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ICT in Business

**Self-Service Technology Adoption:
A B2B Logistics Perspective**

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MASTER'S THESIS

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Abbreviations

SST: Self-Service Technology, a technological interface allowing customers to obtain services independent of involvement of a service employee.

TBSS: Technology Based Self-Service, synonym for a self-service technology.

TAM: Technology Acceptance Model, theoretical model used to describe the factors that influence SST adoption.

LSP: Logistics Service Provider, a company that provides management over the flow of goods and materials between points of origin to end-use destination.

LLP: Limited Liability Partnership, a partnership in which some or all partners have limited liabilities.

B2B: Business - to - Business, commerce transactions between businesses.

B2C: Business - to - consumer, commerce transactions between consumers.

ATM: Automated Teller Machine, cash dispenser.

EDI: Electronic Data Interchange, is an electronic communication method that provides standards for exchanging data via any electronic means.

SPSS: Statistical Package for the Social Sciences, a software tool used for statistical data analysis.

Abstract

Self-service technologies (SSTs) have become immensely popular in today's world. Ranging from self-check in at the airport, withdrawing funds through an ATM or even online shopping, the application of self-service technologies is becoming widespread. While its usage is abundant in a B2C context very few SSTs have been implemented in a B2B context, especially for logistics service providers.

This thesis addresses the various factors that affect the adoption of SSTs within a specific B2B logistics context. By examining the adoption of SSTs within other industries (retail, finance and airline) a number of theoretical models were uncovered that could potentially describe the adoption in a B2B context. These models were used to create a single hypothetical model describing the adoption of SSTs for B2B logistics. A survey was conducted and its results used to examine the validity and potential usage of the hypothetical model.

The hypothetical model proved to be incorrect and could not be considered an accurate description of the adoption of SSTs within a B2B logistics context. The Technology Acceptance Model by Davis was shown to be the most fitting representation of SST adoption within the context of this thesis. Regardless it can be complemented using several factors mentioned in the Diffusion of Innovations theory by Rogers such as "complexity" and "compatibility". Future (qualitative) research would have to be conducted in order to uncover factors related specifically to the adoption of SSTs in a B2B context.

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1. Introduction

Over the past few years digital technology has completely changed the way customers and businesses deal with services. Our daily life is surrounded by services supported by information technology, from visiting an ATM machine to checking in at an airport, you can do it all yourself through so called “Self-Service Technologies” (SSTs) or “Technology Based Self Services “(TBSS)

A SST is a technological interface that enables customers to obtain goods and services without direct contact with the service provider (Meuter, Ostrom, Roundtree, & Bitner, 2000). Examples of SSTs are: Internet banking, self-scanning possibilities in warehouses and supermarkets, paying bills by mobile phones, order tracking, the airline check-in via Internet, check-in booths at airports, interactive kiosks, interactive phone/voice systems, ATMs, package tracking, tax preparation software, electronic retailing and Internet shopping (Castro, Atkinson, & Ezell, 2010).

Whereas SSTs are common in some industries such as retailing and finance they are less predominant in the field of logistics. BDP International as a Logistics Service Provider (LSP) provides other businesses with the ability to outsource their logistical process and in this context only deals with other companies (B2B) as opposed to dealing directly with individual consumers (B2C). Communication with the customer and service delivery differs greatly between each customer as does the service itself, for larger customers with significant order volume BDP provides A to Z support. These customers have outsourced almost their entire logistics process to BDP, which mostly includes transportation from a production plant to the end-customer. Within this context some form of self-service technology is used, mainly in the form of Electronic Data Interchange (EDI) which allows for basic digital communication between the customer and BDP. While automation and SST usage has become the standard for high volume customers, it is less frequently implemented or used by low volume, high margin customers. IT focus within logistics has historically been on high volume automation as the below figure shows.

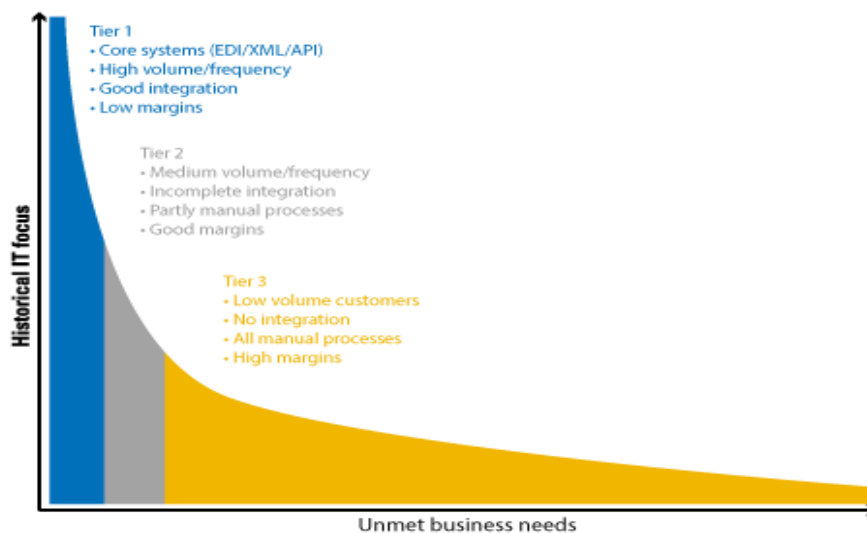


Figure 1: IT Focus in Logistics (Andreasen, 2014)

While the logistics industry seems to have fallen behind when it comes to SSTs, we're seeing a gradual increase in usage of said technologies. The introduction of SSTs has created dramatic changes within certain industries. For example consider retailing where physical stores (bricks and mortar) are slowly disappearing and web based stores are popping up like flies. This thesis addresses the ways in which customers perceive SSTs, what affects their attitude and motivation to use them and how LSPs can use these factors to gain a competitive advantage in regard to SST applications.

1.1 Thesis Structure

This thesis is written according to the following structure. Chapter one includes a brief introduction to the topic, a problem description including research questions and a summary of the organizational and scientific relevance of the thesis subject.

The second chapter describes the methods used to conduct research. The techniques used for the literature review are described as well as details in regard to the survey such as; population size, respondent selection, and response rate. Chapter three includes the results of the literature review with descriptions of existing theoretical concepts found in other industries. Following the results of the literature review is a description of the various types of logistics service providers presented in chapter four.

Chapters five, six, and seven contain a description of the hypotheses, theoretical model and survey results respectively. The hypotheses have been derived from the results of the literature review and the theoretical model is in turn established by combining the hypotheses. Chapter seven includes in-depth analyses of each individual hypothesis and uses statistical techniques to either confirm or reject these hypotheses.

Chapter eight includes the answers to the sub-questions formulated in chapter one. These answers are based on the results as presented in chapter seven. Finally in the ninth chapter the results and approach of the thesis are discussed, as well as the research limitations and the opportunities for future research.

1.2 Problem Description

There is no denying that Self-service technologies will play an important role in nearly all industries. However existing literature and discussions have focused mostly on certain industries (Retailing & Banking) and within a certain context (B2C). This thesis aims to fill the literary “gap” by addressing the attitudes and motivation to adopt SSTs within the logistics industry and more specifically in a B2B context.

The main research question that will be addressed is;

“What factors influence the adoption of self-service technologies by customers of logistics service providers?”

In order to successfully answer the above mentioned research question the following sub-questions have been formulated;

Sub-Question #1: *How have self-service technologies been introduced and adopted within B2C industries?*

Within this part of the research, existing literature is consulted in order to determine how customers and businesses within the banking, retail and airline industries responded to and adopted self-service technologies. This information will be used to create hypotheses about the possible effects of such technologies within the logistics industries.

Sub-Question #2: *What beliefs do the customers of logistics service providers hold towards the adoption and usage of self-service technologies?*

The results of the first sub-question will be combined with survey data in order to determine what customers of the LSP think of SSTs and what affects their motivation to adopt such a technology. This will either confirm or disprove hypotheses formulated as a result of the literature review.

Sub-Question #3: *How does the world of logistics and specifically the environment of the LSP differ from that of B2C industries in regard to self-service technology adoption?*

This part of the study will address the differences between B2C industries (banking, retail, airline) and the B2B environment of LSPs in regard to the adoption of self-service technologies, and where possible expand on present academic theory.

Sub-Question #4: *What are the motivators that enable / block SST adoption?*

The answer to this question will briefly describe the various factors related to SST adoption that can be influenced or caused by the LSP.

1.3 Relevance

This sub-chapter briefly describes the relevance of this thesis on a scientific and organizational level.

1.3.1 Scientific Relevance

Existing literature is severely lacking in regard to self-service technologies in a B2B and logistics setting. This thesis aims to expand on existing theory created within the context of B2C and applying it to the situation of the LSP. The Technology Acceptance Model, Service Characteristics by Rogers and the Self-Efficacy theory by Bandura will be used as theoretical frameworks. Numerous hypotheses will be tested in order to verify the validity of these models and if possible expand on them within the context of B2B logistics.

1.3.2 Organizational Relevance

BDP International and all other logistics service providers can benefit from the results of this thesis. The results will provide LSPs with an insight on what factors influence the adoption and usage of SSTs and how these factors have affected various other markets and industries. Furthermore a single specific part of the thesis is dedicated to assess which factors can be influenced by LSPs and potentially stimulate the usage of SSTs in order to gain a competitive advantage. The competitive advantage can be achieved through service innovation which has shown to lead to higher levels of market performance (Grawe, 2009). Additionally compared to other industries the innovative output of LSPs is rather low (Blecker, Kersten, & Ringle, 2014) so being innovative within this market could be a competitive edge if done correctly.

2. Method

Throughout this chapter the methods for quantitative research are described. Initially a literature review was conducted in order to gain an understanding of the context of the research and the theoretical framework in which the research is placed. The results of this literature review have been used to create the subsequent survey. The survey has been used as the primary tool for data collection and allowed for data analysis, which in turn was used to uncover correlation within the data, as well as confirm or disprove the hypotheses formulated after the literature review. The figure below shows the overall research approach that has been used. The essence being that the results (conclusions) provided give an answer to the research question and that new research can spark from these findings. The methods mentioned will be described more extensively in the following sub-chapters.

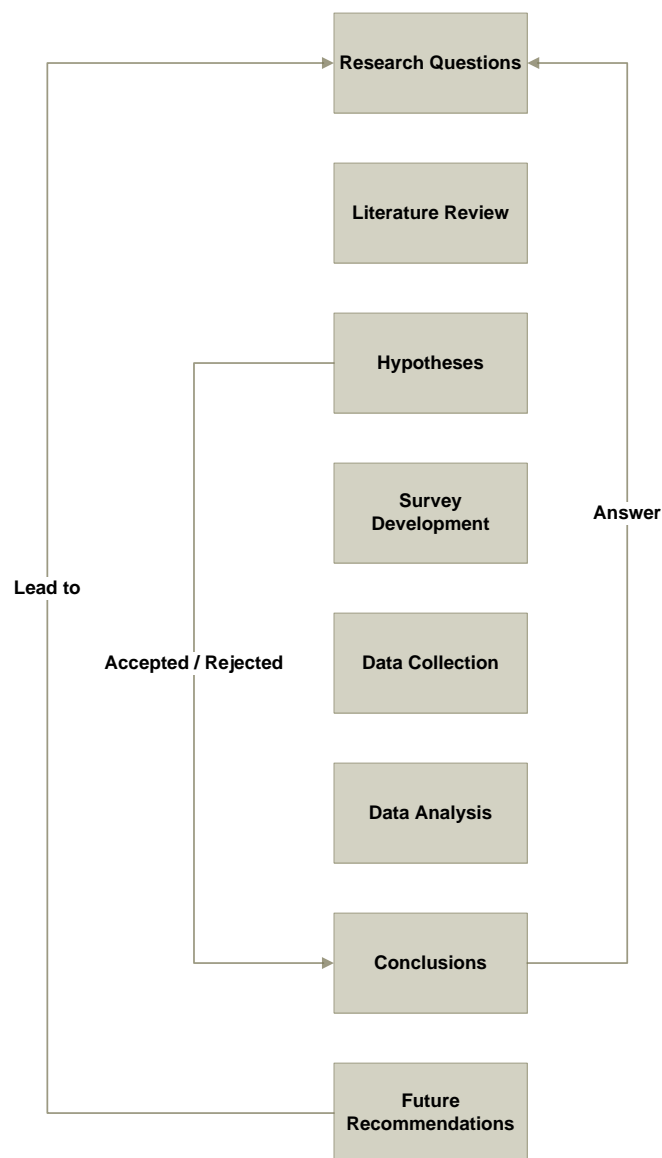


Figure 2: Research Method

2.1 Literature Review

Existing literature was consulted to identify the theoretical models that have been presented in the field of SST research. The results have shown that the literature and models were mostly related to B2C environments and that the psychological behavior in regard to SST adoption has been widely discussed. No literature was found in regard to SST adoption within a B2B logistics context, which in turn resulted in the proposed research question. This approach is known as the “Deductive approach” (Saunders, Lewis, & Thornhill, 2009).

After the identification of the research gap, additional literature was reviewed in order to come up with hypotheses that could be used to answer the research questions. This review was done in a structured manner using the below method as described by (Saunders, Lewis, & Thornhill, 2009).

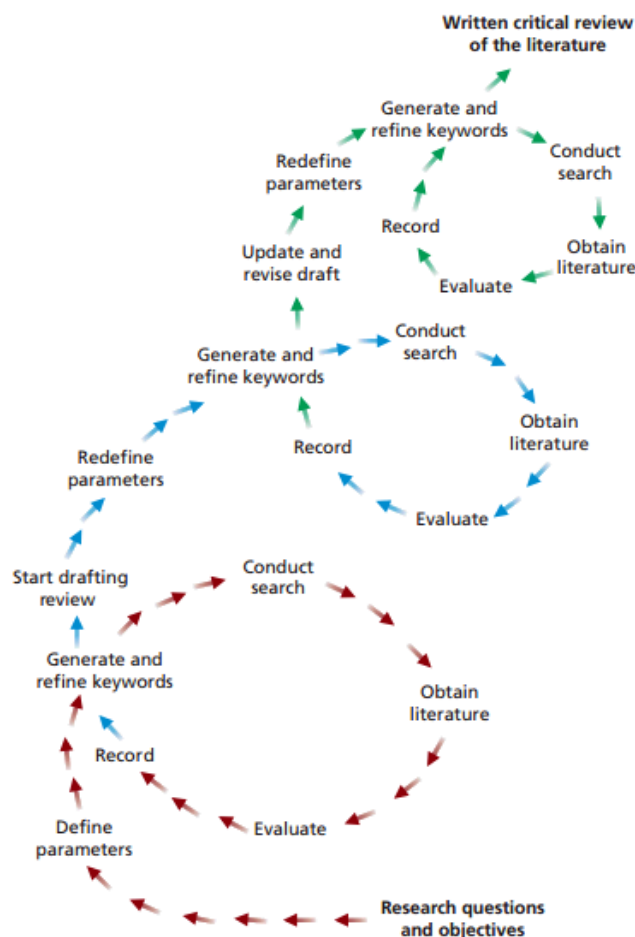


Figure 3: Literature Review Process (Saunders, Lewis, & Thornhill, 2009)

Several literary “loops” were performed with each loop creating additional keywords and lists of relevant authors within the field. The literature itself was verified to be relevant to the study before it was thoroughly reviewed.

At first the abstract was read in order to determine whether the subject matched with what was being researched. If the document appeared unclear or unfitting after reading the abstract it was immediately discarded. In case the abstract was deemed relevant enough, the introduction and conclusion were read in order to identify the documents main findings and beliefs. Once again the choice was made whether the literature was relevant enough after which it was either discarded or reviewed in detail. Eventually, a large amount of literature was reviewed and a theoretical framework for the research was established. The literature also allowed for the creation of hypotheses and a theoretical model that could be tested throughout the remainder of the research.

2.2 Survey

In order to confirm or disprove the hypotheses, data had to be gathered from the target group. In this case the target group consisted of companies that have outsourced their logistics to a logistics service provider (LSP) and operate solely on a B2B level. The questions used in the survey were drafted in such a way so that they were concise, to the point, and easy to understand for those with less knowledge of the field.

Special attention was paid to the length of the survey. Because it would be sent to the customers of BDP it was essential that they did not feel “harassed” or “annoyed” by such a request. The survey was narrowed down to 31 questions in total, half of which were statements that needed to be rated according to the Likert scale (Likert, 1932). This resulted in the survey having an average estimated completion time (without breaks) of 8 minutes. Anonymity was guaranteed to the respondents and their consent was obtained upon the submission of the survey. Because the survey was conducted in a business environment and the respondents were the customers of the LSP, extra precaution was taken not to harm the relation between these companies in any way, shape, or form.

Instrument wise the online tool Typeform was used, this survey tool was chosen due to its professional appearance in both survey layout and URL description as well as its ability to collect, analyze, and present respondent data in real-time. Google Forms was also considered as a tool but was found to be lacking in both presentation and customizability. The survey was conducted between April the 13th 2015, and the 8th of May 2015.

2.2.1 Survey Details

The survey itself has been designed as follows: the first few questions are demographic in nature; this means that they are aimed at obtaining more information about the respondents. The reason this information is necessary is because there might be a relation between the results and the respondents' position within the company and / or the company size and order volume. A decision has been made to design these questions as multiple choices, with the categories of company size, organizational position and order placement type being pre-defined. This was done in order to better structure the data, leaving these questions open ended might have resulted in numerous different answers which would have to be transformed into usable data.

The questions that follow are multiple choice and relate to the respondents experience and attitude towards SSTs. The respondent is presented a number of options that could either motivate or demotivate him/her to use the SST and is asked to select one or more that he or she views as a motivator. The options available are a result of the literature review as previous research on SSTs has uncovered a number of key motivators for SST usage. These factors have been used in the survey as a means to verify whether they apply within the context of this research.

The final questions that made up the bulk of the survey were statements which the respondent had to agree or disagree to using a five point Likert scale (Likert, 1932). These statements were predominantly based on the Technology Acceptance Model (Venkatesh & Davis, 2000) and the Theory of Planned Behavior (Ajzen, The theory of planned behavior., 1991). In a way all the statements aimed to uncover the attitude of the respondent towards SSTs, be that the requirements they set to such a technology or the factors that might motivate them to use it. In order to prevent bias in any way the statements have been formulated in such a way that the theories that they were derived from aren't overly visible, this also makes the statements easier for the respondent to understand and answer.

