 = 'Return on Time'
ROT2 = 'Return on Time'
ROT3 = 'Return on Time'
ROT4 = 'Return on Time'
SR2 = 'Security Risk'
SR3 = 'Security Risk'
SR4 = 'Security Risk'
PR1 = 'Privacy Risk'
PR2 = 'Privacy Risk'
PR3 = 'Privacy Risk'
PR4 = 'Privacy Risk'
PR5 = 'Privacy Risk'
ATT1 = 'Attitude'
ATT2 = 'Attitude'
ATT3 = 'Attitude'
ATT4 = 'Attitude'

'Perceived Usefulness = 'Scalability' 'Availability' 'Ease of Use' 'Return on Time'
'Attitude' = 'Ease of Use' 'Perceived Usefulness' 'Return on Time' 'Security Risk' 'Privacy Risk'
'Adoption' = 'Attitude'

Method of Estimation = Maximum Likelihood

Path Diagram
End of Problem

Sample Size = 238

PRELIS SYNTAX: KaffeLarsen

Structural Equations

Adoption = 0.76*Attitude, Errorvar.= 0.42 , R^2 = 0.58
(0.047) (0.081)
16.03 5.21

Perceive = 0.13*Ease of + 0.17*Availabi + 0.11*Scalabil + 0.65*Return o, Errorvar.= 0.29 , R^2 = 0.71
(0.052) (0.069) (0.088) (0.063) (0.050)
2.51 2.41 1.27 10.44 5.87

Attitude = 0.80*Perceive - 0.050*Ease of + 0.051*Return o - 1.11*Security + 0.97*Privacy, Errorvar.= 0.16 , R^2 = 0.84
(0.097) (0.064) (0.098) (0.53) (0.53) (0.054)
8.24 -0.78 0.53 -2.09 1.82 2.94

Goodness of Fit Statistics

Degrees of Freedom = 409
Minimum Fit Function Chi-Square = 2116.11 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 1582.67 (P = 0.0)
Satorra-Bentler Scaled Chi-Square = 739.48 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 330.48
90 Percent Confidence Interval for NCP = (258.28 ; 410.52)

Minimum Fit Function Value = 8.93
Population Discrepancy Function Value (F0) = 1.39
90 Percent Confidence Interval for F0 = (1.09 ; 1.73)
Root Mean Square Error of Approximation (RMSEA) = 0.058
90 Percent Confidence Interval for RMSEA = (0.052 ; 0.065)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.022

Expected Cross-Validation Index (ECVI) = 3.85
90 Percent Confidence Interval for ECVI = (3.55 ; 4.19)
ECVI for Saturated Model = 4.19
ECVI for Independence Model = 81.63

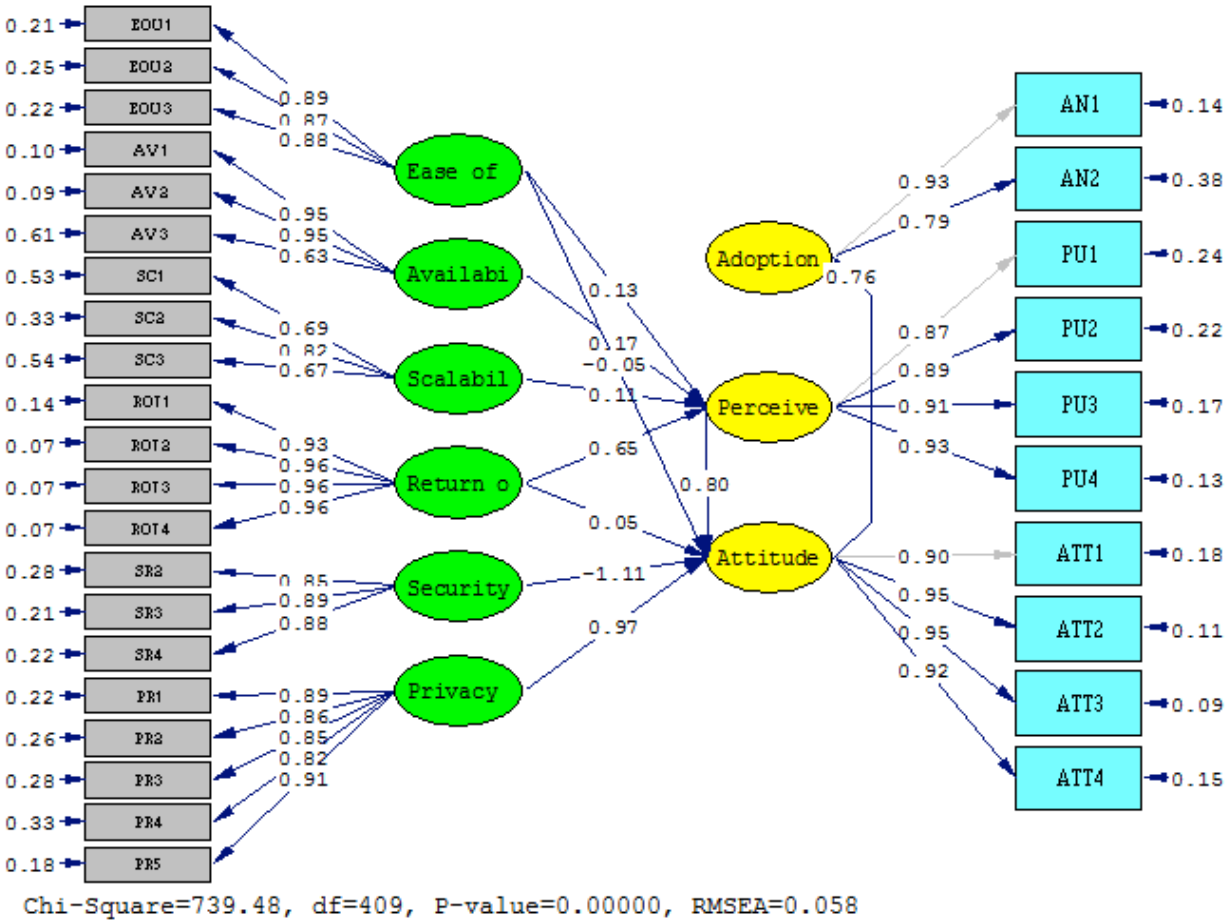
Chi-Square for Independence Model with 465 Degrees of Freedom = 19285.46
Independence AIC = 19347.46
Model AIC = 913.48
Saturated AIC = 992.00
Independence CAIC = 19486.10
Model CAIC = 1302.57
Saturated CAIC = 3210.25

Normed Fit Index (NFI) = 0.96
Non-Normed Fit Index (NNFI) = 0.98
Parsimony Normed Fit Index (PNFI) = 0.85
Comparative Fit Index (CFI) = 0.98
Incremental Fit Index (IFI) = 0.98
Relative Fit Index (RFI) = 0.96

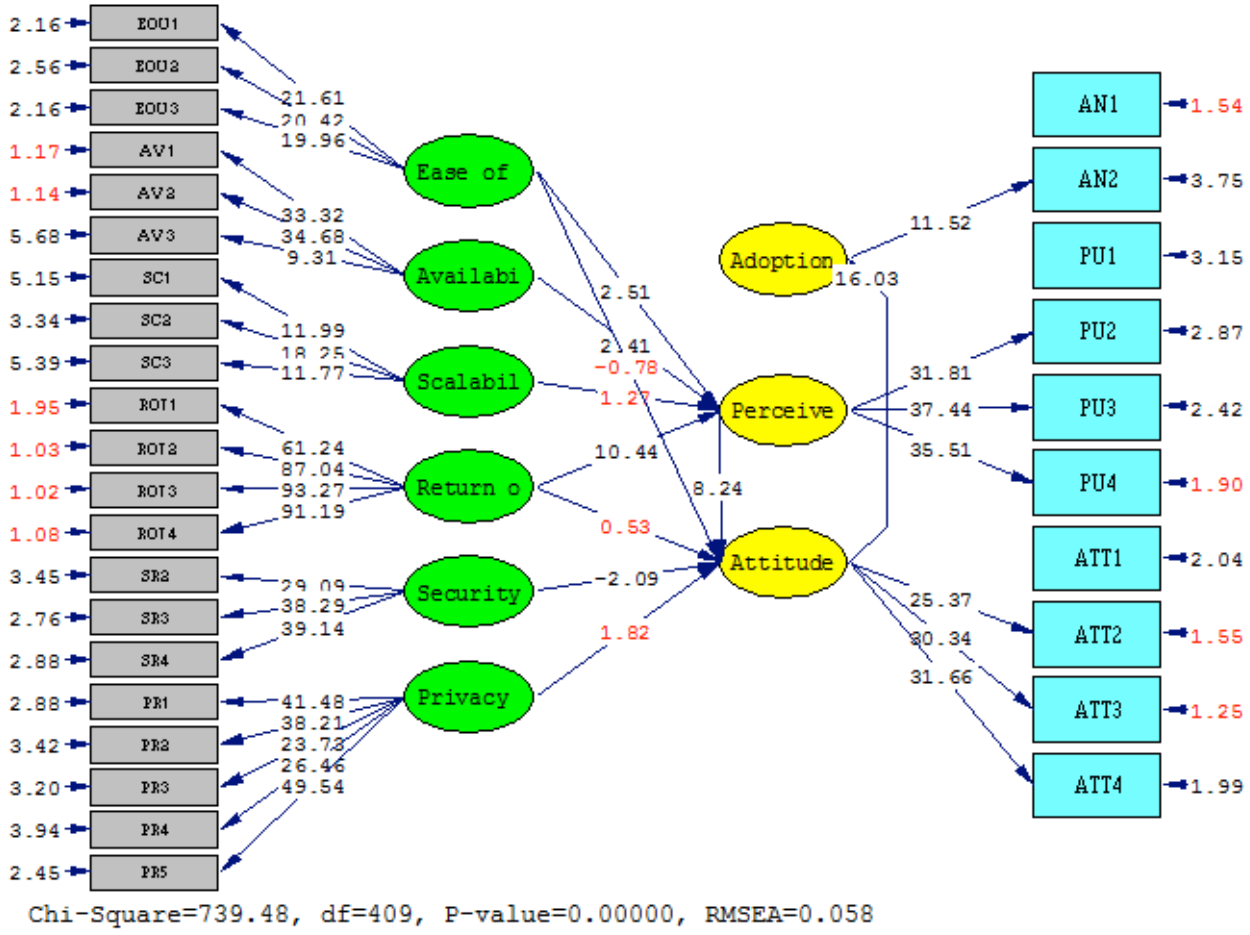
Critical N (CN) = 154.34

Root Mean Square Residual (RMR) = 0.053
Standardized RMR = 0.053
Goodness of Fit Index (GFI) = 0.70
Adjusted Goodness of Fit Index (AGFI) = 0.63
Parsimony Goodness of Fit Index (PGFI) = 0.58

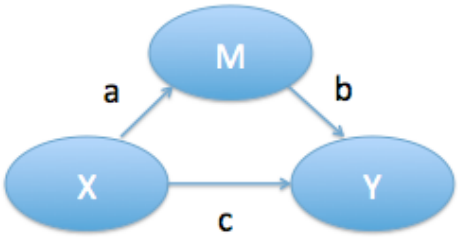
Path Diagram Structural Model – Standardized Solution



Path Diagram Structural Model – T-Values



Appendix 17 – Mediation Analysis



Does Privacy Risk (X) have an indirect effect on Attitude (Y) mediated by Security Risk (M)?