Furthermore a questionnaire guide was used written by Icek Ajzen (Ajzen, Constructing a TPB questionnaire: Conceptual and methodological considerations., 2002)(author of the Theory of Planned Behavior) which describes possible ways to retrieve respondent data in regard to individual behavior. This guide notes that the context of the statements must be made very clear as well as the way in which the statements themselves are worded. Different wording can change the respondents' attitude even though the same is meant; this could negatively influence the survey results and create a certain form of bias. The final survey can be found in Appendix A.

2.2.2 Respondent Selection

As stated before, the survey was sent to customers of the LSP and to companies that have been customers of the LSP in the past. The contact information was obtained from higher management of the LSP and the survey was distributed via e-mail, accompanied by an introductory letter describing the purpose of the survey and overall research (Appendix B).

No sample was taken from the entire population; the reason for this was that a fairly low response rate was expected. Limiting the number of surveys sent out could have a drastic impact on the number of results returned. Furthermore the profile of the customers was generally the same and therefore no distinction could be made within the respondent group that would impact the research results. The question is then, what is this customer profile? Who are the customers of the LSP?

By far the largest part of the LSPs customer base is international chemical manufacturers. These companies focus mainly on transforming raw material into materials that can be used by end-product manufacturers. While large chemical manufacturers are the main source of income for the LSP, they do not represent the largest amount of customers. This is due to their high and predictable order volume across several years. Even though these types of customers are included in the research, the main focus is on smaller “one time” customers who do not have fixed contracts with the LSP and might switch service provider based on capabilities and pricing. These customers are expected to be far more inclined to use SSTs and are therefore expected to provide more relevant data.

2.2.3 Data Analysis

The survey was sent to 240 individuals on the 13th of April. On the 28th of April all participants of whom word was not received were sent a kind reminder, which once again requested their participation. In total 60 responses ($N = 60$) were received on the 8th of May. After having received all responses data analysis was conducted using IBM SPSS 22.0 and numerous statistical techniques such as Spearman’s Rho, Cronbach’s Alpha, and Mann Whitney U. The anonymized survey results are listed in Appendix C.

3. Self-Service Technologies

This chapter aims to describe what Self-Service Technologies are, how they have evolved over time and what factors affect the adoption of these technologies. These factors will be approached from both a B2C as well as a B2B perspective. Even though the thesis itself focuses solely on B2B interactions the behavior described in a B2C context can to a large degree be generalized and applied to a B2B setting.

As mentioned earlier in this thesis, Self-Service Technologies are technical interfaces that allow a customer, be that a private consumer or a business to acquire a product or service without the involvement of a service employee. SSTs are abundant in our lives; chances are high that each of us make use of a SST every single day. A prime example of a SST that we deal with quite often is that of the gas-station (Vandermerwe & Rada, 1989), first introduced in the late 1900s gas stations used to be manned by service employees. These employees would fill up your tank for you, as well as clean your windshield and check your oil/tires. As cars became more popular, more and more employees were needed to serve the customers, which resulted in increased labor costs. This quickly led to the introduction of the self-service gas station at which the customer could pump their own gas and pay at the cashier. It wasn't long before ATMs (another SST) were incorporated into the self-service gas station, even removing the need for a cashier.

SSTs are essentially the "do it yourself" mentality incorporated into a technical interface (Goodwin, 1988). The introduction of a SST may seem as merely a business decision in order to cut costs and increase overall capacity; it is actually much more than that. Providing the customer with the ability to do something themselves gives them a certain sense of freedom and empowerment which can affect their overall satisfaction with the service. Even though both the service provider and customer will eventually benefit from the introduction of a SST, adoption from a customer perspective is still a widely discussed subject. Even something as common as a self-service gas station is still considered an issue today as some states in the US only have employee operated gas stations (Castro, Atkinson, & Ezell, 2010).

3.1 Initial Trial Decision

So what factors influence the adoption of SSTs? The industries in which SST adoption is more common, such as retailing and finance, have identified the biggest obstacle to be triggering the customer to use the technology for the first time. Which in literature has been defined as the "initial trial decision" (Meuter, Bitner, Ostrom, & Brown, 2005). This phenomenon can be related back to change management theory which describes that people are generally averse to change and are often unwilling to do so. Introducing a SST means an alteration in the previous (old) process and will result in both the customer as well as the service provider having to work differently. Furthermore the introduction will also make the customer a co-producer of the service with certain responsibilities (Meuter, Bitner, Ostrom, & Brown, 2005).

Besides the general aversion to change there are several other factors that directly affect the adoption of self-service technologies. "Role clarity" is such a factor; it describes the degree of customer and employee understanding in regard to the usage of the SST (Meuter, Bitner, Ostrom, & Brown, 2005). If role clarity is low, meaning either party does not understand his or her role within the process then the chance that the SST will be adopted is much lower (Meuter, Bitner, Ostrom, & Brown, 2005).

Another influencing factor in regard to the adoption rate of SSTs is "Motivation". When a customer has the opportunity to choose between an interpersonal option or a SST they must be sufficiently motivated to use the later (Meuter, Bitner, Ostrom, & Brown, 2005). Motivation can be increased through intrinsic and extrinsic rewards, with the rewards being predominantly psychological such as the feeling of accomplishment when successfully performing the service (intrinsic) or the self-interest a consumer has in completing the service (extrinsic).

"Ability" also affects SST adoption. It relates to the individual having the necessary skills and confidence required to perform a task (Scholder, Bearden, & Sharma, 1991) (Jayanti & Burns, 1998) (Jones, 1986). A large part of an individual's confidence to perform a task is related to self-efficacy. The strength of one's self-efficacy (personal beliefs that one can perform a task successfully) is often related to the complexity of a task. If someone believes they cannot perform a task, or doubt their ability to do so they will often refrain from engaging such a task in order to prevent possible failure. Even though they might be aware that the task they refuse to do is a better alternative (Seltzer, 1983).

The above mentioned factors and obstacles are all related to individuals and behavior on a human level. These are not the only factors to be considered as there are also situational influences that can affect the adoption of a SST. One such a factor is the perceived waiting time before processing of a simple service. If a customer is more confident of being able to perform a task (usually the case with simple services) their confidence helps move them towards a SST, especially if the perceived waiting time of the traditional service delivery option is long (Weijters B. , Rangarajan, Falk, & Schillewaert, 2007). This factor does not apply to complex services; in this case the waiting time has no / very little effect on the customers' choice between the traditional service delivery option or a SST. Reason for this occurrence is that the increased waiting time does not compensate for the customers lack of confidence (Simon & Usunier, 2007).

Another situational influence is that of perceived crowdedness in the area where either the SST or the interpersonal option is located. When users perceive the area to be crowded their preferences shift, in case both service delivery options are located in the same area and the waiting times appear equally long, the relative advantage of either service delivery option disappears and the "traditional" inter-personal option is often chosen (Gelderman, Paul, & van Diemen, 2011). In the case of perceived crowdedness, confidence seems to become less of an issue. The advantages of reduced waiting time and faster processing often outweigh the customers' lack of confidence.

3.2 Technology Acceptance Model

Davis incorporated most if not all of the above mentioned factors into a single theoretical framework, namely the Technology Acceptance Model (TAM) (Davis, 1986).

This model uses similar factors to describe how individuals react to the introduction of technologies. "TAM theorizes that an individual's behavioral intention to use a system is determined by two beliefs: perceived usefulness, defined as the extent to which a person believes that using the system will enhance his or her job performance, and perceived ease of use, defined as the extent to which a person believes that using the system will be free of effort." (Venkatesh & Davis, 2000).

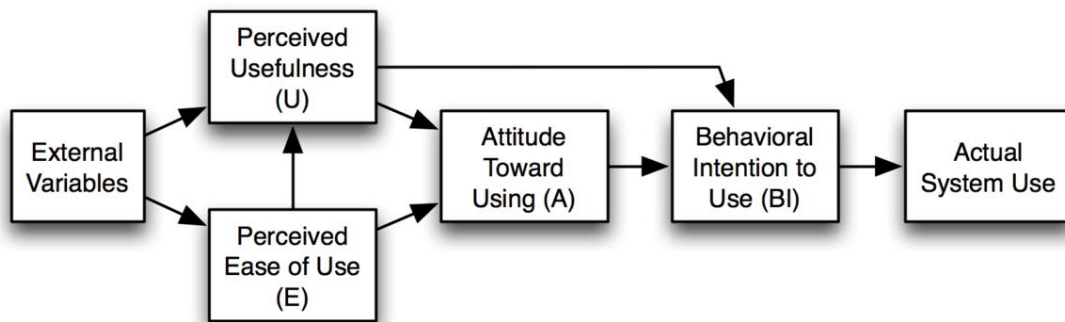


Figure 4: Technology Acceptance Model (Davis, 1986)

In a business context we can apply the theory of the TAM to explain the overall usage of self-service technologies. Perceived usefulness is one of the key factors determining whether a SST will be adopted. The reason for this is that if the usefulness is either unclear or poorly described then motivation to use the technology will most likely drop as a result. Factors that either negatively or positively influence perceived usefulness are:

The subjective norm is where a superior or co-worker suggests that a particular system might be useful (Venkatesh & Davis, 2000). The user may themselves through internalization and expert power come to believe in the usefulness of the system. Regardless of whether the usage of the system is mandatory or voluntary the subjective norm will influence the perceived usefulness through the persuasive social information that is provided to the user.

The self-image of an individual can also have a direct effect on the perceived usefulness of a system. In modern work environments interdependence with other social actors in order to carry out one's work has increased dramatically. Studies have shown that performing behavior consistent with that of the group increases ones membership status within that group and in turn the image of the individual (Pfeffer, 1982). This leads to increased power and influence within the group which can eventually impact the job performance of the individual.

Using a particular system can cause such an increase in self-image and job performance, which the user then attributes to the system as opposed to the fact that they are now complying with group standards. This then increases the perceived usefulness of the system as an increase in job performance increase is related to the usage of the system.

Output quality is also a driving factor behind the perceived usefulness of a system (Legris, Ingham, & Colletette, 2003). If the output is poor or alternative systems / technologies provide superior output then the usefulness drops dramatically. Superior output quality of a system as opposed to that of the "traditional" approach will have a positive effect on the perceived usefulness, whereas similar quality will not have an impact on the perceived usefulness.

The final factor influencing perceived usefulness is result demonstrability. This means that a system must produce results that are expected by the users and are relevant to his or her needs. In some cases relevant results were delivered by the system but displayed in such an obscure manner that the user was unable to perceive its usefulness. In general adequate results will improve perceived usefulness slightly, whilst unclear or irrelevant results will have larger negative impact on the perceived usefulness of the system (Meuter, Bitner, Ostrom, & Brown, 2005).

3.3 Freedom of Choice & Psychological Reactance

Now that we have seen that there are numerous factors that influence the adoption of a SST, it has become apparent that the implementation of such technologies can be very challenging. One might decide to enforce the usage of SSTs, removing the traditional service delivery option leaving the customer with no other option but to use the SST. While this might seem as a wise decision the effects of enforcing SSTs can be dramatic. Forcing customers to use a SST removes their freedom of choice and is therefore likely to reduce their perceptions of decisional control (Reinders, Dabholkar, & Frambach, 2008). The perceived lack of control generally leads to a negative impact on customer relationship, especially when the customer is obligated to use a single service delivery mode.

Expanding on the freedom of choice, studies have shown that customers who are able to make their own decisions are more intrinsically motivated than customers engaging in activities without having a choice (Zuckerman, Porac, Lathin, & Deci, 1978). Furthermore, forced adoption of an innovation often results in resistance towards that particular innovation (Ram & Hyung, 1991). This relates back to the fact that customers have to change their existing processes and behavior before the innovation can be properly used. If they aren't involved in the process of introducing the innovation a feeling of negligence and manipulation arises creating a large degree of resistance. Eventually this may result in a mostly negative attitude towards the innovation itself. Enforcement of SSTs and related innovations do not only affect the feelings of an individual towards the technology, they also affect the view a customer has on the service provider. Implementing a SST often results in a restricted service delivery choice, according to (Pritchard, Havitz, & Howard, 1999) a restriction of choice results in a decreased feeling of responsibility by the customer.

Customers that are restricted in their choice will be less committed to successfully fulfilling the task. The reason for this being that if activities are viewed as out of one's control then failures are easily attributed to external circumstances. One of these circumstances could be the fact that there is only a single service delivery option available. This phenomenon is described by the "Attribution Theory" as mentioned by (Arkin, Gleason, & Johnston, 1976).

Another theory that can be applied to the enforcement of SSTs is that of "Psychological Reactance". This theory states that restricted freedom leads to frustration and hostile attitudes towards the source of the restriction (Fitzsimons & Lehmann, 2004). In this case the service provider is the source of the restriction as they are imposing the usage of the SST upon their customers. Also, customers are generally dissatisfied when they are "robbed" of an alternative service delivery mode especially when they have grown accustomed to it. The combination of dissatisfaction and the feelings caused by psychological reactance will eventually result in a negative attitude towards the service provider, who from a psychological point of view is to blame for the issues the customer has to deal with.

3.4 Fallback Option & Previous Experience

The previously mentioned adverse effects can in some degree be resolved, by offering employee interaction as a fallback option when the SST fails or when a customer is in need of help or special assistance (Reinders, Dabholkar, & Frambach, 2008). The introduction of such a recovery option partly restores the customers' sense of freedom and choice, because they can now escape a potentially annoying situation which occurs through confusion or failure. This also has a direct effect on the adoption rate of the SST. If a customer knows that there is an employee to help them should they be unable to complete the task for whatever reason, than they are far less hesitant to try it. As is to be expected the availability of the fallback option (service employees) is essential to the customers' perception thereof. Obviously a poorly reachable helpdesk can be detrimental to the customers' view of the service provider.

Furthermore literature has shown that a customers' previous experience with SSTs can greatly increase the likelihood that they will try out a new SST option (Meuter, Bitner, Ostrom, & Brown, 2005). Customers that use SSTs regularly and various forms of it (both personal and business related) often have a more positive attitude towards SSTs. Experience using these types of technologies also improves the adoption rate of SSTs (Lin & Hsieh, 2006). In most cases the experience of an individual with SSTs determines how badly they are affected by the previously mentioned downsides, literature even states that experienced users are not affected by the psychological side effects of enforcement at all (Reinders, Dabholkar, & Frambach, 2008).

3.5 Diffusion of Innovations

Some aspects of the Diffusion of Innovations theory by (Rogers, 2003) can also be related to the adoption of self-service technologies. Especially the service characteristics show a lot of similarities with the factors mentioned in the Technology Acceptance Model. The five service characteristics and their relation with SST adoption will be described below:

- “Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes.” (Rogers, 2003)

Measuring relative advantage is often done in economic terms, the (to-be) user is easily motivated by a financial gain or other economic return. Nevertheless factors such as social prestige, convenience and satisfaction play important roles as well. The key is that it doesn't really matter if the object (SST) is very advantageous, what matters is that the user considers to be advantageous. If the relative advantage is considered high, the adoption rate will be significantly improved.

- “Compatibility is the degree in which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.” (Rogers, 2003)

An innovation that isn't compatible with the values and norms of a social system will not be adopted as rapidly as an innovation that is compatible (Diffusion of Innovations Theory, 2010). In the context of SSTs, the self-checkout in grocery stores is a good example of an innovation that is considered incompatible. For years people have paid at the cashier and let the cashier scan their products, now customers themselves are in charge of scanning and payment which goes against their old habits. Even though the perceived usefulness of the innovation might be high, if it is considered incompatible with the social system the adoption will be significantly slower.

- “Complexity is the degree to which an innovation is perceived as difficult to understand and use. “ (Rogers, 2003)

It makes sense that some innovations are more easily understood than others. Rogers states that the ease of use or perceived ease of use has a direct effect on the adoption rate of an innovation. For instance a parking garage payment device can be seen as much easier to use than an online banking application. We can see the relation between adoption rate and ease of use for these two examples, paying for a garage ticket through a self-service device is now considered the standard, whilst online banking still has a way to go as far as the overall adoption goes. It can be concluded that If an innovation requires the user to develop new skills and understandings (for example learn how to make payments online) then the adoption rate will be slowed down.

- “Triability is the degree to which an innovation may be experimented with on a limited basis.” (Rogers, 2003)

Allowing users to try out an innovation or SST will remove a degree of uncertainty that the user might have. Results can be demonstrated and the ease of use may be increased because a safe learning environment has been created. The results of the trial can in turn have an effect on the perceived usefulness of the innovation as long as the trial was successful. Obviously the trial can have an adverse effect on either factor if the results of the trial are considered below expectations. In general the triability of an innovation will have a positive effect on the adoption rate thereof.

- “Observability is the degree to which the results of an innovation are visible to others.”

While triability already addresses the importance of results demonstrability this is additionally emphasized with observability. The easier it is for users to see the results of an innovation the more likely they will be to adopt it. In regard to SSTs an example of an observable result can be a printed copy of the order the customer has just placed, but any confirmatory overview of what the user has done can be seen as an adequate observable result. The effect of observability on the adoption of an innovation is not that great if the results are observable because users have come to expect their results to be observable. A lack of observability on the other hand will greatly reduce adoption as it creates uncertainty about the results and in turn the perceived usefulness.