Step	X - Variable	M - Variable	Y - Variable	Significance
1	PR		ATT	0.003
2	PR	SR		0.000
3	**PR**	SR	ATT	0.938
3	PR	**SR**	ATT	0.078

Does Privacy Risk (X) have an indirect effect on Attitude (Y) mediated by Perceived Usefulness (M)?

Step	X - Variable	M - Variable	Y - Variable	Significance
1	PR		ATT	0.003
2	PR	PU		0.235
3	**PR**	PU	ATT	0.000
3	PR	**PU**	ATT	0.000

Does Scalability (X) have an indirect effect on Perceived Usefulness (Y) mediated by Availability (M)?

Step	X - Variable	M - Variable	Y - Variable	Significance
1	SC		PU	0.000
2	SC	AV		0.000
3	**SC**	AV	PU	0.000
3	SC	**AV**	PU	0.000

Does Return on Time (X) have an indirect effect on Attitude (Y) mediated by Perceived Usefulness (M)?

Step	X - Variable	M - Variable	Y - Variable	Significance
1	RoT		ATT	0.000
2	RoT	PU		0.000
3	**RoT**	PU	ATT	0.006
3	RoT	**PU**	ATT	0.000

Does Ease of Use (X) have an indirect effect on Attitude (Y) mediated by Perceived Usefulness (M)?

Step	X - Variable	M - Variable	Y - Variable	Significance
1	EOU		ATT	0.000
2	EOU	PU		0.000
3	**EOU**	PU	ATT	0.819
3	EOU	**PU**	ATT	0.000

Appendix 18 – Between Groups Comparisons

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
SR	Equal variances assumed	0.137	0.712	-2.166	236	0.031	-0.36301	0.16762	-0.69323	-0.03279
	Equal variances not assumed			-2.161	231.885	0.032	-0.36301	0.16797	-0.69394	-0.03208
PR	Equal variances assumed	0.35	0.555	-2.624	236	0.009	-0.45027	0.17163	-0.78839	-0.11215

	Equal variances not assumed			-2.614	229.643	0.01	-0.45027	0.17222	-0.78961	-0.11093
PU	Equal variances assumed	2.6	0.108	-1.283	236	0.201	-0.23638	0.1843	-0.59946	0.1267
	Equal variances not assumed			-1.29	235.271	0.198	-0.23638	0.18322	-0.59734	0.12457
ROT	Equal variances assumed	0.243	0.622	-0.949	236	0.343	-0.17784	0.18731	-0.54686	0.19117
	Equal variances not assumed			-0.948	232.272	0.344	-0.17784	0.18765	-0.54755	0.19186

IX. Preliminary Thesis Report

Martin Ygre 0784726
Espen Andreassen 0815348

BI Norwegian Business School – Preliminary Thesis Report

"Above the Clouds: Heaven or Hell?"

Hand-in date:

16.01.2012

Campus:

BI Oslo

Supervisor:

Tor Wallin Andreassen

Exam Code and Name:

GRA 1902 Preliminary Thesis Report

Programme:

Master of Science in Strategic Marketing Management

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I. Abstract

We live in an age of time where technology development is the name of the game in business, and advancements are made with in skyrocketing speeds, merciless to those who are caught sleeping in class. This software age spurs the drastic amount of increases in innovations seen the last decade. On one side, innovations has been easier to develop and offer to the market place through technology and the downfall of the traditional, physical market place. On the other, due to technological progress and creative solutions, new innovations often demand a change in consumer behavior in order to work as intended by the firm. This paradox is neatly complimented with a misconception of what needs you are actually satisfying with your customer group. Are you buying a vacuum, or a clean and happy home? Without proper homework it is difficult to reach consumers' and have a sufficient diffusion of the firms service, reflected through a 90% failure rate of new innovations. Therefore, understanding the driving mechanisms behind consumer adoption of new technology is of paramount importance. In this study we tested how the trend return on time, and an application's functionality influenced the adoption rate of the service/product, whilst measuring consumers' perceived added value from a service provided through cloud technology. For companies, this information will function as guidelines to create successful innovations by strategically using the characteristics of what is called "the next IT revolution", cloud computing, to satisfy customer needs.

1. Introduction

1.1 Consumer Adoption: Free Up Time and Increase Intuitive Functionality

National and global media have dubbed this millennium as the "software age", and proclaimed "software is eating the world" (Johnson 1998, Andreesen 2011). Most countries and continents are now wired together, and "Internet", "mail", "Facebook" and "Google" are household words. Some argue that the world is in fact becoming flat – with workflow software, uploading, outsourcing and mobile digital devices connecting consumers and firms, products and services around the globe (Friedman 2005). It has never been easier for firms or consumers to innovate and launch new products and services, however research shows that up to *90%* of new innovations are considered flops by management (Gourville 2006). Schneider and Hall (2011) explain that one of the main reasons of failure is the lack of functionality of the innovation; *"if consumers can't quickly grasp how to use your product, it's toast"*. Dredge (2011) cites a new report from Deloitte where a staggering 80% of branded applications intended for smartphones had been downloaded *less than 1000 times*. In comparison, the Apple's App Store, Google's Android Market and In Motion's BlackBerry App World generates 1.6 billion downloads *each month*. One of the basic questions managers must ask themselves is "*what is my app for?"* According to Dredge, the way forward is to release apps that have real functionality, which solves a problem or provide features that are genuinely meaningful. Apple's horde of loyal customers is an obvious example that functionality fueled by design, quality and simplicity leads to increased adoption of new innovations and perceived value added by the innovation. Bettencourt and Ulwick (2008) proclaim that people "hire" products and services to get a job done. Clayton Christensen, Harvard Business Professor and praised author, asks the following question: *"When customers engage your product (or service) to do a job, what is the job they really want done?"* (Andreassen 2011:A). Customers do not buy security systems and insurance, they buy peace of mind. They do not buy word-processing software, the buy documents. Indeed, a problem of new-innovation adoption is the existence of *"a gaping mismatch between what innovators think consumers desire – and what consumers really want"* (Gourville 2006:1). As the digital habits of consumers have gone from "on premises" to "on demand" (Chorafas 2010, KPMG 2010), the needs for physical products and attributes are being overtaken by service driven

software. Ofek and Wathieu (2010:1) assert that trends of the digital revolution have led consumers to *"value offerings that provide instant gratification and help them multitask"*. We know that consumers hire productivity software (i.e. Microsoft Office) to do a job more efficiently – they buy time that can be saved and spent on other activities. In their research, "Value-driven service innovation", Andreassen et al. (Working Paper) find that one of the consumer trends that lead to a higher probability of innovation success is the importance of product/services that optimizes tech-savvy and tech-hungry consumers' "Return on Time". One of the premises of the phenomenon *"Cloud Computing"* is to reduce dependency on earthlike products, services, hard drives and servers, freeing up capacity with more convenient and intuitive functional solutions that saves the consumer time and money. We are inclined to ask; given the inevitable business ultimatum of "innovate or die", should not firms focus on how consumers' actual use new technology solutions and the motivation behind?

1.2 An Old Idea Whose Time Has Come

Cloud computing *"represents a fundamental change in the way information technology (IT) services are invented, developed, deployed, scaled, updated, maintained and paid for"* Marston et al. (2011:176). Put succinctly, Cloud computing enables a consumer to use different applications, platforms or software infrastructure over a network and access it on one or more digital devices. John McCarthy proclaimed in 1961: *"Computation may someday be organized as a public utility"* (Yusuf et al. 2011:47), and Armbrust et al. (2009:2) calls cloud computing *"an old idea whose time has come"*. The hype of cloud computing has led Gartner Research to forecast the phenomenon to be a *$150 billion business by 2014* (Marston et al. 2011), and ABI Research (2010) has released a new study, "Consumer Cloud Computing", which found that a overwhelming *143 million consumers* took advantage of the free or low-cost cloud applications, a number that is forecasted to reach nearly 160.6 million by the end of 2015. Indeed, Vivek Wadhwa, Professor associated with amongst others Harvard and Stanford, classified the advance of cloud computing as one of his five tech predictions for 2012 (Wadhwa, 2011). IMS Research (2010) expects the growth of connected devices to reach 22 billion within the next decade, effectively increasing consumers' incentives to move to the cloud. The current findings of Andreassen et al. (Working Paper) trend research is supported in, among others, a recent

American consumer cloud computing report by marketing research agency Ipsos MediaCT (2011:3); *"Cloud-based digital content and services for consumers are ramping up, due to a confluence of market forces: smartphones, tablets, and other web-centric devices; ever-expanding web connectivity capacity; increasing demand for mobility and convenience; and supply-side desire for secure and economical delivery of content and services".* Consequently, the fundamental question market oriented innovators should ask themselves is: *How can I use the cloud to facilitate adoption of my innovations and create added value for my customers?*

1.3 Theoretical Contribution and Managerial Implication

The main issue of the state of the art on cloud computing as a platform for facilitating innovation adoption and creating added value for consumers is precisely the lack of consumer oriented academic literature, surveys and reports. Most of the current articles and books on cloud computing are written from a B2B or technical perspective. Similarly, literature on the subject of Return on Time is scarce and inconclusive, and few, if any, attempts to explore the marketing opportunities created by the cloud and current hot consumer trends. We therefore seek to explain our conceptual model with theories from other fields where applicable. In this thesis we aim to contribute to the fields of consumer behavior on the Internet, hereunder cloud computing, technology adoption and added value. From a managerial point of view, we aim to use cloud computing characteristics to explain and investigate how return on time and functionality influences the adoption of innovations leading to perceived added value for consumers and consequently higher willingness to pay for innovations. Because innovation is a ticket to stay in the market, this research is of great importance to managers. The goal is therefore to provide companies with guidelines to avoid innovation flops by knowing how to incorporate consumers' future needs when creating tomorrows products/services. As Andreassen (2011:B) notes, "the sky is NOT the limit!"

2. Conceptual Model and Problem Statement

2.1 Conceptual Model

In our conceptual model (Figure 2.1), we depict the relationship between the independent variables (IV's), dependent variables (DV's) and moderators. Return

On Time, Functionality and Adoption of Innovation are intermediate variables due to their independent and dependent nature. The model explains that Return on Time is a function of consumers' ability to buy, save and spend time, while Functionality is affected by the scalability and availability of an innovation. Return on Time and Functionality are predicted antecedents to Adoption of Innovation, moderated by Privacy and Security. Finally, Adoption of Innovation is an antecedent to the consequence variable, Value Added. Scalability, Availability, Privacy and Security are derived concepts from the Cloud Computing literature, while the concept of Return On Time originates from trend literature. Functionality, Adoption of Innovation and Value Added stems from general marketing literature.