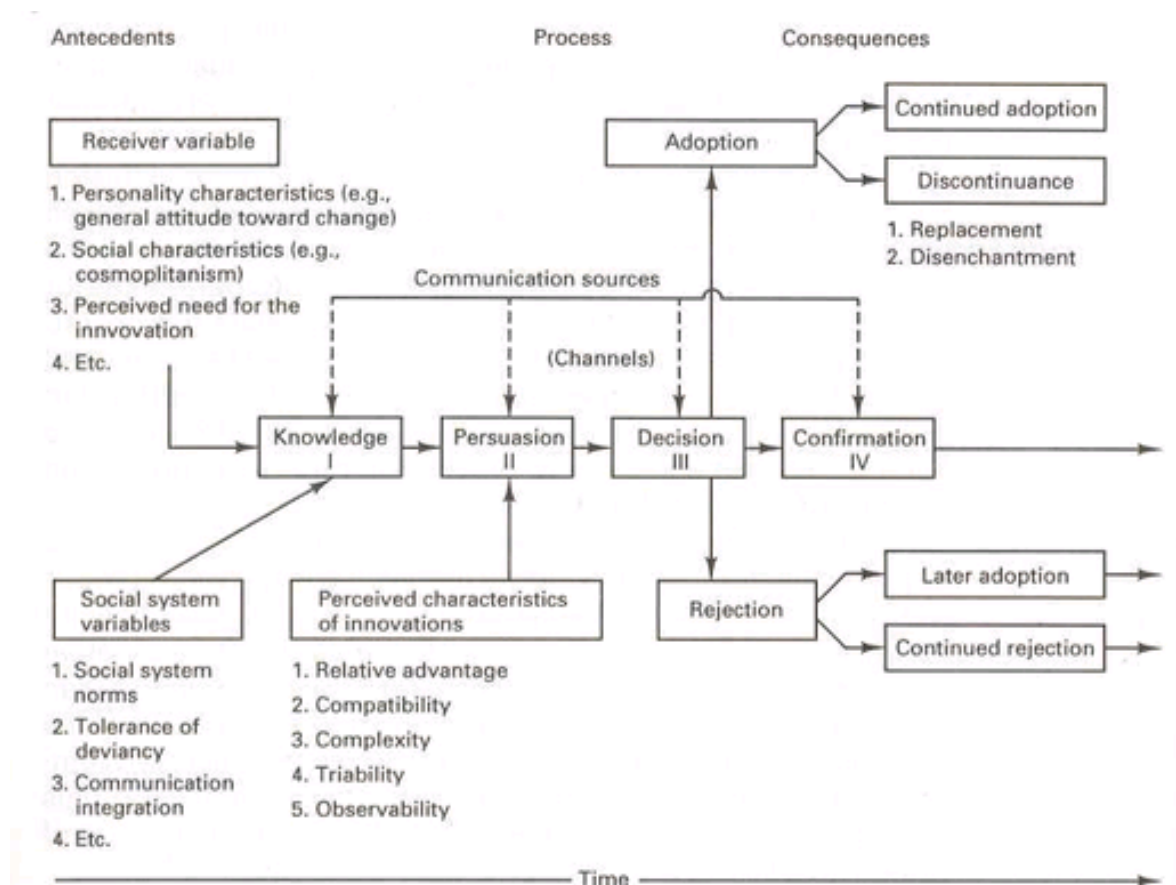


Figure 5: Diffusion of Innovations (Rogers, 2003)

The complete model of the Diffusion of Innovations theory is shown here. It is important to note that throughout this thesis the focus will be on the perceived characteristics of innovation, therefore the other aspects mentioned within the model will not be examined. The perceived characteristics of innovations will be combined with the various factors described in the Technology Acceptance Model and the Self-Efficacy theory by Bandura. By combining these three theoretical approaches a framework is established in which the adoption rate of self-service technologies and underlying psychological factors can be studied.

3.6 Self-Service Technologies in B2C Industries

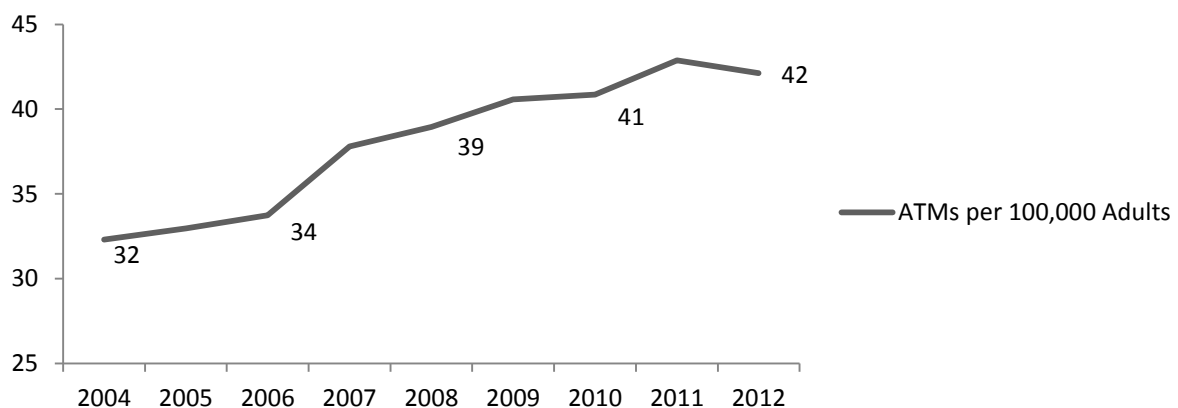
Based on the above we can see that SSTs and their adoption is complicated.

Getting customers to become effective users is a troublesome process with countless factors that have to be taken into consideration. With this in mind we can look at how other industries and global markets have gone about introducing SSTs and how they have dealt with the various influential factors.

3.6.1 Banking Industry: Automated Teller Machines

The banking sector is home to one of the most well-known SSTs around, namely the Automated Teller Machine (ATM). First introduced in the 1970s, today there are over 1.8 million machines in operation all across the globe. With total transactions up to almost over 44 billion each year the ATM is one of the most used self-service technology in existence (Global ATM Market and Forecasts, Overview, 2008).

The first ATMs were located at the banks as an alternative means for the customer to withdraw funds. In a relatively short time period the need for ATMs at different locations was recognized. Machines were placed at locations such as shopping malls, airports and restaurants in order to remove the need to go to the bank. Not only did the introduction of the ATMs remove the need for tellers (thus a reduction in labor costs) it also removed the need for the customer to adhere to the banks limited opening hours, as the service was now available 24/7. The introduction of the ATMs and the adoption rate thereof wasn't especially quick. In the early years of its introduction the usage of ATMs was relatively low, banks continued to offer an inter-personal delivery option which combined with the general distrust of technology present at the time caused for a low adoption rate.



Graph 1: (Automated Teller Machines per 100,000 Adults, 2012)

In time a reduction in the amount of bank tellers (inter-personal) and an increase in ATMs at various different locations increased its overall usage. The need and deployment of ATMs rose sharply around 1996 when credit card companies such as MasterCard and Visa began to allow surcharges on ATM transactions (Castro, Atkinson, & Ezell, 2010). This surcharge could be collected by the ATM operator which stimulated investment in ATMs.

The banking industry itself didn't do much besides promoting and reassuring the customer in order to improve the adoption rate. They knew that the customer would be extremely hesitant at first to trust their money to a machine and the various other risks that come paired with unsupervised cash withdrawal (theft). Over time the adoption rate grew as technological distrust digressed, yet despite the fact that ATMs have become generally accepted banking offices still offer an inter-personal service to those that refuse to use technological means.

3.6.2 Banking Industry: E-Banking

Another important SST to have been introduced in banking is that of E-banking (also referred to as online or internet banking). While still somewhat controversial in several countries the usage of internet banking has seen a tremendous growth in Western Europe (Bughin, 2004), North America (Kolodinsky, Hogarth, & Hilgert, 2004) and large parts of Asia (Laforet & Li, 2005). E-Banking has created entirely new channels in which banks do business, as well as open up the possibility for new online only banks which have completely removed the necessity of brick & mortar banks.

E-Banking has been widely adopted since its introduction around the turn of the century and its adoption has not been slow either. Nowadays E-banking is considered normal in the areas mentioned earlier and used by more than 50% of banking customers in the US (Kolodinsky, Hogarth, & Hilgert, 2004). There are numerous factors that have affected the adoption rate of E-banking: among these relative advantage was shown to have a significant relation on adoption.

A survey conducted by Kolodinsky et al. noted that respondents who had more positive perceptions about the relative advantage of e-banking technologies had a higher probability of adopting them (Kolodinsky, Hogarth, & Hilgert, 2004). This positive view of relative advantages stems from the visibility of potential time- and money savings, as well as convenience through 24/7 availability and the removed necessity to visit a banking office (Karjaluo, Mattila, & Pento, 2002). In turn these factors are influenced by the bank as the information they supply directly affect the way a customer perceives the technology, if information was incomprehensive and contained a low level of detail then this would directly impact the perceived relative advantage as the potential benefits would be unclear.

Secondly, previous experience with E-banking technologies has also shown to improve motivation to use (Kolodinsky, Hogarth, & Hilgert, 2004). The relation was significant as respondents were almost twice as likely to adopt E-banking if they had previous experience with it. This can be explained through the fact that the user has already surpassed the "initial trial" phase in which they will have to use the technology for the first time. During this phase result demonstrability is low, as well as the users' confidence level to complete the task. Once the phase is over these factors (should the first attempt be a success) will be reduced and in turn improve a user's perception about the technology (Davis, 1986).

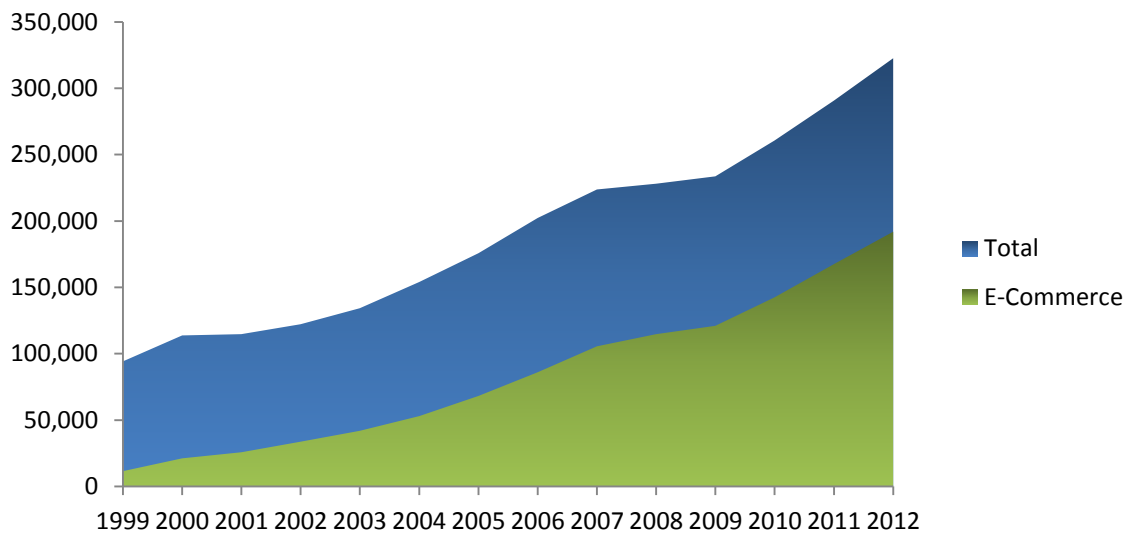
The third and final factor that has shown to affect E-banking adoption is: fear of technology or perceived risk of E-banking. The perceived security issues paired with E-banking are still the predominant factor slowing down E-banking adoption. Customers are afraid to entrust their finances to something which is online because they fear it's not properly secured, or that the security might be breached by their own doing (phishing / viruses). This perceived risk can barely be reduced by the bank as it is rooted deep inside the psyche (Wang Y.-S. , 2003). Reducing technological distrust will take time and its reduction is closely related to the social norms. As E-banking is becoming the new standard, the general opinion of the social system will become more positive and in turn influence the group who is demotivated to use E-banking due to their distrust of the technology.

3.6.3 Retail Industry: Self-Checkout & E-Commerce

Self-checkout is one of the most widespread applications of self-service technology. It entails the customers' ability to scan, bag, and pay for their products themselves (Castro, Atkinson, & Ezell, 2010). The amount of transactions that take place in retail stores is substantial, over 60 billion transactions each year worldwide. The potential savings when only a small portion of this shopping is done fully by the customer is tremendous (Atkinson, 2005).

While self-checkout in retail stores is still relatively new, the adoption rate over a short period of time has been significant. Major grocery stores in the US reported that 15 to 40 percent of all daily transactions are done via the self-service delivery option (North American Self Checkout Systems, 2009). As with the introduction of the ATM, the service providers in this case have also introduced this SST alongside their traditional service delivery option. The customer was given a choice to use the technology, but would not be enforced to do so or be negatively affected if they did not use it. Perceived benefit would have to be created through experimentation by the customer and experiences with similar technology, in a sense the service providers are relying on the customers drive to shop faster and more efficiently in order for the SST to catch on.

Of course one of the most obvious self-service technology to hit retail to date is E-commerce also referred to as E-retail or online (web) based shopping. Web based shopping has taken up very large portions of the total retail sales environment, the ease of use combined with the 24/7 availability has made it a far more popular place to shop than the traditional stores. Over the past 15 years E-commerce has gone from being only 10 % of the total retail sales to over 50 %.



Graph 2: Total- and E-Commerce Sales (U.S. Electronic Shopping and Mail-Order Houses, 2012)

The adoption of E-commerce from a consumer perspective has been anything but slow. Early usage around the year 2000 was relatively low, but this was due to the fact that few households owned a personal computer. As the amount of PCs grew so did the usage of E-commerce. Not only the perceived ease of use and the usefulness of E-commerce have been identified as factors influencing its adoption. Results of a study by (Vijayasarathy, 2004) show that there are other relevant factors that explain intentions to use B2C online commerce.

Compatibility is one of these factors and is found mostly in the consumers' perception about the compatibility of online shopping to their lifestyle (Vijayasarathy, 2004). It appears that individuals that spend more time using digital technology in both their personal and work environment see online shopping as being more compatible to their lifestyle. This need for a non-store shopping alternative also stems from these individuals being "time starved" or having an aversion to in-store shopping. While retailers cannot influence the lifestyle of an individual they can aim their self-service solutions to these particular customers as they are their primary online market segment.

The adoption rate of this self-service technology was initially held back by the lack of technological means to use it. The barrier that followed was the users' confidence to order something online and the security risks related to online payments. Even though payment methods and its security have vastly improved over the years, the incidents where vendors have suffered from security breaches have significantly affected the customers' confidence (Atanasov, 2001). Retailers have for an extended period of time been trying to convince consumers of the level of security provided with online shopping. By sharing explicit privacy policies and statements as well as overviews of overall retailers have attempted to increase consumer confidence (Vijayasarathy, 2004). As time passed online retailers have proven trustworthy, their websites often very easy to use and delivery has switched to overnight. All of these factors have influenced the adoption rate of E-commerce and have made it a huge self-service success.

3.6.4 The Air Line Industry: Check-in Kiosks

Airlines are increasingly investing in self-service kiosks which allow customers to check-in themselves. A common issue with air travel is the check-in time, passengers have to stand in line and wait for the chance to receive their boarding pass and drop off their luggage. This is not only extremely time-consuming but is also very costly for the airline which has to invest heavily in labor cost. Research shows that traditional check-in costs are about 3\$ per passenger, as opposed to 0.14\$ when using a self-check-in service (Self-Service Economy Arrives Gradually, 2007).

The adoption of these kiosks has been relatively slow, mostly due to technological distrust and the lack of confidence to complete the task (self-efficacy). Customers are afraid of the consequences when they make a mistake using the kiosk, they fear not being able to catch their flight. A risk that does not match the potential benefits of skipping the waiting line at the traditional check-in counter. Existing literature has shown that the perceived risk of using a self-service technology would have a negative impact on behavioral intention (Meuter, Bitner, Ostrom, & Brown, 2005) (Wu & Wang, 2005).

Another important factor is that of perceived quality (result demonstrability) which also relates to the customers fear of incorrect results after using the kiosk. Especially in the airline industry it is of utmost importance that the personal data of the customer is correct and supplied in time. Because a self-check in kiosk is a novel system customers automatically have a lower quality perception towards it (Lu, Chou, & Ling, 2009), even without having made use of it. This is due to the fact that they have grown accustomed to the traditional check-in which got the job done. On the other hand research by (Lu, Chou, & Ling, 2009) has shown that once customers have gained a positive understanding of the service quality this will positively affect their attitude towards it.

In order to combat these negative attitudes against the kiosks, the International Air Transport Association (IATA) has launched a "Fast Travel" initiative designed to explain, standardize and bring more self-service options to air travelers (Castro, Atkinson, & Ezell, 2010). By offering extensive information to air travelers regarding the usage of SSTs (Kiosks) and attempting to standardize the SSTs setup by the airlines, the IATA aims to reduce the travelers' lack of confidence and motivate them to try the SSTs.

Usage of the fast travel program and overall self-service technologies at airports as a whole is around 21% (Fast-travel, 2015) which is still relatively low. Adoption is expected to increase but this may take some time as the introduction itself brings about tremendous changes to the check-in process, which has been almost the same since the dawn of commercial air travel.

4. Logistics Service Providers

In order to determine how logistic service providers and their customers will be affected by the introduction of self-service technologies we must first identify what LSPs are, how they operate and what their key processes are like. A logistics service provider (LSP) is also referred to as a third party logistics provider (3PL) in literature, but throughout this thesis the term “LSP” will be used.

As the name would have you suspect, an LSP is an independent company that offers various logistics services for their customers (other businesses), taking over parts of / or all of their supply chain management functions (Hertz & Alfredsson, 2003). The main reason as to why companies make use of LSPs is because it allows them to focus on their core competencies and outsource noncore activities which in turn opens up the opportunity for improved cycle time, delivery performance, and as a result customer satisfaction (Mitra & Bagchi, 2008). Not all LSPs provide the same types of services, four types can be identified:

Standard 3PL Provider: this is the most basic form of a 3PL provider. They would perform activities such as, pick and pack, warehousing, and distribution (business) – the most basic functions of logistics. For a majority of these firms, the 3PL function is not their main activity.

Service Developer: this type of 3PL provider will offer their customers advanced value-added services such as: tracking and tracing, cross-docking, specific packaging, or providing a unique security system. A solid IT foundation and a focus on economies of scale and scope will enable this type of 3PL provider to perform these types of tasks.

The Customer Adapter: this type of 3PL provider comes in at the request of the customer and essentially takes over complete control of the company's logistics activities. The 3PL provider improves the logistics dramatically, but does not develop a new service. The customer base for this type of 3PL provider is typically quite small.

The Customer Developer: this is the highest level that a 3PL provider can attain with respect to its processes and activities. This occurs when the 3PL provider integrates itself with the customer and takes over their entire logistics function. These providers will have few customers, but will perform extensive and detailed tasks for them.

Panel 1: Logistic Service Provider Types

The main focus throughout this thesis will be on the third type mentioned above “The Customer Adapter”. While the company on which the research is based also provides services according to the fourth type it is not their core business. The focus is on taking over customers’ logistics operations and communicating with the various parties involved in the supply chain process. Furthermore the customer still determines the start and finish of service delivery and the need for the service, in case of “The Customer Developer” most of the in- and outbound service call-offs are determined by the LSP whilst overseen by the customer.

There is another distinction that can be made within the field of LSPs namely that between asset-owning and non-asset-owning providers. Non-asset providers often referred to as lead logistics providers (LLP) use the assets of other companies to provide logistic services, this provides the company with the advantage of flexibility and substantially less fixed costs caused by material such as trucks, ships, trains etc. (Levi, Kaminsky, & Levi, 2003). Non-asset providers are able to adjust their costs based on customer demand without the risk of unused assets. Because the company at which this research is conducted is non-asset, the focus of the thesis will be on non-asset logistic service providers.