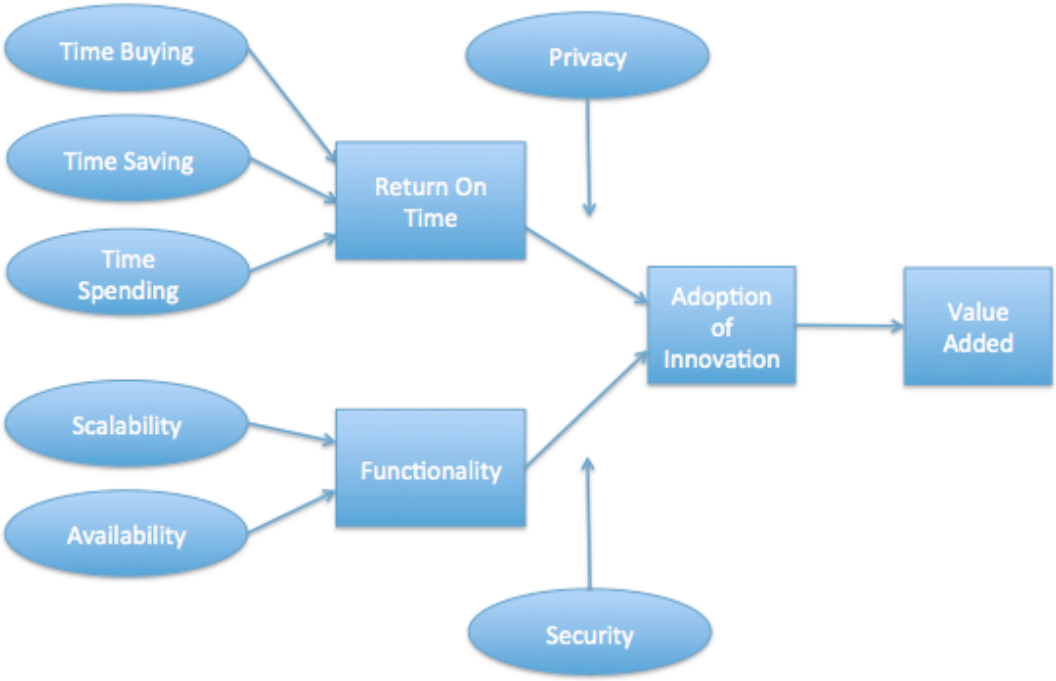

Figure 2.1: The Conceptual Model

2.2 Problem Statement

Based on our conceptual model, the topics relevancy today and the following literature review, our preliminary problem statement is:

How can managers use cloud technology to improve consumers' adoption rate of new innovations by increasing functionality and consumers' perceived return on time to create added value?

It is important to note that the problem statement will function as a guideline for future progress and is subject to continuous improvement.

3. Literature Review

3.1 Defining Cloud Computing

Defining cloud computing is not an easy task due to the existing vast array of nebulous terms, concepts and explanations which is constantly changing and evolving faster than most can keep up with (Chee and Franklin, Jr. 2010, Marks and Lozano 2010). Velte, Velte and Elsenpeter (2010:3) simply denote the cloud icon on a desktop as representative for *""all that other stuff" that make the network work"*. The term has been widely used in advertising and hyped in media, and it has been featured in expos, conference, journals and numerous articles since the late 2000's. The debate has been fueled with both negative and positive voices. Larry Ellison, Oracle's CEO, was quoted in the Wall Street Journal remarking: *"The interesting thing about Cloud Computing is that we've redefined Cloud Computing to include everything that we already do. (...) I don't understand what we would do differently in the light of Cloud Computing other than change the wording of some of our ads"* (Krangel 2008). Hewlett-Packard's Vice President of European Sales, Andy Isherwood, agreed and stated that *"a lot of people are jumping on the (cloud) bandwagon, but I have not heard two people say the same thing about it. There are multiple definitions out there of "the cloud"* (Armbrust et al. 2009:3).

Scholars also debate the term Cloud Computing. Chee and Franklin, Jr. (2010:3) encompasses management, efficiency, delivery mechanisms and the concept of abstraction and states: *"Cloud Computing is an information-processing model in which centrally administered computing capabilities are delivered as services, on an as-needed basis, across the network to a variety of user-facing devices"*. Buyya et al. (2008:601) incorporates clusters and grids to propose the following definition: *"A Cloud is a type of parallel and distributed system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resource(s) based on service-level agreements established through negotiation between the service provider and consumer"*. A recently more widely used definition stems from a

working paper composed by the Commerce Department's National Institute of Standards and Technology (NIST). NIST defines cloud computing as *"a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction"* (Mell and Grance 2011).

These definitions all suggest that cloud computing is a concept for using the Internet to deliver hosted services in a wide array of categories. NIST suggests three basic service models for cloud computing:

SaaS – Cloud Software as a Service:

The SaaS model allows customers to use various client devices through a thin client interface (web-browser, web-mail) to access an application that is hosted as a service on a cloud infrastructure. The cloud infrastructure, uncontrolled by the customer, includes network, servers, operating systems, storage and individual application capabilities – with the possible exception of limited user-specific application configuration settings (Mell and Grance 2011, Velte et al. 2010).

PaaS – Platform as a Service:

The PaaS model supplies the customer with the capability to create, build or acquire applications and services using tools and programming languages supported by the provider, and to deploy these onto the cloud infrastructure. The customer does not have to download or install any software. The customer has no control over the underlying cloud infrastructure including network, servers, operating systems or storage. However, the customer does have control over the deployed applications and possible application hosting environment configurations (Mell and Grance 2011, Velte et al. 2010).

IaaS – Cloud Infrastructure as a Service:

The IaaS model allows the customer to deploy and run arbitrary software (operating systems and/or applications etc.) on processing, storage, networks, and other fundamental computing resources supplied as an outsourced service from a cloud provider. Similar to SaaS and PaaS, the customer does not control the underlying cloud infrastructure, however, the customer controls operating

systems, deployed applications and possibly limited control of select networking components (e.g. host firewalls) (Mell and Grance 2011).

NIST lists four deployment models for the cloud infrastructure. *Private clouds* refer to a cloud infrastructure controlled exclusively by an organization, and managed by the organization or a third party existing either on premise or off premise. *Community clouds* refer to a cloud infrastructure, which is shared by more than one organization and where the infrastructure supports a specific community with collective concerns (e.g. security requirements and compliance considerations). It is managed and exists similarly as a private cloud. *Public clouds* are owned by an organization offering cloud solutions where the general public or a large industry group have access to the cloud infrastructure. Finally, a *hybrid cloud* is composed of two or more of the three preceding models (Mell and Grance, 2011 and Ryan and Loeffler, 2010).

3.2 Drivers of Functionality: Cloud Computing Characteristics

Above the Clouds: Heaven?