The distinctions described above can be used to structure various types of logistic service providers into layers. In general there are five layers, ranging from 1PL to 5PL each with its own traits. The first layer (1PL) is used to describe the firm or the individual that needs to transport or obtain the cargo.

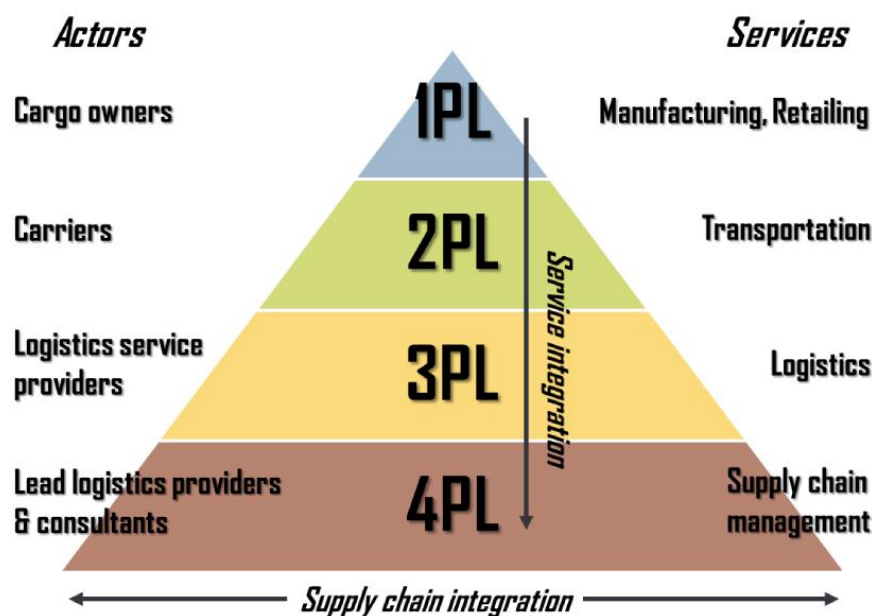


Figure 6: Logistics Service Layers

2PL providers are asset-based carriers that allow 1PL customers to ship their goods. Companies included within this layer are shipping lines, rail operators, trucking companies etc. These companies are only responsible for transport indicated by the shipper (1PL), they do not determine what cargo is transported or where. They are merely a way for the 1PL to obtain assets needed for transport. Other services such as import / export documentation or customs clearance is still the responsibility of the 1PL.

3PL providers are essentially evolved 2PL providers that offer additional logistic capabilities and operational integration. A 3PL takes over a large portion of a customer's supply chain activities and adds value through information, knowledge and reduced transportation costs. These companies offer both the transport itself as well as the activities around it such as the earlier mentioned documentation and customs clearance.

The service provided by the 3PL is often specialized as well. Whereas 2PL providers allow only for point to point transport without customization, the 3PL provider is able to customize their service for each individual customer. Specialization can range from complete transport A-B, to storage (warehousing) and distribution (Vasiliauskas & Jakubauskas, 2007). Asset wise the 3PL provider is very asset light compared to a 2PL provider while their returns are higher. The 3PL operates as a middle man between the customer and the 2PL, taking away the need for the customer to arrange documentation and plan transport. While these providers still have some assets such as warehouses, most of the transport is done using assets from providers in lower layers.

The company on which this research is based can be considered a 3PL provider, it does not own any assets (even offices are rented as opposed to company owned) and it provides customized services to its customers by using the assets of other service providers.

The 4PL provider is 100% non-asset and acts only as an interface between the customer and multiple logistic service providers. Nearly all aspects of the customers supply chain are managed by the 4PL and often include a substantial integration with the customers' existing company structure. When the concept was first defined the exact definition of a 4PL provider was: "A supply chain integrator that assembles and manages the resources, capabilities, and technology of its own organization with those of complementary service providers to deliver a comprehensive supply chain solution." (Norall, 2013). While at the time the term was trademarked by Accenture it no longer is today, even though the definition still accurately describes the 4PL provider.

The most recently added provider layer is 5PL; this relatively new concept includes companies that focus on providing a complete logistics supply chain solution. Through supply chain management they aim to control the entire flow and transformation of goods within the logistic network of the customer (Vasiliauskas & Jakubauskas, 2007). This allows the customer to focus on their core business (for example production) and have the 5PL focus on the distribution processes such as storage, transportation, clearance, delivery etc. All the customers has to do is produce, indicate how much they are going to want to produce and the 5PL takes over the remaining activities which involve the transportation of goods.

In conclusion this thesis is based on a "Customer Adapting non-asset 3PL service provider". Delivering specialized services to long-term contract customers whilst employing the assets and resources of other providers in order to meet the customers' transportation demands. Henceforth the company on which this research focuses will be referred to as the "Logistics Service Provider" or LSP.

5. Hypotheses

Based on the findings derived from the literature review we can define a number of hypotheses that will be tested throughout the remainder of this thesis. The hypotheses will be distributed among the sub-questions and provide a basic framework for the remainder of the study.

H1: Order volume has a negative effect on the perceived usefulness of a self-service technology.

A higher order volume is expected to have an increasingly negative effect on the perceived usefulness of a SST. As a result of internal research at the LSP it has become apparent that customers with a high monthly order volume (30+ / month) have already introduced order process automation through electronic data interchange. Because this approach is fully automated and requires no additional effort from the customer it is expected that these customers will see no value in self-service technologies as it will only lead to an increased workload on their end.

H2: Financial gains paired with the usage of a self-service technology have an effect on the perceived usefulness.

From a B2C perspective, discounting and time saving has proven to be a significant motivator in SST adoption. Through this hypothesis the same will be tested within a B2B context. Financial gains in the context of this hypothesis relate to a discount in service price and the time saved when using a SST (only in cases where no other means of automation is currently in place).

H3: Perceived usefulness has an effect on the attitude towards a self-service technology.

H4: Perceived ease of use has an effect on the attitude towards a self-service technology.

Numerous studies conducted in the context of B2C (Vijayasarathy, 2004) (Wang Y.-S. , 2003) (Meuter, Bitner, Ostrom, & Brown, 2005) (Karjaluoto, Mattila, & Pentto, 2002) have identified a relation between perceived usefulness (PU), perceived ease of use (PEoU) and the attitude of an individual towards a self-service technology. As these hypotheses have been confirmed in a number of studies, they are expected to be confirmed as a result of this thesis as well.

H5: The perceived relative advantage of a self-service technology has an effect on an individual's attitude towards it.

H6: Compatibility of a self-service technology has an effect on the individuals' attitude towards it.

H7: The complexity of a self-service technology has an effect on the individuals' attitude towards it.

H8: Trialability of a self-service technology has an effect on an individual's attitude towards it.

H9: Observability has an effect on an individual's attitude towards the self-service technology.

The diffusion of innovations theory has often been used to describe the adoption of self-service technologies (Kolodinsky, Hogarth, & Hilgert, 2004) (Lee, Lee, & Eastwood, 2003). But most if not all of this research has taken place in a B2C context. The above hypotheses are used to test whether the theory of (Rogers, 2003) can also be applied within a B2B context, and how each of the service characteristics affects a customers' attitude towards SSTs.

H10: Self-efficacy as an intrinsic reward has an effect on the attitude of an individual towards self-service technologies.

Personal control and the gratification one receives upon completing a task are seen as forms of self-efficacy (Bandura, 1977). It is expected that the attitude of customer employees will be affected slightly due to the need or desire for self-efficacy. Because the work that is done by the employee is still “enforced” by higher management, the effect is expected to be low or non-existent. The reason for this being the fact that the task mostly relates to the success of the business and has no significant direct impact on the goals of the individual.

H11: Perceived usefulness has an effect on the degree of expert power exerted to stimulate self-service technology adoption.

H12: Expert power has an effect on the behavioral intention to use a self-service technology.

Expert power plays only a minor role in B2C SST adoption, the effects on the attitude to use are minimal as well as the effect on behavioral intention. It is expected that expert power plays a much bigger role in a B2B context (managerial power, organizational hierarchy) and has a direct effect on behavioral intention. This hypothesis is based on the assumption that operational employees despite having a negative attitude towards a SST will still use it if management requires them to do so. Expert power in turn is expected to be influenced by the perceived usefulness experienced by management; if PU is low the amount of expert power exerted will also be low.

H13: An individual’s attitude towards self-service technologies has an effect on their behavioral intention to use it.

An individual might consider a SST useful and have a positive attitude towards it but this does not automatically mean that they intend to use it. While attitude is decisive in a B2C context it is not always the deciding factor from a B2B perspective. Various organizational factors outplay an individual’s attitude towards a SST such as finances, managerial decisions, existing service delivery options etc. Therefore it is expected that a positive attitude does not by default lead to a behavioral intention to use.

6. Research Model

Based on the hypotheses a research model can be derived. This model is based on the Technology Acceptance Model (Davis, 1986) and integrates the service characteristics from the diffusion of innovations theory defined by (Rogers, 2003). Additionally the factors of self-efficacy (Bandura, 1977) and expert power (French & Raven, 1959) are described separately as it is expected that they play a different role in B2B self-service adoption as they do in a B2C context.

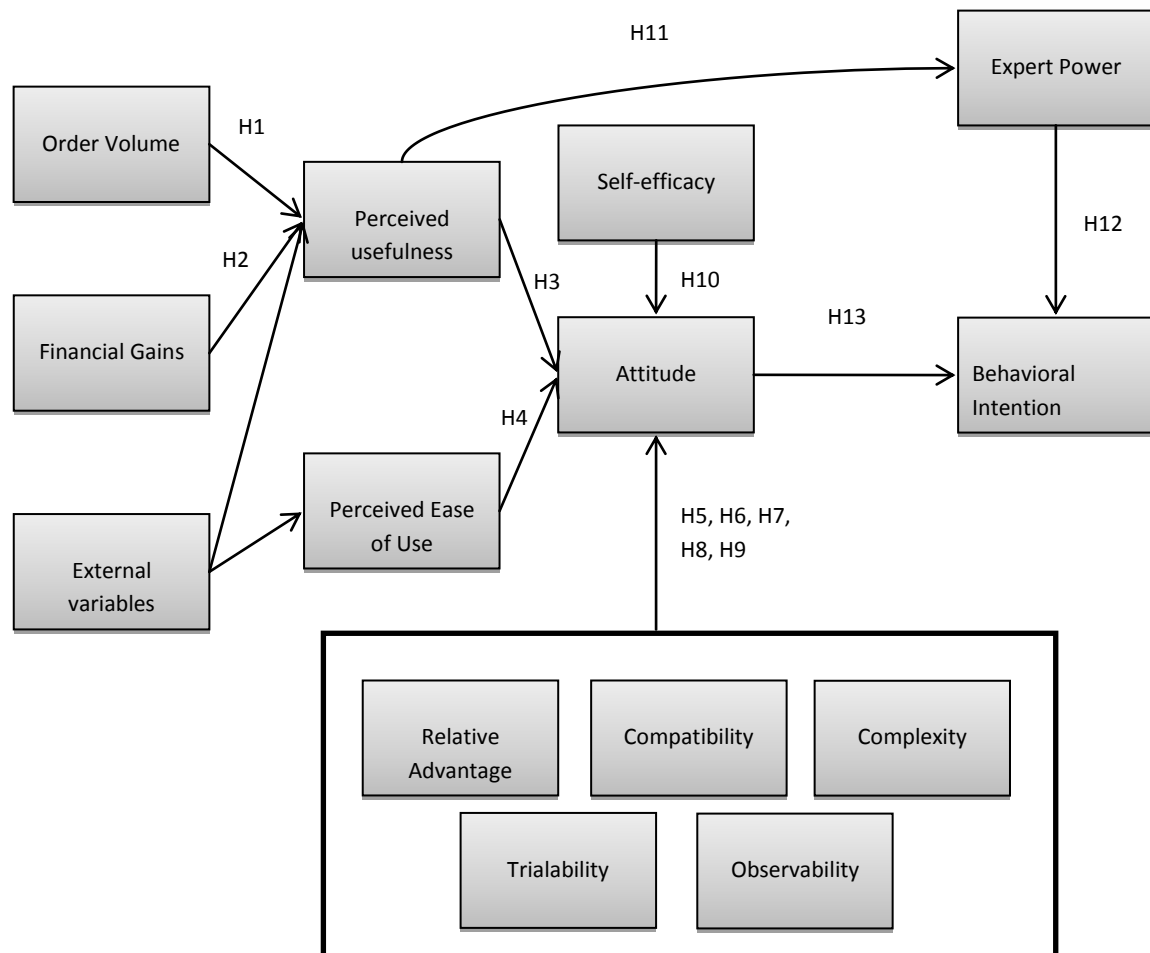


Figure 7: Research Model

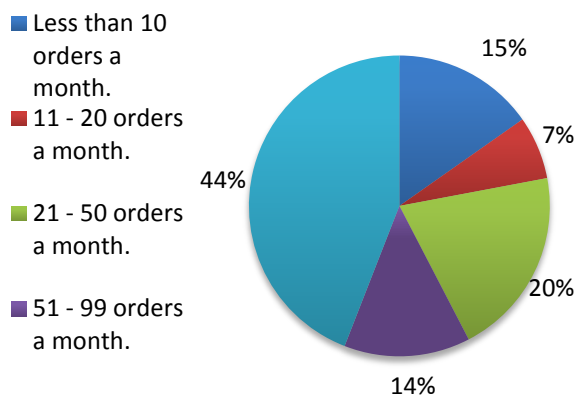
It is important to note that no hypotheses were established to confirm or disprove the relationship between the external variables and the perceived usefulness or perceived ease of use. The decision was made not to investigate this relationship within the thesis as it has been proven in existing literature (Simon & Usunier, 2007) (Meuter, Ostrom, Roundtree, & Bitner, 2000). Therefore we will assume that external variables other than those explicitly mentioned (financial gains & order volume) have a direct effect on perceived usefulness and perceived ease of use.

7. Results

This chapter includes a description of the survey results and addresses the hypotheses that have been established in a previous section of this thesis. First the demographic characteristics of the respondents are described, including an overview of the companies in which the respondents are employed (company size & order volume) as well as the position of the individual within the company. Secondly each individual hypothesis is tested and the results used in the final section of this chapter, in which the hypothetical model is validated.

7.1 Demographics

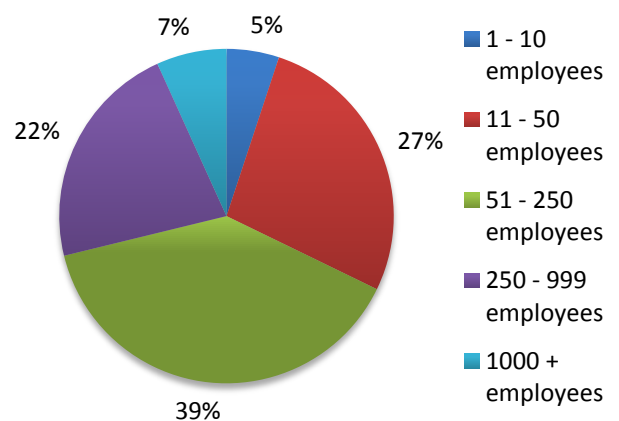
In total 60 ($N = 60$) individual responses were received from a population of 240 individuals, resulting in a response rate of 25%. This is considered a reasonable response rate as research has shown that the average survey response rate in organizational research is around 35.7% with a standard deviation of 18.8% (Baruch & Holtom, 2008). Furthermore the various subgroups within the population have each been well represented as is shown by the below figures.



Most respondents worked at larger companies with 47% being employed at companies that include 250 or more employees. The order volume strongly correlates with this as 44% of the respondents indicated that their company ships over a hundred orders each month with their logistics service provider. This nearly 50/50 spread between “large” and “small” customers will allow hypothesis #1, which addresses the relationship between order volume and perceived usefulness, to be thoroughly researched.

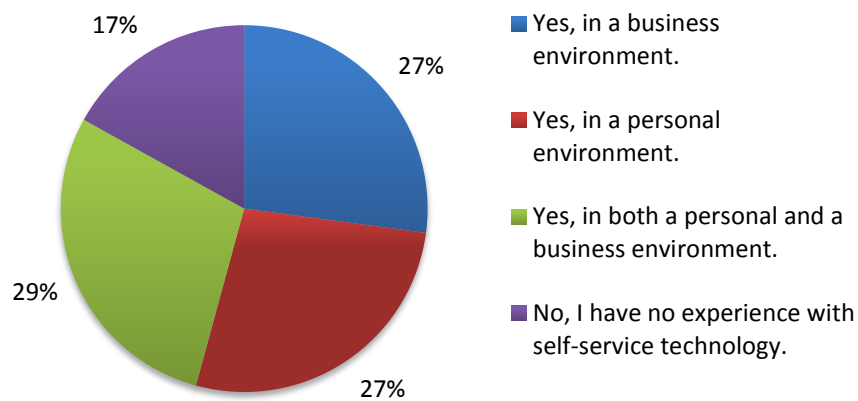
Graph 4: Order Volume

Before conducting the survey it was already known that relatively “large” companies make up the bulk of the business for the LSP, but that these customers were few in number. Even though the focus of the survey was on smaller companies with no order automation in place, a large portion (47%) of the respondents turned out to be from “larger” companies. It is assumed, but not proven, that the long-term relationship with the LSP and the amount of potential contacts within larger companies contributed to this high response rate from “large” companies.



Graph 3: Number of Employees

Because previous experience has shown to play an important role in self-service technology adoption (Meuter, Bitner, Ostrom, & Brown, 2005) (Meuter, Ostrom, Roundtree, & Bitner, 2000) (Wang, Harris, & Patterson, 2012), the decision was made to retrieve this information in order to look for any correlations within the data.



Graph 5: Previous Experience

Out of all the respondents 83% had previous experience with self-service technologies in either a personal or business environment. This may have a negative impact on the ability to examine any relations between previous experience and attitude towards SST. Reason being that the number of respondents with "no experience" is too small for statistical analysis, as shown in the below table which presents the results of a Chi Square test comparing respondents with and without experience.

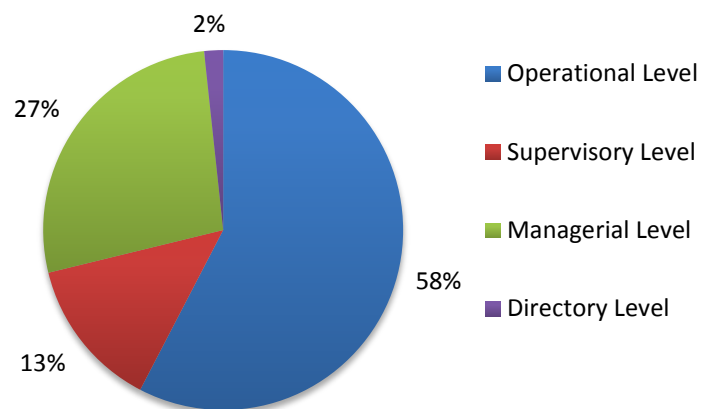
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5,444 ^a	5	,364
Likelihood Ratio	5,823	5	,324
N of Valid Cases	60		

a. 8 cells (66,7%) have expected count less than 5. The minimum expected count is ,51.

Table 1: Chi Square

When looking at the hierarchical position of the respondents within their respective companies it is shown that 58% of all respondents are employed at an operational level. Meaning that they are responsible for order placement and deal with this process on a daily basis. The remainders of the respondents are employed at the supervisory level or higher, due to this somewhat equal spread of respondents we are able to look for any correlations between the hierarchical position of the respondent and his or her attitude towards SSTs.

In short, the demographic results have yielded data suitable for hypothesis testing. Most if not all of the pre-defined sub-groups are well represented by the responses and allow for the analysis of correlations between order volume, hierarchical position, organizational size, and the attitude towards SSTs. Unfortunately too few respondents had no previous experience with SSTs, therefore any potential relations between experience and attitude towards SSTs cannot be examined.



Graph 6: Hierarchical Position

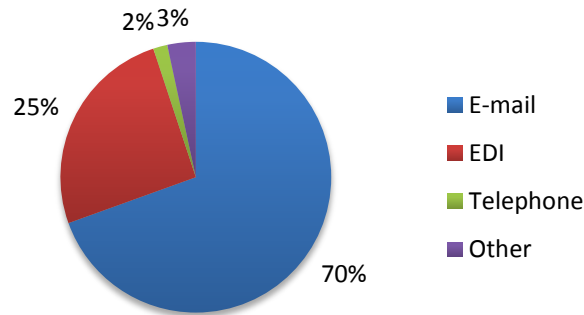
7.2 Hypothesis Testing

Throughout this sub-chapter the survey results will be used to either confirm or reject the hypotheses. Each hypothesis will be analyzed using at least one statistical approach. The results of this analysis determine the validity of the hypotheses and eventually the entire research model.

Because nearly all survey questions related to the attitude towards SSTs were formulated using a 5 point Likert Scale the statistical techniques that can be used are limited. Data received from Likert scales is ordinal in nature meaning that the categories themselves have a rank order, but the intervals between values cannot be presumed equal (Jamieson, 2004). There are only a few statistical techniques that deal with ordinal data, namely Spearman's Rho (Spearman's rank correlation coefficient) and the Mann Whitney U test. Both these techniques will be used to examine correlations within the data and respondent sub-groups. Additionally Cronbach's Alpha will be used to determine whether multiple scales (questions) can be combined into a single scale.

7.2.1 Hypothesis #1

The first hypothesis states that: order volume has a negative effect on the perceived usefulness of a self-service technology. It is expected that the height of the order volume will have an effect on the perceived usefulness of a SST. Most companies with a high order volume have automated their order placement process using electronic data interchange, as is shown by the graph below. This automation of order placement is assumed to completely remove the need for SSTs and in turn negatively affect the respondents' attitude towards such technologies.



Graph 7: Order Placement Type

In order to examine perceived usefulness and its correlation with order volume, the numerous questions used to measure aspects of perceived usefulness had to be grouped into a single result. Using Cronbach's Alpha questions #15, #16, #19, #20, and #30 were grouped and tested whether they could be combined into a single scale. The results of this statistical test are shown on the next page.

Reliability Statistics

Cronbach's Alpha	N of Items
,698	5

Table 2: Cronbach's Alpha - Perceived Usefulness

The lower threshold for Cronbach's Alpha is around $\alpha = 0.7$, therefore it is possible to use questions #15, #16, #19, #20, and #30 as a single scale measuring perceived usefulness. Examining the relationship between order volume and the combined scale for perceived usefulness has resulted in the following:

Ranks

	Order Volume	N	Mean Rank	Sum of Ranks
Perceived Usefulness	Low	26	34,50	897,00
	High	34	27,44	933,00
	Total	60		

Table 3: Mann-Whitney U - Order Volume (1)

Order volume was initially defined into several categories, ranging from 1-10 orders to over a 100 orders. In order to perform the Mann Whitney U test the order volume data had to be transformed into two categories, “low” and “high”. Order volume above 50 was grouped as high, while all data equal to or less than 50 was grouped as low.

	Perceived Usefulness
Mann-Whitney U	338,000
Wilcoxon W	933,000
Z	-1,566
Asymp. Sig. (2-tailed)	,117

a. Grouping Variable: Order Volume

Table 4: Mann-Whitney U - Order Volume(2)

The results show that order volume has a weak negative effect on perceived usefulness, hypothesis #1 is accepted. The Z value (-1,566) indicates that respondents who noted a higher order volume gave a lower rating to the perceived usefulness of SSTs. The relationship between the variables itself is moderate as indicated by the Asymp.Sig (2-tailed) value $p = 0,117$, significance scores lower than 0,05 indicate a strong relationship, as the value moves closer to 1 the relationship decreases in strength.

7.2.2 Hypothesis #2

Hypothesis #2 states that: financial gains paired with the usage of a self-service technology have an effect on its perceived usefulness. This hypothesis is derived from the fact that within B2C industries, discounts and potential time savers are a significant motivator for SST adoption. As part of the research is to compare the B2C industries with a B2B industry there is a need to look at whether the same holds true within the context of this thesis.

The importance of financial gains was derived from survey questions #20 and #21, and tested for reliability using Cronbach’s Alpha of which the results are shown below.

Cronbach's Alpha	N of Items
,609	2

Table 5: Cronbach's Alpha - Financial Gains

Results of Cronbach’s Alpha show that combining both questions into a single scale is marginally viable.

Correlation was tested between the new scale “importance of financial gains” and perceived usefulness which resulted in the following:

Correlations			Financial Gains	Perceived Usefulness
Spearman's rho	Financial Gains	Correlation Coefficient	1,000	,721**
		Sig. (2-tailed)	.	,000
		N	60	60
	Perceived Usefulness	Correlation Coefficient	,721**	1,000
		Sig. (2-tailed)	< ,000	.
		N	60	60

** . Correlation is significant at the 0.01 level (2-tailed).

Table 6: Spearman's Rho - Financial Gains

Correlation between two variables is significant when the Sig. (2-tailed) value is close to 0, 05 (Neuendorf, 2002) (Saunders, Lewis, & Thornhill, 2009). In this case when examining the correlation between the need for financial gains and the perceived usefulness of SSTs it is shown that the significance is strong at a value of $p < 0,000$ and $r = 0,721$. Therefore hypothesis #2 is accepted, financial gains have a strong positive effect on the perceived usefulness of SSTs.

7.2.3 Hypothesis #3

The third hypothesis states that: perceived usefulness has an effect on the attitude towards SSTs. Literature from B2C research has shown that perceived usefulness is one of two primary determinants of a consumers attitude towards SSTs (Meuter, Ostrom, Roundtree, & Bitner, 2000) (Meuter, Bitner, Ostrom, & Brown, 2005). In order to determine whether the same upholds in a B2B context, the correlation between perceived usefulness and attitude towards SSTs was tested.

Correlations			Attitude SST	Perceived Usefulness
Spearman's rho	Attitude SST	Correlation Coefficient	1,000	,108
		Sig. (2-tailed)	.	,413
		N	60	60
	Perceived Usefulness	Correlation Coefficient	,108	1,000
		Sig. (2-tailed)	,413	.
		N	60	60

Table 7: Spearman's Rho - Perceived Usefulness

Results show a negligible correlation between perceived usefulness and the attitude towards SSTs, hypothesis #3 is accepted. Correlation itself is weak at $r = 0,108$ and statistical significance is minor with a value of $p = 0,413$ meaning that the dependence between variables is low, it cannot be assumed that a higher rating of perceived usefulness will be associated with a significantly more positive attitude towards SSTs.

7.2.4 Hypothesis #4

Hypothesis #4 states that: perceived ease of use has an effect on the attitude towards a self-service technology. Perceived ease of use also stems from research previously conducted in B2C environments and together with perceived usefulness make up the primary factors to influence the attitude towards SSTs. By combining the answers from survey questions #13, #17, #18, #24, and #28 a single scale to measure perceived ease of use was created.

Cronbach's Alpha	N of Items
,748	5

Table 8: Cronbach's Alpha - Perceived Ease of Use

Cronbach's Alpha has shown that the items in question can be used as a single scale to describe perceived ease of use, $\alpha = 0,748$. In order to determine the correlation between perceived ease of use and the attitude towards SSTs analysis was performed using Spearman's Rho of which the results are shown on the next page.

			Attitude SST	Perceived Ease of Use
Spearman's rho	Attitude SST	Correlation Coefficient	1,000	-,072
		Sig. (2-tailed)	.	,584
		N	60	60
	Perceived Ease of Use	Correlation Coefficient	-,072	1,000
		Sig. (2-tailed)	,584	.
		N	60	60

Table 9: Spearman's Rho - Perceived Ease of Use

Correlation between perceived ease of use and attitude towards SSTs has shown to be insignificant. Values of correlation and significance are: $r = -0,72$ and $p = 0,584$.

Both values are too low to assume any relation between perceived ease of use and attitude towards SST exists, therefore hypothesis #4 is rejected.

7.2.5 Hypothesis #5

In hypothesis #5 it is stated that: the perceived relative advantage of a self-service technology has an effect on an individual's attitude towards it. The service characteristics as defined by Rogers have been commonly used in B2C research to describe factors influencing the adoption of SSTs. One of these characteristics is relative advantage which describes the expected returns the customer will receive upon using the SST. Because economic returns have already been examined separately (hypothesis #2) the returns in this case are the results of using the SST in terms of order accuracy and the demonstrability of results. Relative advantage was measured by combining the results of survey questions #19, #20, and #21. Cronbach's Alpha was used to verify whether they could be merged into a single scale, of which the results are shown below.

Reliability Statistics	
Cronbach's Alpha	N of Items
,609	3

Table 10: Cronbach's Alpha - Relative Advantage

Cronbach's Alpha was shown to be barely sufficient, $\alpha = 0.609$ and allowed for analysis between relative advantage and the attitude towards SSTs. The results of the analysis using Spearman's Rho are shown on the next page.

Correlations			Attitude SST	Relative Advantage
Spearman's rho	Attitude SST	Correlation Coefficient	1,000	-,019
		Sig. (2-tailed)	.	,882
		N	60	60
	Relative Advantage	Correlation Coefficient	-,019	1,000
		Sig. (2-tailed)	,882	.
		N	60	60

Table 11: Spearman's Rho - Relative Advantage

No significant relation can be identified between attitude towards SSTs and the relative advantage in terms of order accuracy / result demonstrability. Values of $r = -0.019$ and $p = 0.882$ show that there is hardly any correlation between the two. In other words, data retrieved from the questions related to relative advantage had very little to no impact on the attitude score provided by the respondents. Therefore hypothesis #5 is rejected; relative advantage does not have an effect on the attitude towards SSTs.

7.2.6 Hypothesis #6

The sixth hypothesis assumes the following is true: compatibility of a self-service technology has an effect on the individuals' attitude towards it. Compatibility has been measured through a single question which asked the respondent whether if given the choice they would either go with a SST or the traditional service option. Correlation between compatibility and attitude towards SSTs was examined using Spearman's Rho, of which the results are shown below.

Correlations			Traditional Serv	Attitude SST
Spearman's rho	Compatibility	Correlation Coefficient	1,000	-,410**
		Sig. (2-tailed)	.	,001
		N	60	60
	Attitude SST	Correlation Coefficient	-,410**	1,000
		Sig. (2-tailed)	,001	.
		N	60	60

** . Correlation is significant at the 0.01 level (2-tailed).

Table 12: Spearman's Rho - Compatibility

Analysis has uncovered a moderate negative relation between compatibility and the attitude towards SSTs. Correlation is negative and moderate, $r = -0,410$ meaning that a lower score on compatibility will result in a more negative attitude towards SSTs. The relationship is significant at $p = 0.01$, therefore hypothesis #6 is accepted, compatibility has a moderate but significant effect on the attitude towards SSTs.

7.2.7 Hypothesis #7

Hypothesis #7 states that: the complexity of a self-service technology has an effect on the individuals' attitude towards it. Complexity is another service characteristic as defined by Rogers; it describes the perceived difficulty of an innovation. It is expected that an increasingly hard to use SST requiring a high level of understanding is less likely to be adopted. The answers to questions #13, #24, #25 and #28 were initially combined to form a single scale in order to measure complexity but failed to meet the demands of the Cronbach's Alpha test. The inclusion of a question in regard to a necessity for extensive logistics knowledge led to a disastrous drop in scale validity.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Easy to Use	9,33	4,633	,240	,594
Mistake	11,23	2,792	,616	,280
Mistake Effect	10,95	3,099	,463	,425
Extensive Knowledge	10,58	3,806	,202	,653

Table 13: Cronbach's Alpha - Complexity (1).

As a result "Extensive Knowledge" was dropped from the scale and complexity was defined by the answers to questions #13, #24, and #25, resulting in a more suitable Cronbach's Alpha of $\alpha = 0,653$

Cronbach's Alpha	N of Items
,653	3

Table 14: Cronbach's Alpha - Complexity (2)

In order to determine any correlations between complexity and an individual's attitude towards SSTs the data was analyzed using Spearman's Rho. This showed that complexity has a moderate negative effect on the attitude towards SSTs. $r = -0,281$ means that increased complexity will result in a slightly lower than average attitude towards SSTs. Significance $p = 0,030$ is less than 0,05 which means that the relationship can be considered statistically significant, therefore hypothesis #7 is accepted. Complexity has a weak negative effect on an individual's attitude towards SSTs.

			Attitude SST	Complexity
Spearman's rho	Attitude SST	Correlation Coefficient	1,000	-,281*
		Sig. (2-tailed)	.	,030
	Complexity	Correlation Coefficient	-,281*	1,000
		Sig. (2-tailed)	,030	.

*. Correlation is significant at the 0.05 level (2-tailed).

Table 15: Spearman's Rho - Complexity

7.2.8 Hypothesis #8

Using the fourth service characteristic defined by Rogers the following hypothesis was formulated: trialability of a self-service technology has an effect on an individual's attitude towards it. This hypothesis assumes that the availability of a demo-version or at least the ability to test a SST will have an effect on the individuals' attitude towards it. As trialability was measured using a single construct there was no need to group several questions and perform Cronbach's Alpha.

The results of the correlation test using Spearman's Rho are shown below.

Correlations			Attitude SST	Trialability
Spearman's rho	Attitude SST	Correlation Coefficient	1,000	,135
		Sig. (2-tailed)	.	,303
		N	60	60
	Trialability	Correlation Coefficient	,135	1,000
		Sig. (2-tailed)	,303	.
		N	60	60

Table 16: Spearman's Rho – Trialability

Results show that there is no statistically significant relationship between trialability and the attitude towards a SST. Correlation is almost non-existent $r = 0,135$ and significance score is way too high $p = 0,303$, indicating that the two variables are not related. Hypothesis #8 is rejected; trialability does not have an effect on an individual's attitude towards SSTs.

7.2.9 Hypothesis #9

The ninth hypothesis states that: observability has an effect on an individual's attitude towards the self-service technology. Observability is also one of Rogers service characteristics and describes the perceived clarity of results when using a SST. It is expected that when the results of using a SST are unclear the attitude towards it drops. On the other hand clear results are not expected to automatically guarantee a positive attitude as research has shown that customers often take these for granted (Kolodinsky, Hogarth, & Hilgert, 2004). In order to measure observability, the answers to questions #15 and #19 were combined into a single scale and tested for reliability using Cronbach's Alpha. Resulting in a positive score of $\alpha = 0,769$

Reliability Statistics	
Cronbach's Alpha	N of Items
,769	2

Table 17: Cronbach's Alpha – Observability

The correlation between observability and an individual’s attitude towards SSTs was examined using Spearman’s Rho of which the results are shown below.

			Attitude SST	Observability
Spearman's rho	Attitude SST	Correlation Coefficient	1,000	,067
		Sig. (2-tailed)	.	,613
		N	60	60
	Observability	Correlation Coefficient	,067	1,000
		Sig. (2-tailed)	,613	.
		N	60	60

Table 18: Spearman's Rho - Observability

No significant relationship has been found between observability and attitude. Correlation between both variables very low at $r = 0,067$ indicating that a change in either variable has very little to no influence on the other. This claim is supported by the significance score which far exceeds the 0,05 threshold at $p = 0,613$. Hypothesis #9 is therefore rejected; observability does not have an effect on an individual’s attitude towards SSTs.

7.2.10 Hypothesis #10

Hypothesis #10 states that: self-efficacy as an intrinsic reward has an effect on the attitude of an individual towards self-service technologies. Self-efficacy is an individual’s belief that he or she can perform a task (Bandura, 1977). It can work as a motivator as it encourages the user to “challenge” themselves, successfully completing the task will in turn result in a psychological stimulant motivating the user to continue using the new approach.

In order to measure the degree in which the respondents find self-efficacy of importance the answers to questions #21, #26, and #27 were combined to create a single scale allowing the measurement of “Self-efficacy”. The reliability of this scale was tested using Cronbach’s Alpha, yielding the following results:

Cronbach's Alpha	N of Items
,685	3

Table 19: Cronbach's Alpha - Self Efficacy

The results of Cronbach’s Alpha were positive at $\alpha = 0,685$ barely allowing for the usage of the scale “Self-Efficacy” consisting of questions #21, #26 and #27. Consequently analysis was performed using Spearman’s Rho of which the results are shown on the next page.

Correlations			Self Efficacy	Attitude SST
Spearman's rho	Self Efficacy	Correlation Coefficient	1,000	,160
		Sig. (2-tailed)	.	,222
		N	60	60
	Attitude SST	Correlation Coefficient	,160	1,000
		Sig. (2-tailed)	,222	.
		N	60	60

Table 20: Spearman's Rho - Self Efficacy

Analysis has shown that no reliable relationship between the two variables can be derived. The correlation score was found low at $r = 0,160$ and the score for significance exceeded the 0,05 mark at $p = 0,222$. This indicates that a change in either self-efficacy or an individual's attitude does not mean that the other variable will change as well. Therefore hypothesis #10 is rejected; there is no apparent relationship between self-efficacy and an individual's attitude.