Surveys and articles stemming from leading companies and acclaimed newspapers (i.e. Deloitte, Gartner Group, Wall Street Journal, Washington Post etc.) indicate that issues and challenges faced using cloud computing in B2B market is similar to what consumers experience when they first encounter the cloud. From a business perspective, Tsai et al. (2010:684) determines that the advantage of cloud computing over traditional computing to be *"agility, lower entry cost, device independency, location independency, and scalability"*. Marston et al. (2011) identifies the following characteristics; faster time-to-market due to quicker access to resources, lowered barriers to innovation, cost-advantages and scalability, while KPMG's annual cloud computing survey (2010) determined cost savings, improved flexibility and better scalability as the main drivers of cloud computing. Buyya et al. (2009:601) asserts that computing services needs to be *"highly reliable, scalable, and autonomic to support ubiquitous access, dynamic discovery and composability"*. Pemmaraju and Rangaswami (2010) found that business agility, cost efficiency and to leverage core competencies and free IT resources to focus on innovation were the main reasons for moving to cloud computing. Armbrust et al. (2009:4) highlights the following advantages of cloud computing:

"The illusion of infinite computing resources available on demand, the elimination of an up-front commitment by cloud users, and the ability to pay for use of computing resources on a short-term basis as needed (e.g. processors by the hour and storage by the day)". The authors also assert that mobility and mobile interactive applications will, depending on level of availability, be a significant driver for cloud computing. Moreover, they highlight the importance of availability as crucial for any service today: if Google search were down, people would automatically assume the whole Internet was down (!). Katzan Jr. (2009) describes cloud service facilities by four key factors: *Necessity* – a certain amount of users will depend on the service to satisfy daily needs, *reliability* – the availability of the service, *usability* – the perceived easefulness and convenience of the service, and *scalability* – the ability for users to expand or decrease their use of the service (pay-as-you go). The author also stresses the importance of accessibility and that services are typically free to the client. Furthermore, a benchmark research report from Ventana Research (2011) indicated that cloud computing enables more rapid information flow facilitating quicker response to changes in the market. Vivek Kundra, Federal CIO in the Obama Administration, denotes cloud computing from a consumer perspective by using the following analogy; "*There was a time when every household, town, farm or village had its own water well. Today, shared public utilities give us access to clean water by simply turning on the tap; cloud computing works in a similar fashion. Just like water from the tap in your kitchen, Cloud Computing services can be turned on or off quickly as needed. Like at the water company, there is a team of dedicated professionals making sure the service provided is safe, secure and available on a 24/7 basis. When the tap isn't on, not only are you saving water, but you aren't paying for resources you don't currently need"* (Biswas 2011).

Converting these business characteristics to consumer characteristics taken current consumer trends into account, the common denominators seems to be: 1) *Scalability*, hereunder the low entry-costs, cost-saving advantages and the pay-as-you-go model, and 2) *Availability*, hereunder the flexibility of device and location independency, the current consumer need to stay agile, connected, mobile and have ubiquitous access anytime anywhere, and the seemingly abundant available resources and flow of information existing in the cloud today. Deloitte (2009:14) wrote in their market overview report of cloud computing *"the pay-as-you go*

model and multi-tenancy leads to increased ROI with quicker payback and upfront investment". Similarly, from a consumer perspective, the higher perception of scalability and availability offered by a service, the higher perception of functionality is created. Together with the perceived *ROT - return on time*, the functionality of the service/product leads to added value for the consumer.

Scalability

The notion of scalability relates to the degree to which consumers may tailor a service to suit their needs. Ahmed et al. (2011:711) defines it as *"how well the solution to some problem will work when the size of the problem increase"*. Customer needs evolve, and firms need an understanding of how to satisfy customers through this process or risk dissatisfaction or a loss of customers. The attributes of applications address this challenge, if not by design, through intrinsic qualities of the cloud technology. Marston et al. (2011:178) argues that services using the cloud *"can be shared by different end users, each of whom might use in in very different ways"*. The goal is therefore to be able to scale services up and down based on demand. From a consumer perspective, the ability to scale one's use of a certain service based on demand will result in significant cost-savings in the form of personal economies of scales achieved on the behalf of the service provider.

Drop box illustrates the importance of scalability, for both service providers and consumers. Take the example of a hypothetical customer that are considering use of the service for the first time and is therefore not that familiar with it. The customer is interested and is giving the service a chance, but will initially store a limited amount of data. Drop box then lets you choose 2GB of storage for free. Later, that same customer, satisfied with the service provided, may want to increase his or hers storage capacity. Through becoming a paying customer, the appropriate storage space may be acquired and the amount paid is relative to the requested amount of GB. This functionality, which is easy to supply in applications, is an attribute customers and their wallets appreciate. Rogers (1995) notes that the perceived relative advantage of an innovation is an explanatory concept in the innovations adoption process. The simple functionality of

scalability lets consumers customize their service to suit their needs and willingness to pay.

Availability

Drop box was mentioned due to its scalability attribute. Another important, functional enhancing aspect with drop box, illustrative to a wide range of applications, is availability. Stored documents are available on computers, smartphones and pads regardless of where you are in the world. Katzan Jr. (2009) notes that among applications' strengths is availability. Through Internet access, applications has the potential to be accessed and used regardless of what physical location the consumer is in and other activities he or she is currently involved in.

3.3 Functionality:

Relative advantages perceived by consumers are, not surprisingly, predictors for adoption (Rogers 1995). Application offer services that can easily be acquired through different channels and maybe even in better quality. Why then, has the cloud made such an impact? This is a complicated question, but a part of the answer is expected, as seen in the research model, to be the increased perception of functionality through a tectonic shift in the areas of scalability and availability.