7.2.11 Hypothesis #11

One factor that has not been widely discussed in B2C research is expert power. It is expected that expert power (the role of leadership & management) plays an important role in B2B SST adoption. This expectation has resulted in the following hypothesis: perceived usefulness has an effect on the degree of expert power exerted to stimulate self-service technology adoption. In order to measure expert power, a single measurement scale had to be created. Questions #27 and #29 were used to create this scale and tested for reliability using Cronbach's Alpha.

Reliability Statistics	
Cronbach's Alpha	N of Items
,743	2

Table 21: Cronbach's Alpha - Expert Power

The results of Cronbach's Alpha were positive $\alpha = 0,743$ which allowed for it to be used in further analysis. In order to examine any relationship between perceived usefulness and expert power a correlation test was conducted using Spearman's Rho. It is important to note that the scale used to measure perceived usefulness is identical to that of previous hypotheses consisting of questions #15, #16, #19, #20, #30 with a Cronbach's Alpha score of $\alpha = 0,698$

Correlations

			Expert Power	Perceived Usefulness
Spearman's rho	Expert Power	Correlation Coefficient	1,000	,269*
		Sig. (2-tailed)	.	,038
		N	60	60
	Perceived Usefulness	Correlation Coefficient	,269*	1,000
		Sig. (2-tailed)	,038	.
		N	60	60

*. Correlation is significant at the 0.05 level (2-tailed).

Table 22: Spearman's Rho - Perceived Usefulness & Expert Power

Results of Spearman's Rho have uncovered a moderate positive relationship between both variables. With a correlation score of $r = 0,269$ and a significance score of $p = 0,038$ it can be concluded that the perceived usefulness of a SST will result in an increased degree of expert power. Meaning that if higher management considers the SST useful, the odds are high that they will use their power as business leaders to stimulate SST adoption. Hypothesis #11 is therefore accepted, perceived usefulness has a moderate positive effect on the degree of expert power exerted.

7.2.12 Hypothesis #12

Hypothesis #12 states that expert power has an effect on the behavioral intention to use a self-service technology. Because hierarchy and leadership play an important role in a B2B context it is expected that expert power has an effect on an individual's behavioral intention to use a SST. The previously defined scale for expert power was compared to the results of the respondents' interest towards SSTs (measured on a 3 point scale, not interested – interested). Data analysis using Spearman's Rho resulted in the following.

Correlations

			Expert Power	Interest SST
Spearman's rho	Expert Power	Correlation Coefficient	1,000	,198
		Sig. (2-tailed)	.	,129
	Interest SST	Correlation Coefficient	,198	1,000
		Sig. (2-tailed)	,129	.

Table 23: Spearman's Rho - Expert Power & Behavioral Intention

The table shows that correlation is negligible at $r = 0,198$ and significance score is reasonable at $p = 0,129$. This indicates that there is a no relationship between expert power and an individual's behavioral intention to use SSTs. The assumption that increased expert power leads to an increase in usage of SSTs is therefore invalid, hypothesis #12 is rejected.

7.2.13 Hypothesis #13

The final hypothesis that was formulated states that: an individual’s attitude towards self-service technologies has an effect on their behavioral intention to use it. One of the key principles of the original Technology Acceptance Model is that the attitude of an individual is the main driver behind the actual adoption (behavioral intention) of a SST. In order to test whether the same upholds within the context of this thesis, the correlation between attitude and interest towards SSTs was analyzed.

Correlations			Interest SST	Attitude SST
Spearman's rho	Interest SST	Correlation Coefficient	1,000	,798**
		Sig. (2-tailed)	.	,000
		N	60	60
	Attitude SST	Correlation Coefficient	,798**	1,000
		Sig. (2-tailed)	<,000	.
		N	60	60

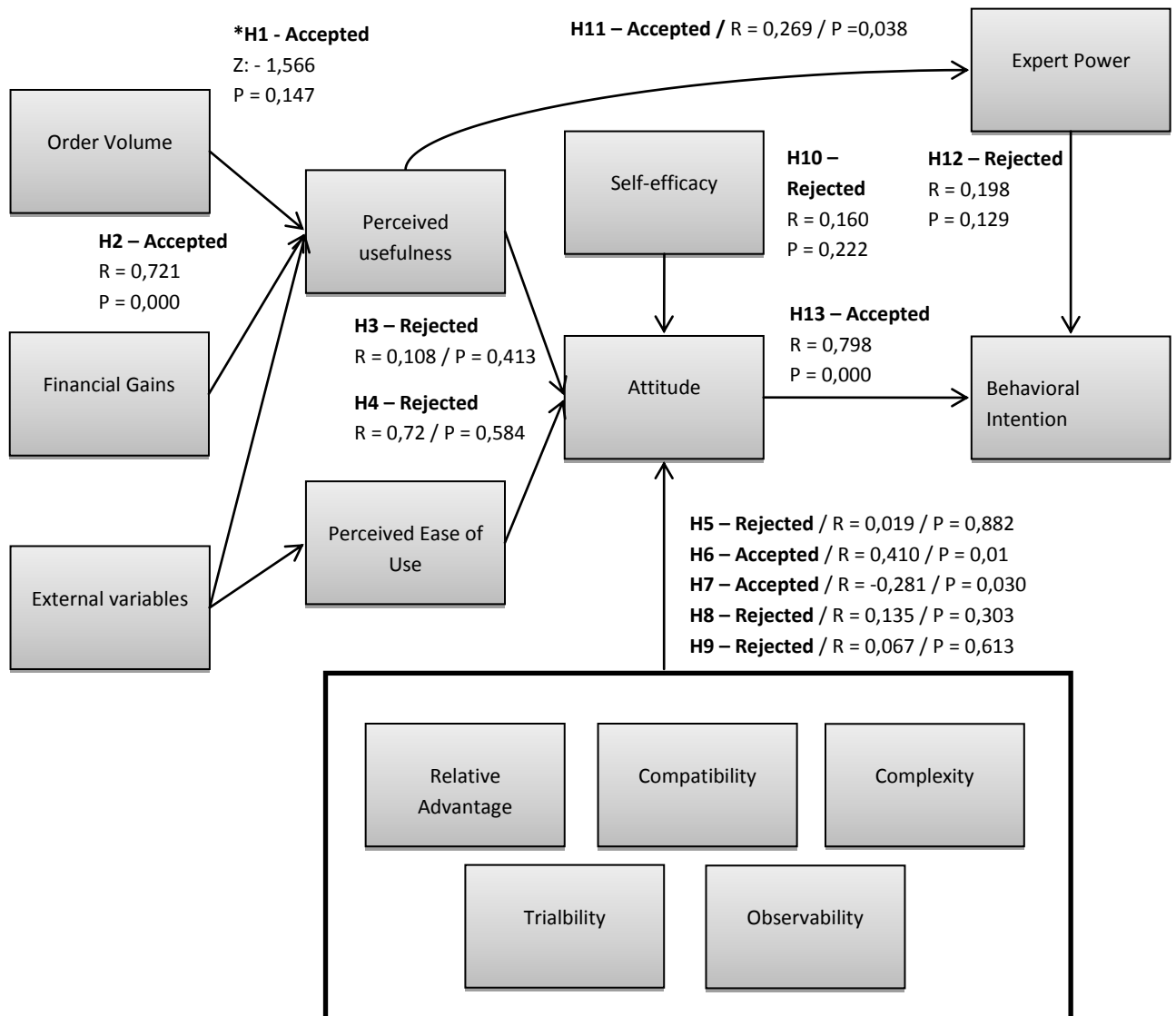
** . Correlation is significant at the 0.01 level (2-tailed).

Table 24: Spearman's Rho - Behavioral Intention

The results of Spearman’s Rho show that there is a strong positive relationship between behavioral intention and attitude towards SSTs. Correlation score is the highest we’ve seen out of all variables at $r = 0,798$ and significance is strongest as well at $p < 0,000$. These results allow for the conclusion that a change in attitude score will have a direct effect on the likeliness to adopt. A more positive attitude will always result in a higher chance that the SST will be adopted and the opposite goes for a negative attitude. Hypothesis #13 is accepted.

7.3 Validation of the Model

Throughout the results chapter it has been shown that a large amount of hypotheses could not be accepted. Data analysis has uncovered that hypotheses 1, 2, 6, 7, 11, and 13 were accepted and 3, 4, 5, 8, 9,10 and 12 were rejected. Most accepted hypotheses, related to constructs derived from the Technology Acceptance Model with only hypotheses #3 (perceived usefulness) and #4(perceived ease of use) being rejected. Very few of the service characteristics defined by Rogers were accepted, the data did not yield sufficient evidence to support the claim that relative advantage, trialability, and observability had an effect on an individual’s attitude towards SSTs. The results of statistical analysis have been placed into the original research model in order to visualize the results.



Results of Mann Whitney U Test.

Figure 8: Research Model (2)

While the model holds true to some extent, not all concepts can be accepted. Therefore the research model is rejected; self-service technology adoption in a B2B logistics context cannot be visualized as per the above model.

8. Conclusions

This chapter contains the conclusion of the research. Each sub-question will be answered separately using the survey and literature review results. By combining the answers to the sub-questions the main question can be answered.

8.1 Sub-Question #1

“How have self-service technologies been introduced and adopted within B2C industries?”

In answering this research question emphasis will be placed on the theoretical constructs that have been derived from the adoption patterns within B2C industries. These theories have served as a basis for development of a theoretical model that could be applied in a B2B context. Throughout this thesis three different industries have been looked at namely: banking, retail, and airline. Each of which having shown different adoption rates and motivational factors.

Banking

Online banking and the ATM have proven to be prime examples of successful self-service technologies. Both technologies have been adopted by a large part of the consumer market within a short period of time. This adoption was stimulated by the positive perceived relative advantage, customers that have a more positive perception of e-banking technologies have shown to be far more likely to adopt it (Kolodinsky, Hogarth, & Hilgert, 2004). Previous experience with similar technologies has also shown to have a positive effect on adoption. Respondents that had previously used e-banking technologies were actually twice as likely to adopt it again as opposed to respondents with no experience (Kolodinsky, Hogarth, & Hilgert, 2004). In the banking industry almost all research supports the Technology Acceptance Model by (Davis, 1986). The underlying factors and principles that make up the model have been proven several times (Bughin, 2004) (Karjaluoto, Mattila, & Pento, 2002) (Kolodinsky, Hogarth, & Hilgert, 2004) (Curran & Meuter, 2005), we can therefore safely state that: self-service technology adoption in the B2C banking industry can be described using the Technology Acceptance Model.

Retail

Two retail self-service technologies have been examined, self-checkout and E-commerce. While both technologies differ greatly in terms of application and usage they share similar adoption patterns and motivating / demotivating factors. Within retail the perceived usefulness of a SST and the benefits that the customer could potentially derive from them have proven to be the most apparent motivational factor (Vijayasathy, 2004) (Chen & Tan, 2004) (Weijters B. , Rangarajan, Falk, & Schillewaert, 2007). Individual customers look for any financial or time saving gains when deciding on whether to use a self-service option. If the benefits are unclear then voluntary adoption is very unlikely.

Whilst most retail self-service research has focused on testing and expanding on the Technology Acceptance Model, Vijayarathy instead introduced the diffusion of innovations theory (Rogers, 2003). In this augmentation of the TAM he described that the service characteristics of innovations can to a large extent be combined with the TAM. In retail for example we can see that “compatibility” one of the service characteristics has a large impact on perceived usefulness and in turn the likelihood for adoption (Vijayarathy, 2004). Based on the literature it can be concluded that SST adoption in retail can be described using a mix of the Technology Acceptance Model and the theory of innovation diffusion.

Airline

In the airline industry self-service check-in kiosks have become increasingly popular, especially for the airlines themselves. Research has shown that traditional check-in costs are at 3\$ per passenger as opposed to 0.14\$ dollars when using the self-check in option (Self-Service Economy Arrives Gradually, 2007). While airlines have encouraged usage of these kiosks, passengers are still very hesitant due to a number of factors. Technological distrust, self-efficacy, and result demonstrability are the primary factors that could be identified (Meuter, Bitner, Ostrom, & Brown, 2005) (Wu & Wang, 2005) (Lu, Chou, & Ling, 2009). In general the passenger does not have the confidence (self-efficacy) to use the kiosk because the effects of a mistake are perceived as very high. They fear that they will miss their flight or lose their luggage and that this cannot be resolved in due time. While the original technology acceptance model does not include the mention of self-efficacy, research within the airline industry has proven that it is an important factor when looking at self-service technology adoption (Dabholkar & Bagozzi, 2002). Therefore it can be stated that within the airline industry, SST adoption can be best described using the Technology Acceptance Model and the theory of Self-Efficacy (Bandura, 1977).

The answer..

To a large degree all of the self-service technologies in the banking, retail, and airline industries have shown to be affected by similar motivational factors. While in each industry the dominant factors differ, a common ground has been created by the Technology Acceptance Model. This leads us back to the research question originally posted: “How have self-service technologies been introduced and adopted within B2C industries?” The answer is that the introduction and adoption of SSTs has been in accordance with the Technology Acceptance Model by Davis in combination with the diffusion of innovations theory by Rogers and the Self-Efficacy theory by Bandura. These three theoretical frameworks / models combined encompass most of the literature related to the acceptance of SSTs within a B2C context.

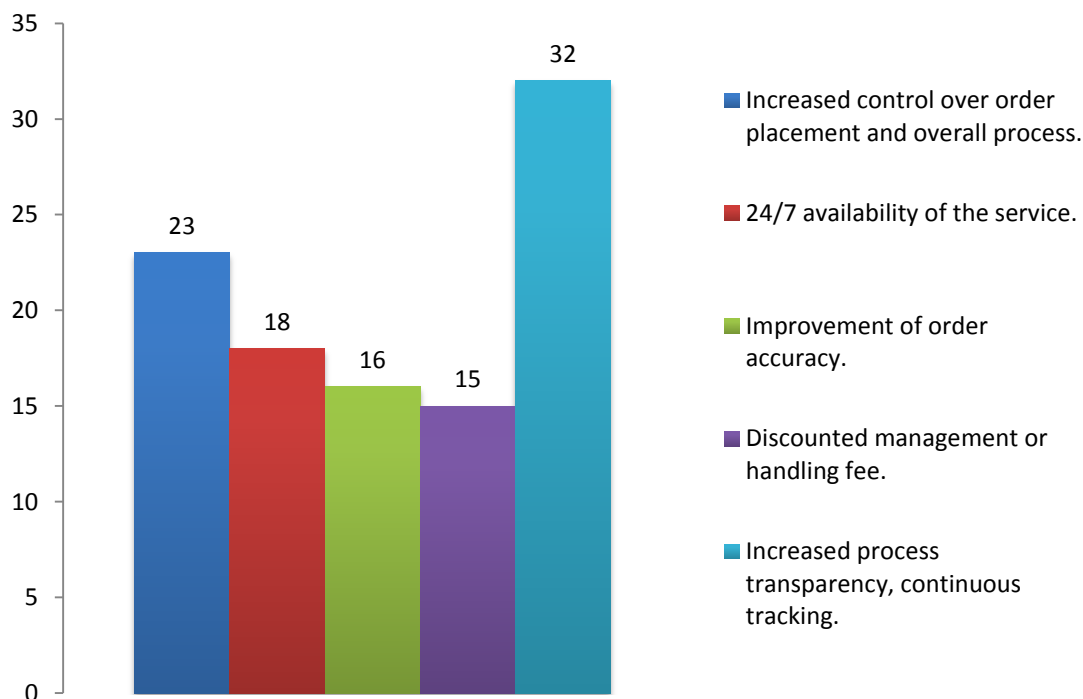
8.2 Sub-Question #2

“What beliefs do the customers of logistics service providers hold towards the adoption and usage of self-service technologies?”

The hypotheses have been tested and their results described in the results chapter. It has been shown that not all hypotheses passed the statistical tests and were therefore rejected. Through data analysis and overall research a number of beliefs could be identified that typify the attitude and behavior of customers of logistics service providers.

The first belief that could be identified is that the usage and potential of a SST depends strongly on the order volume of the customer. A high order volume paired with an existing automated order placement process always leads to a disinterest towards SSTs, on the other hand the interest in SSTs increases as order volume drops. Customers who ship only a few orders via the LSP are more eager to try and use SSTs than those with higher order volumes, as is supported by hypothesis #1.

Another belief that could be derived from survey data is that when a customer considers adopting a SST they expect to gain additional control over the process. Out of 60 respondents, 32 noted that “Increased process transparency and continuous tracking” was one of the main reasons why they would consider to use a SST, as shown in the graph below.



Graph 8: Motivating Factors

The customers consider regaining some control over an outsourced process as an important factor. This is supported by the lack of correlation between perceived ease of use and the attitude towards SSTs as shown in hypothesis #4.

Remarkably a discount in management or handling fee scored rather poorly in terms of importance. Even though hypothesis #2 (related to financial gains) scored rather well and showed to have a strong positive effect on perceived usefulness. What can be derived from this is that the customer cares little about compensation in only monetary terms, but seeks gains mostly in the form of time saving.

In general the customer beliefs relate strongly to the concepts described in the Technology Acceptance Model (Davis, 1986). Those briefly described in this sub-chapter are the beliefs that stand out from the model and appear to relate specifically to the context of this thesis.

The answer..

In short it can be stated that the beliefs customers of logistics service providers hold towards SSTs are;

- Order volume is leading, if it is too high the SST becomes unusable due to the extra work needed to be performed by the customer.
- SST adoption should provide the customer with more control and transparency over the entire logistics process.
- Financial gains are to be realized through time-saving and efficiency as opposed to mere monetary discounts.

8.3 Sub-Question #3

“How does the world of logistics and specifically the environment of the LSP differ from that of B2C industries in regards to self-service technology adoption?”

In the answers to sub-question #1 it has been shown that SST adoption in a B2C context can be described using a combination of three theoretical models / constructs. Namely the Technology Acceptance Model (Davis, 1986), the Self-Efficacy theory (Bandura, 1977) and the service characteristics by (Rogers, 2003). The applicability of each of these theories within a B2B logistics context will be described throughout this sub-chapter in order to formulate an answer to the sub-question.

Technology Acceptance Model

Perceived usefulness, perceived ease of use, attitude and behavioral intention are factors derived directly from the Technology Acceptance Model which have been placed into the research model of this thesis. Through data analysis it has been shown that the underlying concepts of all factors except for perceived ease of use have been proven true in a B2B context. Especially the relationship between attitude and behavioral intention (indicating what a person thinks about SSTs in relation to the actual odds that they will adopt it) has proven to be significant. While ease of use is one of two factors influencing attitude in the original TAM, it has not shown to be significant within the context of this thesis. Possible explanations include the customers' ability to train their personnel in using the SST if the benefits are great enough. Additionally customers do not expect the SST to be difficult as most if not all of the respondent organizations had employees with logistics backgrounds place the orders, this vastly reduces the odds that the SST will be perceived as difficult to use.

Self-Efficacy

The concept of self-efficacy in regard to SST adoption has been researched before (Dabholkar & Bagozzi, 2002) (Meuter, Bitner, Ostrom, & Brown, 2005). Within B2C focused research it was shown that self-efficacy plays an important role in the motivation and demotivation to use a SST. Results of the survey have shown that no significant relationship between self-efficacy and attitude towards SST was found in a B2B context. This can be explained due to the fact that users do not always have a choice whether they want to use the SST, as it can be enforced by management. This can completely remove the sense of challenge and personal ambition to try something new, eliminating any room for intrinsic rewards through self-efficacy.

Service Characteristics

The service characteristics as defined by Rogers are: relative advantage, compatibility, complexity, trialability, and observability. Out of these five characteristics only compatibility and complexity have turned out to be related to an individual's attitude towards SSTs. This has shown that customers of the LSP require the SST to be coherent with current processes and should not deviate too much from the existing way of doing business. Immensely complex and user unfriendly application are also frowned upon by the customers as indicated by the importance of the complexity characteristic.

Exact reasons as to why relative advantage, trialability, and observability have not been deemed usable in the context of B2B logistics are unknown. Research has not uncovered substantial evidence to fully support claims in regard to these factors. It is assumed that hierarchical (expert) power and the availability of existing order placement techniques play an important role in this. Future in-depth research would have to be conducted in order to support this.

The answer..

Self-service technology adoption in a B2B logistics context has shown to be only moderately different than its adoption in B2C environments. The Technology Acceptance Model was usable to a large extent. Nearly all factors related to SST adoption included in the model were found to be applicable in the context of this thesis as well.

There was no evidence to support the applicability of self-efficacy as a factor influencing SST adoption; this is where B2B differs greatly from B2C. Self-efficacy is predominantly an individual psychological factor and is less likely to be triggered from work that does not have a direct effect on the individuals' personal goals and ambitions.

Out of the five service characteristics defined by Rogers only two have been verified as factors influencing B2B logistics SST adoption. Compatibility and complexity were shown to be influencing factors but relative advantage, trialability, and observability were not. All five factors have been proven influential within B2C environments (Kolodinsky, Hogarth, & Hilgert, 2004) (Walker & Johnson, 2003) which is where the results of this thesis differ as well.

In short it can be stated that; the Technology Acceptance Model most accurately represents the target groups' attitudes towards SST, with only perceived ease of use not being applicable. Self-efficacy does not have an influence on attitude or adoption, and only two out of five service characteristics by Rogers can be applied. The difference between B2B logistics and B2C environments is that all three theories described can be applied to B2C adoption, and neither of the theories can be applied to its full extent within a B2B context.

8.4 Sub-Question #4

“What are the motivators that enable / block SST adoption?”

The survey results have uncovered a number of factors that influence SST adoption within a B2B logistics context. A number of these factors can be influenced by the logistics service provider and in turn improve the likelihood of adoption and attitude towards SSTs. An overview of these so called “motivators” and “demotivators” are presented throughout this sub-chapter.

Perceived usefulness was shown to have a significant effect on an individual’s attitude towards SSTs. To some degree perceived usefulness strongly depends on the background of the customer, their previous experience with SSTs and attitude towards technology can be motivation enough for them to have a negative attitude towards SSTs (Karahanna & Straub, 1999). While the LSP cannot influence these factors there are some sides to perceived usefulness that can be influenced. Results have shown that customers of LSPs value increased control and transparency over the order process as one of the most important reasons to adopt a SST. Emphasizing the control the customer will gain from using the SST as well as demonstrating the traceability of an order will, based on the results of this thesis, strongly motivate a customer to adopt the SST.

While ease of use (Technology Acceptance Model) was shown to have no effect on an individual’s attitude towards SSTs, complexity (Service Characteristics) as defined by Rogers actually does have an effect. Even though both concepts may seem closely related they do differ, ease of use as the name states is focused mainly on how easy something is to use, i.e. how long will it take to use? Will there be a lot of information on the screen? Complexity on the other hand emphasizes the knowledge required to perform the task, does the user need a vast amount of knowledge of logistics to perform the task? Is advanced experience with similar applications required? (Liljander, Gillberg, Gummerus, & Riel, 2006) While both factors are stimulated by similar techniques the LSP would be wise to focus on complexity as customers have shown little interest in ease of use. Complexity or the customers perception thereof can be reduced through logical design decisions and training. User interface designs that include descriptions of the various fields, buttons and other functionalities have shown to be perceived as far less complex (Frese, 2008). Training on the other hand is something that can easily be provided by the LSP, simply having training sessions with the customers (users) informing them about the capabilities of the application and giving them a first hands-on experience can already greatly reduce the perceived complexity (Gallivan, 2001).

Besides positive motivating factors influencing attitudes and adoption of SSTs, there are also demotivators that if treated incorrectly by the LSP can greatly reduce the likelihood of adoption. The availability of the traditional service delivery mode, be that e-mail, EDI or otherwise can have a negative effect on the adoption of the SST. Even though the continuation of the traditional delivery mode is essential (Meuter, Bitner, Ostrom, & Brown, 2005), it should not be stimulated or promoted in any way when the SST is made available. All references to its existence should be removed and should instead point towards the SST. This way the existing customers who prefer the traditional service delivery mode can still use it, but new customers will not be motivated to use anything else but the SST (Savareikiene & Galinyte, 2012).

A very important and rather obvious de-motivator is forced usage of the SST, in other words the complete removal of the traditional service delivery mode. B2C research has shown that forced usage creates a lot of resistance and a very negative attitude towards SSTs (Ram & Hyung, 1991). The same is expected within a B2B logistics context, enforcement may even result in loss of business with disgruntled customers opting to use a different LSP.

The answer..

This thesis has uncovered four motivators / demotivators (blockers) related to the adoption and attitude towards SSTs in a B2B logistics context. These motivators / demotivators are:

Motivators

- Emphasize control & transparency by providing means for customers to trace their shipments integrated in the order placement SST.
- Reduce perceived complexity through extensive training and a detailed user interface including extensive descriptions of functionalities.

Demotivators

The below mentioned factors will de-motivate SST adoption / attitude if performed differently.

- Maintain the existing traditional service delivery mode but de-motivate its usage by removing any reference to its existence.
- Do not enforce usage of the SST by removing the traditional service delivery mode.

8.5 Main Question

The main question that this thesis has aimed to answer is: what factors influence the adoption of self-service technologies by customers of logistics service providers? Throughout the document a number of theoretical models and concepts have been discussed and their applicability in a B2B logistics context was tested. Based on the findings of the literature review and survey data the following can be concluded about the factors influencing SST adoption.

Order volume was shown to have an effect on an individual's perceived usefulness of SSTs. Results of the Mann-Whitney U test showed that respondents who stated that they had higher order volumes, scored lower on perceived usefulness ($Z = -1.566, p = 0.147$). This result was expected as automated order placement techniques become far more interesting than self-service once a certain volume is reached. Its relationship with perceived usefulness has led to the conclusion that order volume is a key factor in a customers' motivation to adopt a SST within a B2B logistics context.

Before the collection of respondent data it was expected that pricing and mostly monetary discounts would greatly influence a customers' motivation to adopt SSTs. This expectation turned out to be wrong as the opposite was true, customers have turned out not be motivated by monetary returns (discounts provided by the LSP) but instead aim to achieve financial gains through order placement efficiency. Financial gains, the term used in this research to describe the gain in efficiency paired with SST adoption, has actually shown to have a strong relationship with perceived usefulness. ($r = 0,721, p = 0,000$) It can therefore be concluded that financial gains in terms of efficiency and accuracy are important factors influencing a customers' willingness to adopt SSTs.

According to the Technology Acceptance Model an individual's attitude towards SSTs is determined by two factors, perceived usefulness and perceived ease of use. This thesis has uncovered that within the context of B2B logistics neither factor has an effect on an individual's attitude. While ease of use did not show a direct relationship to attitude, two of Rogers service characteristics, compatibility and complexity did show correlation with an individual's attitude ($r = 0,410, p = 0,001$ and $r = -0,281, p = 0,030$ respectively). Complexity can be confused with ease of use but both differ greatly, complexity is knowledge centered and describes the skills needed by the user to complete the task. Ease of use on the other hand describes the application itself, how the functionalities are set up, how fast you can work through a task. This factor was deemed unimportant by the respondents. Perceived usefulness and compatibility describe the degree in which the SST complies with existing standards, the SST has to comply with all requirements of the existing service delivery mode as well as add improvements. When this is not the case the SST will have a low score on perceived usefulness and compatibility, resulting in a negative attitude towards it. In short it can be stated that compatibility and complexity are important factors influencing SST adoption.

Finally leadership and hierarchical power also referred to as expert power was shown to not have a direct relationship with an individual's behavioral intention to use SSTs. While expert power was expected to be a major influence on an individual's behavioral intention due to enforcement by management, the data has demonstrated that no relationship could be uncovered ($r = 0,198, p = 0,129$).

9. Discussion

This thesis has uncovered that adoption of self-service technologies within a B2B logistics context is considerably different than adoption in a B2C context. As mentioned in the answer to the main question, order volume, compatibility, complexity have all shown to be key factors affecting the adoption of SSTs. Investigation of the literature mostly related to B2C adoption has uncovered many more factors, but these could not be confirmed within the context of this thesis. As with most research this thesis was constrained by a number of limitations which will be described in this chapter. Furthermore a number of suggestions for future research are presented, based on the results of this thesis and its limitations.

9.1 Limitations

In retrospect a more qualitative approach could have yielded new findings in regard to SST adoption. The survey did not allow for new factors specific to a B2B context to be uncovered but instead allowed for the confirmation or rejection of existing theories. Regardless the size of the population (240 potential respondents) called for a data collection technique suitable for larger groups, performing 5 – 10 in depth interviews would have most likely not resulted in data that could be generalized across the entire population.

Furthermore a number of questions stated in the survey ended up not being used, reason for this is that the hypothetical model was altered after the survey had been sent to the respondents. This caused a number of questions (that previously related to the hypothetical model) to suddenly be unnecessary. Removal of these questions would have resulted in a shorter survey and perhaps an even higher response rate.

Additionally the individual responses did not allow for inter-company analysis. Respondents were given a choice whether they wanted to state the company in which they were employed and a large portion of the respondents chose not to do so. Because of this design decision respondent results could not be grouped on a company level and analysis could only be conducted on an individual level. Company level decision making and differences in opinions between operational and managerial staff within the same company could not be uncovered.

9.2 Suggestions for future research

Throughout this thesis SST adoption was investigated from a B2B logistics point of view. With most research aimed at B2C industries this field is quite saturated, but B2B research in regard to this topic is still mostly untouched. Future research could use a similar hypothetical model as used in this thesis and apply it to any other B2B industry to see whether it differs from either logistics or B2C industries.

Furthermore, in-depth research can be conducted using qualitative data collection methods (interviews) to uncover factors specific to adoption of SSTs within a B2B logistics context. As mentioned in the limitations section this thesis has only confirmed or rejected existing theoretical models related to SST adoption. In-depth interviews could uncover factors that have yet to be identified and potentially lead to a new theoretical model specific to a B2B context.

Finally, future research could investigate the "blockers" of SST adoption. While this thesis has addressed mostly stimulating factors there are also numerous de-motivating factors that can have a detrimental effect on an individual's attitude. Take for instance technological failures and forced usage, two factors that within B2C industries have proven to affect adoption, does the same uphold within B2C industries?

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Appendix A: Survey Questions

1. At which hierarchical level are you employed?
 - a. Directory Level
 - b. Managerial Level
 - c. Supervisory Level
 - d. Operational Level

 2. Please state your job title.

 3. How many employees does the company in which you are employed have locally?
 - a. 1 – 10 employees.
 - b. 11 – 50 employees.
 - c. 51 – 250 employees.
 - d. 250 – 999 employees.
 - e. 1000 + employees.

 4. What is the number of orders typically placed at your logistics service provider?
 - a. Less than 10 orders a month.
 - b. 11 – 20 orders a month.
 - c. 21 – 50 orders a month.
 - d. 51 – 99 orders a month.
 - e. More than 100 orders a month.

 5. How long have you been working together with your current logistics service provider?
 - a. Less than half a year.
 - b. 0.5 – 1 year.
 - c. Between 1 and 2 years.
 - d. Between 2 and 5 years.
 - e. More than 5 years.

 6. How would you rate the service provided to you by your current logistics service provider?*
- * Extremely poor (1) – Excellent (10)**
7. Through which means do you typically place an order at your logistics service provider?
 - a. E-mail
 - b. Telephone
 - c. Fax
 - d. Electronic Data Interchange
 - e. Other

8. Do you have any previous experience with self-service technologies in either a personal or business environment?
 - a. Yes, in a personal environment.
 - b. Yes, in a business environment.
 - c. Yes, in both a personal and a business environment.
 - d. No, I have no experience with self-service technology.

9. If your logistics service provider were to provide a self-service option for order placement and related activities would you be interested in using it?
 - a. Very interested. **(Proceed to question #12)**
 - b. Interested. **(Proceed to question #12)**
 - c. Not interested. **(Proceed to question #10)**

10. What are reasons for you to NOT consider a self-service option?
 - a. Order volume too high.
 - b. Current order placement is automated.
 - c. No resources available to perform these tasks.
 - d. Lack of expertise to complete tasks.
 - e. Possible benefits are unclear.
 - f. Not willing to do the additional work.
 - g. Other

11. Would appropriate training, tutorials and other forms of guidance be motivating enough for you to try the self-service option?
 - a. Yes. **(Proceed to question #13)**
 - b. No. **(Proceed to question #13)**

12. What are reasons for you to consider a self-service option?
 - a. Increased control over order placement and overall process.
 - b. 24/7 availability of the service.
 - c. Improvement of order accuracy.
 - d. Discounted management or handling fee.
 - e. Increased process transparency, continuous tracking.
 - f. Other

Below statements were rated on a five point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5)

13. The self-service option must be easy to use.

14. A service employee must be available to assist if necessary.

15. I must be able to review and edit my work.

16. The appearance and readability of the application greatly influence my motivation to use it.

17. Detailed descriptions of required information & fields are mandatory.
18. The availability of a demo version would increase my interest in a self-service option.
19. I expect a clear and concise overview of the order I just placed, or the document I just created.
20. I expect the self-service option to be quicker than the traditional service delivery option.
21. I must be compensated when using the self-service option.
22. Using the self-service option should be a free choice.
23. In case a traditional service delivery mode exists, I would be less inclined to use the self-service option.
24. I'm afraid that I or one of my colleagues will make mistakes using the self-service option.
25. I'm concerned about the effects of a mistake when using the self-service option.
26. Positive experiences with self-service from my colleagues will increase my motivation to use it.
27. Positive experiences with self-service from my superiors will increase my motivation to use it.
28. Order placement should not require extensive knowledge of the logistics process.
29. Recommendations from higher management to use self-service technologies will strongly motivate me to do so.
30. I want to be able to edit and approve all documentation created by the logistics service provider.
31. How would you rate your attitude towards Self-service technologies?*

* **Extremely Negative (1) – Extremely Positive (10)**

Appendix B: Survey Introductory Letter

Dear Sir / Madam,

I'm writing you in order to request your participation in an online survey.

My name is Alex van Koppen and I'm a graduate student of the ICT in Business master's program at Leiden University. At this moment I am writing my master's thesis at BDP International B.V. on the field of "Self-Service Technologies in Logistics" in which I am researching the thoughts and opinions of the customers of logistics service providers in regard to these technologies.

Self-Service Technologies are applications or interfaces which allow the consumer to obtain a product or service without the need to contact the service provider directly. This could be anything from a web shop to a check-in kiosk at an airport.

The survey is 31 questions long and will take no more than ten minutes to complete. Should you participate you are entitled to the research results and these will be digitally provided to you via e-mail upon receiving your approval.

Please note that the results will be completely anonymous and are only intended to be used during thesis research. Your identity will be kept strictly confidential.

If you have any questions about the survey or the thesis project itself, please feel free to contact me at: alexander.vankoppen@bdpint.com or +31 (0) 10 263 09 47.

By completing and submitting this survey, as a participant, you are providing your informed consent.