TRA and TAM

The theory of reasoned action model aims to identify determinants of behavior that is consciously intended (Davis et al. 1989). TRA consists of three explaining constructs; behavioral intention, attitude and subjective norm. A person's behavioral intention is the sum of the attitude related to that specific action and his or hers subjective norm. ($BI = A + SN$). Behavioral intention is a measure of the strength of intention to perform a given task. Attitude is a set of beliefs and feelings relating to an action. These beliefs are formed through information processing of external stimuli, and are an expression of a person's evaluation of the likelihood that an action will lead to a specific outcome. Attitude is defined as; a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object (Fishbein and Ajzen 1975:6)." This definition evolves around three components that bring ambiguity into the interpretation of the concept and the operationalization of measurement scales. (1) Attitudes are learned; (2) attitudes are predispositions; (3) and consistency (consistently favorable or unfavorable.) Fishbein and Ajzen (1975:11) suggest a

way to deal with the conceptual ambiguity in this definition of attitude by; *"(...) attitude should be measured by a procedure which locates the subject on a bipolar affective or evaluative dimension vis-à-vis a given object."* The term subjective norm refers to a person's perception of the influence from significant individual or group regarding the action, and his or hers motivation to follow these expectations

The TRA is a general model and may be used in a broad specter of usage situations. For the purpose of this research, an extended version of the model specifically designed to relate to the acceptance of computer technology is applied. The technology acceptance model was developed by Davis (1986) and is "*capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified"* (Davis et al. 1989:985*)*. TAM's ability to explore the external variables that influence internal beliefs, attitudes and intentions underscores its applicability for this study through its aptitude to understand the reason behind a certain behavior (Davis 1986). Internal beliefs in TAM consists of perceived usefulness (U) and perceived ease of use (EOU), which refers to the consumer's subjective evaluation of the potential benefits related to the use of the technology and the effort the consumer believes is needed to apply the technology, respectively. Additionally, with everything else equal, EOU is expected to influence U, and U is also expected to influence BI along with attitude, which differs from TRA. TAM will be used to look closer on the potential impact of scalability and availability. These variables have the possibility of influencing consumers' evaluation of the service's usefulness, which has a direct impact on attitude as well as behavioral intention.

3.4 Return on Time

Time Buying

Time is a concept that has been widely studied in consumer behavior. Berry (1979) introduced the "Time-buying" consumer as a result of consumers wanting to preserve time due to a perception of time scarcity in the society. A time-buying consumer would focus on reducing *nondiscretionary time* – the time they feel obligated to spend (i.e. work, transport, household tasks, food preparation etc.). Purchasing or "hiring" products or services (dishwashers, microwave ovens) can

free up nondiscretionary time (Nickols and Fox 1983, Bettencourt and Ulwick (2008). Feldman and Hornik (1981) describe time in an absolute sense as finite, not acquirable and not storable (except in the form of books and other media). While you may not be able to buy five minutes at the grocery store, it is certainly easy to use monetary resources to free up time. The term fast food was not coined by accident, possibly reflecting the desire to spend time on tasks and behaviors that is perceived to be more rewarding than food preparation. A magnitude of the products and services available today share this attribute, being easily available and faster than its predecessors which provides consumers with the possibility of freeing up time. Berry (1979) suggested that the development of a time buying consumer was influenced strongly, but not exclusively by time scarcity. Additionally, a shift in what people wanted to spend their time on, more "me-time" is also an important influence.

Time Saving

According to Feldman and Hornik (1981:407), "*the term "saving time" really means the reallocation of time from one activity to another activity to achieve greater efficiency"*. Efficiency in performing a task carries with it a fortunate side effect. Freeing up time allows consumers to undertake their choice from a wide range of activities intended to increase the well being of the individual. Activities they may not otherwise have had the time to perform. Another way to free up time is by reorganizing the current weighting of time spent on or choosing between tasks. Prioritizing through reducing time spent on one activity and shifting workload to others in the family or hired help are commonly used strategies (Nickols and Fox 1983). Another contributing factor is explained through product scarcity, which was shown to be losing its place to time scarcity as an expanding customer bases' perception of material welfare was maturing and the scarcity of time became more salient (Anderson 1971). Anderson (1971) coined the term convenience oriented consumption and suggested that convenience could release time for alternative use. Relating this to the use of applications it is likely that solutions perceived as convenient may be attractive for users that live lives in which they perceive time to be a scarce resource, as indicated through the research model.

Time Spending

Due to the perishable nature of time, a natural goal is to use the freed timeslots created by the reallocation of time in a satisfactory way to enhance the quality of life (Berry 1979). "Quality information faster" is another hot consumer trend identified by the in-progress research of Andreassen et al. (Working Paper). The basic premise of this consumer trend underscores the importance of time allocation when consumers search and choose services and/or products. The opportunity to be able to filter and organize information to one's preferences is an important prerequisite for maximizing return on time. Firms can therefore improve the quality of information services by tailoring content to consumers' interests to optimize their time allocation. As mentioned previously, the shift towards less focus on material goods, and increased importance of me-time underscores the relevance of time spending in consumer evaluations of whether or not to adopt a product. Numerous applications are designed to entertain, and an understanding of consumers' preferences with regards to how they spend time they have otherwise acquired is thus important in order to resonate with potential customers.

Return on Time is a construct introduced in the working paper by Andreassen et al. as a term for capturing the importance of time optimization in today's hectic society. "*Since time is scarce, people claim optimal benefits from their time allocation. Individuals optimize their Return on Time when they can free as many time slots as possible and fill them with the optimal number of self-fulfilling experiences" (*Andreassen et al. Working Paper:8). The authors further explain that people seek the optimal balance of both quality and quantity of experiences when optimizing return on time. Quality of experiences can be optimized by efficiently allocating time to activities that provide the consumer with the greatest value in terms of self-fulfillment, efficiency and pleasure. Optimizing the number of self-fulfilling experiences per unit of time can maximize the quantity of experiences. The research of Andreassen et al. suggest that time-trapped customers will perceived an innovation that increases their return on time as offering added value. As noted, the ability to predict consumers' long-term needs is a prerequisite for avoiding innovation flops. Creating a greater return on time means that firms must innovate to be faster, cheaper, better and make more

convenient solutions than competitors. This will in turn facilitate a higher adoption rate of the service/product (Andreassen et al. Working Paper)

3.5 Moderators of Adoption: Cloud Computing Characteristics

Above the Clouds: Hell?

Several issues arise when businesses are contemplating to take their companies into the skies. Security and reliability are the two leading arguments against entering the cloud (Chorafas 2010, KPMG 2010, Deloitte 2009). Most companies do not like the idea of a loss of control over their basic IT infrastructure. Some companies might feel that the cloud is too vulnerable to hacking and data-theft, as well as the pricing for services is hard to evaluate. End users share some of the concerns firms have towards migrating to the cloud. Privacy is one of the risks that will face consumers who consider cloud solutions. Some of the reservations consumers hold include how the service provider will use the data, whether or not it will be exposed to third parties, and the security of the stored data (Svantesson and Clarke 2010, KPMG 2010). *"End users lack the necessary resources and security education to investigate the data practices of cloud storage providers"* (Sachdeva et al. 2011:1). It is also normal for cloud storage services to not offer any service guarantees, to assume no liability for any data loss, and to reserve the right to disable accounts without reason or prior notification (Sachdeva et al. 2011). It is difficult to assess how many consumers that actually are aware of these terms. Andreassen et al. (Working Paper) suggest that privacy has become a trend among consumers, and that the threat of the involuntary disclosure of information such as credit card numbers, social security numbers, transaction history etc. is being amplified by cloud technology. Additionally, governments have put forth demands that firms must allow surveillance of the content stored on their servers (Soghoian 2010). It is clear from these conditions, that while the cloud is maturing, there is still a lot of uncertainty related to the use of the technology and the contract in which customers enter into with service providers. Therefore, security and privacy are likely to affect the degree to which users are willing to adapt to cloud services.

3.6 Value Added

Perceived value is obviously of importance for the continued and increased success of applications. In many ways, although several new and creative

solutions have been introduced, applications are not reinventing the wheel. They offer services customers services they are already familiar with, such as games/entertainment, software and information. Therefore it is important to separate between value and added value. Many of the services offered through the cloud have reliable substitutes. By added value in this paper we will rely on Chernatony and Harris' (2000:49) who posit; "*added value is a multidimensional construct which includes functional and emotional benefits, as perceived by consumers, relative to the competition. These often also result in benefits for the firm.*" For clarification, in our context, competition refers to substitutes and firm relates to cloud based applications as an industry. Chernatony and Harris underscores that added value is relative to competition. Firms offering applications would therefore benefit from who their current and potential customers consider to be alternatives to their solution and to which degree their solution's added value is unique, relevant and satisfying.

4. Methodology

As our literature review has uncovered, our research area is relatively new and undiscovered. Bryman and Bell (2007) asserts that a strategy called the iterative method - a weaving back and forth between data and theory – is preferred in this case.

"A research design provides a framework for the collection and analysis of data" (Bryman and Bell 2007:40). The design describes how the entire research process should be organized in order to solve the specific task given. Choosing a research design depends on the extent of knowledge of the research area, and the ambition level for the project (Gripsrud et al. 2006). The researcher uses an exploratory design when little or nothing is known about the research area, and the primary goal is to explore a certain topic. The purpose of the design is to gain insight and to comprehend the situation at hand as well as to develop a hypothesis, which then later can be used as bases for further research (Gripsrud et al. 2006). We have chosen to use the *exploratory research design*; due to our imperfect understanding about exactly what measures should be taken to operationalize the different variables in our research. The exploratory design dictates a process where we start exploring relevant literature and gather information through secondary data. The

collection of primary data will also be employed in order to facilitate the subjective approach (Gripsrud et al. 2006).

Through qualitative methods such as in depth interviews with established firms offering cloud technology we aim to improve our understanding of the dynamics in the cloud market with regards to what the firms themselves feel are the biggest challenges in eliciting consumer acceptance and what the expected future strategies and challenges are. Through guided interviews, we will be able to explore the complexity of the industry through respondents' insight based on their own business activities. A checklist will be prepared that includes the main topics and questions we want illuminated. Simultaneously, we expect to probe around new topics and areas that we are not familiar with, which build on the interviewees' expertise. Both first and second hand information will be used in this stage of the research. The authors expect this process to shed new light on our current understanding of the subject, and therefore note that changes may be made to the proposed variables and the implementation plan as a result of these findings. The current plan is to use a generic utility app as an example of cloud based technology in a scenario-based survey.

5. Plan Forward

As noted, this is just a preliminary report, and chances are that the end result will vary substantially. In the following month our main focus will to continue the data gathering process. By increasing our own competence on the subject, we will also discover more research and theories that have been used by previous researchers with the potential to aid our research, as we need to decide on and define all variables included in the research model. Our main source of information will be journal articles. Books will also to be used to gain a wider range of knowledge, while market reports will supply us with more recent data. There is a magnitude of articles with opinions and predictions with regards to the development of cloud computing, trends, technology adoption and added value, however, without the proper theoretical foundation or empirical evidence to support the claims. Therefore, we need to be wary with regards to the source of information to ensure the quality of our data.

After more extensive reading and research has been completed, the next step will be to interview managers in firms that offer cloud technology. We expect this stage to provide us with more information relating to the development of constructs to be used in our research model. Additionally, we expect these interviews to supplement the knowledge we gain through reading, which is why it is necessary to get this process started as soon as possible.

After we have processed the information following the interviews and incorporated them into the study, we aim to do a survey to potential consumers of cloud technology. Writing and proof reading of the thesis will be a continuous process until submission.

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