Yours sincerely,

Alex van Koppen
Leiden Institute of Advanced Computer Science
Master ICT in Business



Universiteit
Leiden

Appendix C: Anonymized Survey Results

#	Q1	Q2	Q3
1	Operational Level	Teamleader Customer Order Service	250 - 999 employees
2	Operational Level	Shipping Planner	250 - 999 employees
3	Operational Level	Export shipping coordinator	250 - 999 employees
4	Supervisory Level	Project Coordinator	11 - 50 employees
5	Operational Level	Supply Planner	51 - 250 employees
6	Managerial Level		11 - 50 employees
7	Operational Level	CSR/DSR	51 - 250 employees
8	Managerial Level	Purchaser	11 - 50 employees
9	Operational Level	Logistics assistant	51 - 250 employees
10	Operational Level	SC administrator	51 - 250 employees
11	Supervisory Level		250 - 999 employees
12	Supervisory Level		11 - 50 employees
13	Managerial Level	Sales & Logistics Manager	51 - 250 employees
14	Managerial Level	Office Manager	1 - 10 employees
15	Operational Level	Customer service specialist	51 - 250 employees
16	Operational Level	operation responsible	11 - 50 employees
17	Operational Level	Purchaser	51 - 250 employees
18	Managerial Level	Manager Logistics	51 - 250 employees
19	Directory Level	Supply Chain Director	51 - 250 employees
20	Managerial Level	Customer Service & Logistics manager europe	11 - 50 employees
21	Managerial Level		250 - 999 employees
22	Operational Level	Marketing & Sales Coordinator	11 - 50 employees
23	Managerial Level	Import Export manager	11 - 50 employees
24	Operational Level	Customer service representative	1 - 10 employees
25	Supervisory Level		250 - 999 employees
26	Operational Level		250 - 999 employees
27	Operational Level	Traffic employee/ Safety Advisor ADR	51 - 250 employees
28	Operational Level	Impex officer/Warehouse manager	51 - 250 employees
29	Operational Level	Logistics	1 - 10 employees
30	Operational Level	Purchasing Manager	51 - 250 employees
31	Operational Level		1000 + employees
32	Managerial Level	Sales & Operations Planning Manager	51 - 250 employees
33	Managerial Level	Logistics Manager EMEA	250 - 999 employees
34	Operational Level	Customer Service Expert	1000 + employees
35	Managerial Level	Manager Supply Chain Operations	51 - 250 employees
36	Operational Level	Export Shipping Lead Coordinator	51 - 250 employees
37	Operational Level	Customer Service Officer	250 - 999 employees
38	Operational Level	Customer Service operator	250 - 999 employees
39	Operational Level	Customer Service Representative	51 - 250 employees
40	Operational Level	Senior Customer Care Officer	51 - 250 employees
41	Managerial Level	Epoxy Logistics Manager Europe	250 - 999 employees
42	Supervisory Level	MRP Controller	11 - 50 employees
43	Managerial Level	Manager Logistics	51 - 250 employees
44	Operational Level	Assistant Controller / Supply Chain	11 - 50 employees
45	Operational Level		250 - 999 employees
46	Supervisory Level	Teamleader sales support distributors	51 - 250 employees
47	Operational Level	Customer Service	11 - 50 employees
48	Operational Level	Teamleader Project Coordination	11 - 50 employees
49	Managerial Level	Global Procurement Manager	250 - 999 employees
50	Managerial Level	Operations Manager	11 - 50 employees
51	Operational Level	Customer Service Specialist	51 - 250 employees
52	Managerial Level	Customer Service and Logistics Manager	1000 + employees
53	Supervisory Level	coordinator Forwarding	51 - 250 employees
54	Operational Level	Logistics Manager	51 - 250 employees
55	Operational Level	Logistic Coordinator	11 - 50 employees
56	Operational Level	Transport & Customs Specialist	1000 + employees
57	Supervisory Level	Project coordinator	11 - 50 employees
58	Operational Level	planner	11 - 50 employees
59	Operational Level		51 - 250 employees
60	Operational Level	Customer Service Representative	51 - 250 employees

#	Q4	Q5	Q6
1	More than 100 orders a month.	More than 5 years.	6
2	More than 100 orders a month.	More than 5 years.	9
3	21 - 50 orders a month.	Between 2 and 5 years.	6
4	11 - 20 orders a month.	Less than half a year.	6
5	21 - 50 orders a month.	More than 5 years.	8
6	More than 100 orders a month.	Between 2 and 5 years.	8
7	More than 100 orders a month.	Between 2 and 5 years.	9
8	Less than 10 orders a month.	Between 1 and 2 years.	8
9	More than 100 orders a month.	0.5 - 1 year	8
10	11 - 20 orders a month.	0.5 - 1 year	5
11	More than 100 orders a month.	Between 2 and 5 years.	8
12	More than 100 orders a month.	More than 5 years.	7
13	More than 100 orders a month.	More than 5 years.	7
14	More than 100 orders a month.	More than 5 years.	7
15	More than 100 orders a month.	Between 2 and 5 years.	6
16	More than 100 orders a month.	Between 2 and 5 years.	8
17	11 - 20 orders a month.	More than 5 years.	8
18	Less than 10 orders a month.	Between 2 and 5 years.	8
19	More than 100 orders a month.	Between 2 and 5 years.	7
20	More than 100 orders a month.	More than 5 years.	7
21	More than 100 orders a month.	Between 2 and 5 years.	5
22	Less than 10 orders a month.	Between 2 and 5 years.	8
23	More than 100 orders a month.	Between 2 and 5 years.	8
24	Less than 10 orders a month.	Between 1 and 2 years.	6
25	21 - 50 orders a month.	Between 1 and 2 years.	7
26	51 - 99 orders a month.	More than 5 years.	8
27	51 - 99 orders a month.	More than 5 years.	8
28	51 - 99 orders a month.	Between 1 and 2 years.	10
29	21 - 50 orders a month.	Between 1 and 2 years.	7
30	Less than 10 orders a month.	Between 2 and 5 years.	8
31	More than 100 orders a month.	More than 5 years.	8
32	51 - 99 orders a month.	Between 2 and 5 years.	7
33	More than 100 orders a month.	More than 5 years.	7
34	More than 100 orders a month.	0.5 - 1 year	7
35	21 - 50 orders a month.	Less than half a year.	6
36	21 - 50 orders a month.	More than 5 years.	8
37	21 - 50 orders a month.	More than 5 years.	8
38	More than 100 orders a month.	More than 5 years.	8
39	21 - 50 orders a month.	Between 1 and 2 years.	7
40	51 - 99 orders a month.	Between 2 and 5 years.	7
41	More than 100 orders a month.	Between 2 and 5 years.	7
42	Less than 10 orders a month.	Between 2 and 5 years.	8
43	21 - 50 orders a month.	More than 5 years.	9
44	Less than 10 orders a month.	Between 2 and 5 years.	9
45	More than 100 orders a month.	Between 2 and 5 years.	8
46	More than 100 orders a month.	More than 5 years.	8
47	Less than 10 orders a month.	Between 2 and 5 years.	8
48	21 - 50 orders a month.	Less than half a year.	7
49	21 - 50 orders a month.	Between 1 and 2 years.	7
50	Less than 10 orders a month.	More than 5 years.	8
51	More than 100 orders a month.	Between 2 and 5 years.	6
52	More than 100 orders a month.	Between 2 and 5 years.	8
53	51 - 99 orders a month.	More than 5 years.	7
54	More than 100 orders a month.	Between 2 and 5 years.	7
55	21 - 50 orders a month.	Between 2 and 5 years.	10
56	More than 100 orders a month.	Between 2 and 5 years.	7
57	11 - 20 orders a month.	Less than half a year.	7
58	51 - 99 orders a month.	Between 2 and 5 years.	8
59	51 - 99 orders a month.	More than 5 years.	7
60	11 - 20 orders a month.	Between 2 and 5 years.	8

#	Q7	Q8
1	E-mail	Yes, in both a personal and a business environment.
2	E-mail	No, I have no experience with self-service technology.
3	E-mail	Yes, in a personal environment.
4	E-mail	Yes, in a personal environment.
5	E-mail	Yes, in both a personal and a business environment.
6	E-mail	No, I have no experience with self-service technology.
7	E-mail	Yes, in a business environment.
8	E-mail	Yes, in a business environment.
9	Telephone	Yes, in a business environment.
10	E-mail	No, I have no experience with self-service technology.
11	E-mail	Yes, in a personal environment.
12	Electronic Data Interchange (EDI)	Yes, in both a personal and a business environment.
13	Electronic Data Interchange (EDI)	Yes, in a business environment.
14	E-mail	Yes, in a business environment.
15	via an SAP order management system	Yes, in a personal environment.
16	E-mail	No, I have no experience with self-service technology.
17	E-mail	Yes, in a business environment.
18	E-mail	Yes, in both a personal and a business environment.
19	Electronic Data Interchange (EDI)	Yes, in a personal environment.
20	Electronic Data Interchange (EDI)	Yes, in both a personal and a business environment.
21	E-mail	Yes, in both a personal and a business environment.
22	E-mail	Yes, in both a personal and a business environment.
23	Electronic Data Interchange (EDI)	No, I have no experience with self-service technology.
24	E-mail	Yes, in both a personal and a business environment.
25	E-mail	Yes, in a business environment.
26	Electronic Data Interchange (EDI)	No, I have no experience with self-service technology.
27	E-mail	Yes, in a personal environment.
28	E-mail	No, I have no experience with self-service technology.
29	E-mail	Yes, in a business environment.
30	E-mail	No, I have no experience with self-service technology.
31	Electronic Data Interchange (EDI)	Yes, in a personal environment.
32	Electronic Data Interchange (EDI)	Yes, in a personal environment.
33	Electronic Data Interchange (EDI)	Yes, in both a personal and a business environment.
34	E-mail	Yes, in both a personal and a business environment.
35	Electronic Data Interchange (EDI)	Yes, in both a personal and a business environment.
36	E-mail	Yes, in a personal environment.
37	Electronic Data Interchange (EDI)	Yes, in a personal environment.
38	E-mail	Yes, in both a personal and a business environment.
39	E-mail	Yes, in a personal environment.
40	E-mail	Yes, in both a personal and a business environment.
41	Electronic Data Interchange (EDI)	Yes, in a personal environment.
42	E-mail	Yes, in a business environment.
43	E-mail	Yes, in a personal environment.
44	E-mail	Yes, in a business environment.
45	E-mail	No, I have no experience with self-service technology.
46	E-mail	Yes, in a personal environment.
47	E-mail	No, I have no experience with self-service technology.
48	E-mail	Yes, in a business environment.
49	E-mail	Yes, in a business environment.
50	E-mail	Yes, in a business environment.
51	Through our local logistic dept.	Yes, in a business environment.
52	Electronic Data Interchange (EDI)	Yes, in a personal environment.
53	E-mail	Yes, in a business environment.
54	Electronic Data Interchange (EDI)	Yes, in a personal environment.
55	E-mail	Yes, in both a personal and a business environment.
56	E-mail	Yes, in both a personal and a business environment.
57	E-mail	Yes, in both a personal and a business environment.
58	E-mail	Yes, in a business environment.
59	Electronic Data Interchange (EDI)	Yes, in both a personal and a business environment.
60	E-mail	Yes, in a personal environment.

#	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17
1	Interested.			A,C	5	5	5	5	5
2	Interested.			A,B,C,D,E	5	5	5	5	5
3	Not interested.	B	No		5	5	5	5	5
4	Not interested.	E	No		5	5	5	4	4
5	Very interested.			E	5	5	5	5	5
6	Not interested.	A	No		4	4	4	4	4
7	Interested.			A	3	4	3	4	4
8	Not interested.	F	No		5	5	5	5	3
9	Interested.			C	5	4	4	4	4
10	Interested.			E	5	5	5	5	5
11	Interested.			D,E	4	3	5	5	4
12	Not interested.	C,E,F	No		5	5	5	3	5
13	Very interested.			A,D	5	3	5	4	4
14	Interested.			B,E	4	4	4	4	4
15	Not interested.	B	No	A,B,E	3	3	3	3	3
16	Interested.			B,E	3	5	3	4	3
17	Not interested.	F	No		5	3	3	3	3
18	Interested.			B,C,D,E	5	4	4	4	5
19	Interested.			C,D,E	5	4	5	5	5
20	Not interested.	B			5	5	5	5	5
21	Interested.			A,B,C,D,E	5	5	5	5	5
22	Interested.			D,E	5	5	5	4	5
23	Interested.			A,B,C,D,E	5	5	5	5	5
24	Very interested.			B,C	5	5	5	4	4
25	Very interested.			A,E	4	4	4	4	4
26	Interested.			A	5	4	5	4	5
27	Interested.				4	3	4	4	3
28	Interested.			E	5	4	3	4	4
29	Interested.			E	3	4	4	4	4
30	Interested.			A,E	5	5	4	5	5
31	Interested.			E	5	5	5	5	4
32	Interested.			A,C,D,E	5	5	5	5	5
33	Interested.			A,B,D	5	4	5	4	5
34	Interested.			A,E	4	5	5	4	4
35	Interested.			A	5	4	4	5	5
36	Not interested.	C	No		5	5	5	3	5
37	Interested.			A,B,D,E	5	5	5	5	3
38	Interested.			A	4	4	5	4	4
39	Interested.			B,C,E	5	5	5	3	5
40	Very interested.			A,C,D,E	5	5	5	5	5
41	Not interested.	A	No		5	5	5	4	3
42	Interested.			A	4	5	5	5	3
43	Interested.			B	5	4	5	4	4
44	Not interested.	F	No		5	5	4	3	3
45	Interested.			A	5	5	5	4	4
46	Interested.			A,B,E	5	5	5	5	5
47	Interested.				4	4	4	5	4
48	Not interested.	A	No	E	5	5	5	4	4
49	Interested.			A,B,C,D,E	5	5	5	5	5
50	Interested.			B	5	5	5	5	4
51	Interested.			E	5	5	5	3	3
52	Interested.			B,C,E	5	5	5	5	5
53	Interested.			E	5	4	3	3	3
54	Interested.			E	5	4	4	4	4
55	Interested.			A,B,D	5	5	5	5	5
56	Interested.			F	5	4	5	5	5
57	Interested.			A,B,C,D,E	5	5	5	5	5
58	Interested.			C	4	4	4	5	4
59	Interested.			C	5	5	5	3	4
60	Interested.			A,E	5	5	5	5	5

#	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27
1	3	5	5	5	5	3	3	3	5	5
2	5	5	5	5	5	4	3	3	4	4
3	3	5	5	5	5	4	3	4	3	3
4	3	5	3	3	5	4	2	3	4	4
5	4	4	4	5	4	2	2	2	4	4
6	4	4	4	4	4	4	4	4	4	4
7	4	4	4	3	4	3	2	3	3	3
8	4	5	5	4	5	5	4	5	3	2
9	4	4	4	4	4	4	2	2	2	2
10	4	5	5	5	5	3	5	5	5	5
11	4	5	4	3	4	3	2	2	4	4
12	1	5	3	5	5	5	4	5	1	1
13	2	4	3	3	3	3	2	2	3	3
14	4	4	4	4	4	2	2	3	2	2
15	3	3	3	3	3	3	3	3	3	3
16	3	3	4	4	4	4	3	3	3	3
17	2	3	4	3	4	3	3	2	3	3
18	3	5	4	4	4	4	3	3	4	4
19	3	4	5	4	4	1	3	3	3	3
20	5	5	5	5	5	5	1	3	1	3
21	5	5	5	5	5	4	2	2	3	3
22	5	5	5	5	4	2	3	3	3	3
23	4	5	5	5	5	4	5	5	3	4
24	4	5	4	3	5	2	2	2	4	4
25	4	4	4	4	4	3	3	3	4	4
26	4	5	5	5	5	3	2	4	4	3
27	3	3	4	4	4	4	3	3	3	3
28	4	4	4	3	4	3	3	3	4	4
29	3	4	3	4	5	3	1	3	3	3
30	4	4	5	5	4	3	4	4	4	4
31	3	5	5	3	5	3	2	2	4	3
32	5	5	5	3	3	2	2	2	4	4
33	4	4	5	5	4	2	2	2	4	4
34	5	5	5	4	3	3	4	5	3	3
35	5	5	5	5	3	3	3	3	4	4
36	5	5	2	3	5	3	3	3	3	3
37	4	5	5	5	3	2	2	2	4	4
38	3	4	4	4	4	3	2	2	4	4
39	3	5	5	4	4	3	3	3	3	3
40	5	5	5	5	4	2	3	2	5	5
41	3	4	3	5	5	5	3	4	3	3
42	2	4	5	5	5	2	2	2	4	4
43	5	5	5	4	4	3	3	3	3	3
44	3	5	4	4	5	3	3	3	3	3
45	4	4	3	3	4	3	4	4	4	2
46	5	4	3	3	4	3	1	3	3	3
47	2	4	5	3	4	3	3	2	3	3
48	3	5	5	4	5	4	3	3	3	3
49	3	5	5	5	5	3	2	2	5	5
50	3	5	2	3	4	3	3	3	3	3
51	3	4	4	4	3	4	5	5	3	3
52	4	5	4	3	3	1	3	4	3	3
53	3	4	5	3	5	3	3	3	5	3
54	4	4	3	4	4	2	2	3	4	4
55	5	5	3	5	5	4	4	5	5	5
56	3	5	5	4	5	3	4	4	4	2
57	3	5	5	5	5	4	3	3	5	5
58	4	5	4	4	5	4	1	2	1	1
59	5	4	3	4	4	3	3	2	4	4
60	4	5	5	4	4	3	3	4	3	3

#	Q28	Q29	Q30	Q31	Submit Date (UTC)
1	5	5	5	7	4/13/2015 8:05
2	4	4	5	6	4/13/2015 8:14
3	3	3	5	4	4/13/2015 8:30
4	3	4	4	5	4/13/2015 8:54
5	4	3	4	8	4/13/2015 8:56
6	4	4	4	4	4/13/2015 9:04
7	2	3	4	7	4/13/2015 9:07
8	5	2	4	4	4/13/2015 9:38
9	2	2	4	7	4/13/2015 9:45
10	5	3	5	6	4/13/2015 9:48
11	3	3	4	7	4/13/2015 9:53
12	5	1	1	4	4/13/2015 10:09
13	4	3	2	9	4/13/2015 10:17
14	4	2	4	7	4/13/2015 10:25
15	3	3	3	4	4/13/2015 10:42
16	4	3	5	8	4/13/2015 11:03
17	4	3	3	4	4/13/2015 11:12
18	4	3	3	6	4/13/2015 11:28
19	2	3	2	7	4/13/2015 11:43
20	2	3	5	5	4/13/2015 12:12
21	3	3	5	7	4/13/2015 12:20
22	4	3	5	7	4/13/2015 12:37
23	2	4	5	6	4/13/2015 12:41
24	4	3	5	9	4/13/2015 13:08
25	2	3	4	8	4/13/2015 13:21
26	4	4	3	7	4/13/2015 13:39
27	4	3	3	8	4/13/2015 13:40
28	4	3	3	7	4/13/2015 13:57
29	2	3	4	6	4/13/2015 14:12
30	4	4	4	6	4/13/2015 14:14
31	4	4	4	8	4/13/2015 14:30
32	2	4	2	7	4/13/2015 17:10
33	4	4	4	8	4/14/2015 7:02
34	3	4	4	7	4/14/2015 7:55
35	4	4	4	7	4/14/2015 8:19
36	3	3	4	5	4/14/2015 8:32
37	4	4	4	8	4/14/2015 8:59
38	4	3	4	7	4/14/2015 11:09
39	3	3	5	8	4/14/2015 11:53
40	5	3	5	9	4/14/2015 14:15
41	4	4	3	5	4/14/2015 14:17
42	5	4	3	6	4/14/2015 18:35
43	4	3	4	6	4/14/2015 18:37
44	4	4	4	4	4/14/2015 20:04
45	3	2	4	8	4/15/2015 7:41
46	4	3	4	7	4/15/2015 8:15
47	2	2	5	7	4/15/2015 11:36
48	4	2	4	4	4/16/2015 13:42
49	4	3	5	8	4/17/2015 11:47
50	4	3	4	7	4/19/2015 7:44
51	3	2	3	7	4/20/2015 6:59
52	2	3	4	7	4/21/2015 7:02
53	3	3	4	6	4/21/2015 15:28
54	2	4	4	8	4/22/2015 13:31
55	4	3	3	8	4/23/2015 14:02
56	2	2	5	7	4/28/2015 10:21
57	5	5	5	7	4/28/2015 10:28
58	1	3	5	8	4/28/2015 10:36
59	3	3	4	6	4/28/2015 12:04
60	3	3	4	7	4/30/2015 11:26