WEB SELF-SERVICE AND TECHNOLOGY ACCEPTANCE: A CASE STUDY

André S.G. van Friderici, Pascal Ravesteijn and Benny M.E. De Waal. *HU University of Applied Sciences Utrecht. P.O. Box 85029, 3508 AA Utrecht, the Netherlands*

ABSTRACT

This paper examines the factors that determine the acceptance and satisfaction for Web self-service for IT-problems. A case study has been conducted to gain more insights in the acceptance and customer satisfaction of Web self-service within a financial organization in the Netherlands. In the stream of automation innovations Web self-service plays an important role. The Web-based self-service technologies are expected to facilitate an improvement in customer satisfaction for the organization and at the same time reduce operating costs. However, despite the benefits of the web self-service for the organization, users do not have to perceive self-service technologies as favorable for themselves. For the business organizations it is not clear what factors contribute to a successful acceptance of Web self-service for the purpose of improving end-user satisfaction. This study integrates e-service quality aspects, (SERVQUAL) customer satisfaction and the Technology Acceptance Model into a new conceptual model. The relevant hypotheses are tested by survey data collected from 149 respondents of a financial organization. The results indicate that the most important factor for the end-users acceptance is how well the web self-service is perceived to be useful and easy to use. This perception, in its turn, is influenced by a degree and impact the e-services quality aspects have on the overall customer's satisfaction. The more the end-user is satisfied the more he feels the services are useful. The proposed model explained 29.9% of the variance in behavioral intention to use Web self-service.

KEYWORDS

e-service, user satisfaction, technology acceptance model, Web self-service

1. INTRODUCTION

More and more service providers adopt self-service technologies and encourage customers to use these services (Dabholkar and Bagozzi, 2002). The core of the Web self-service concept is that the customer is not being assisted by a service desk employee, but performs certain tasks themselves using web-based technologies. Web-based self-service technologies are expected

to facilitate an improvement in customer satisfaction for the organization while reducing operating costs (Sadiq and Shanmugam, 2003). However, despite the benefits of Web self-service for the organization, users do not have to perceive Web self-service technologies as favorable for themselves. Also forcing customers to use self-service technology might lead to a decrease in positive perception (Lin and Hsieh, 2006) which leads to negative attitudes toward using the self-service technology (Reinders et al., 2008). It is vital for organizations to identify the factors that determine the acceptance of a Web self-service system. Based on these observations the following research question is formulated: Which factors determine the acceptance and satisfaction of a Web self-service system for solving IT problems in an organization?

In the next section, the theoretical foundation of this research is presented. Different views will be presented next to each other and are judged on their usefulness to this research. Thereafter the research methodology is presented, followed by the description and analysis of the results. In the final section the conclusion and a discussion of the recommendations and limitations will be presented.

2. A CONCEPTUAL MODEL OF E-SERVICE QUALITY, CUSTOMER SATISFACTION AND TECHNOLOGY ACCEPTANCE

2.1 Behavior Models

The Theory of Reasoned Action (TRA) is a generally applicable behavior model developed by the psychologists Fishbein and Ajzen (1975). The model assumes that our attitudes and social norms determine our behavioral intention. If people have a positive attitude towards certain behavior and if they think others want to exhibit that behavior (subjective norm) then there is a greater intention to actually perform a specific behavior. Further investigation has shown that at times when people have the intention to show the new behavior, the actual behavior is countered. This is caused by a lack of confidence, skills and control over the behavior (Miller, 2005, p. 127). These findings have led to the development of the Theory of Planned Behavior (TPB) in which the behavior intention of a person is affected by our attitudes, the subjective norm and behavior control (Ajzen, 1991).

Davis (1989) has developed a behavior model on the basis of the TRA model, called Technology Acceptance Model (TAM), which states that the success of a system can be determined by the acceptance of the system. The TAM is designed to determine the factors that influence the acceptance and (future) use of new technology. It was initially developed with a focus on the individual acceptance of information systems in office environments. The main factor for the acceptance of the technology is also the behavioral intention. The TAM model indicates that the property of a technology (external variables) has a direct influence on the usefulness and ease of use as they are perceived by the user (Figure 1).
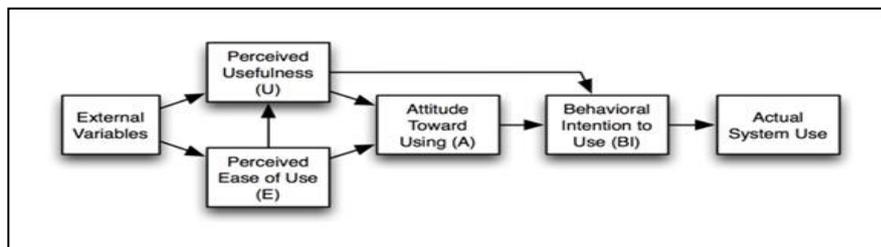
Figure 1. The Technology Acceptance Model (Davis, 1989)

According to several studies the determinants perceived usefulness and the perceived ease of use are convincingly significant user acceptance criteria (Davis, 1989; Hill et al., 1987; Venkatesh and Davis, 2000). On this basis, the attitude and behavioral intention towards the technology is determined and consequently affects the implementation of the system (Davis, 1989; Davis et al., 1989).

Perceived usefulness is one and a half times more important than perceived ease of use in influencing use (Davis, 1989). This means that designers of information systems cannot solve the problem of user acceptance by building better and more user-friendly interfaces.

Both, the TAM as TPB could be used to explain and predict the intention to use the Web self-service system. The TAM model assumes that perceived usefulness and perceived ease of use are always decisive in decisions of users. The TPB model is based on beliefs that are specific for each situation. This makes the use of the TPB-model difficult in regards to different user contexts in comparison to the TAM-model. The TAM-model can be used for quick and inexpensive analysis of acceptance or possible resistance. Also the TAM is a well-established model for measuring the acceptance and use of information systems. In several studies it explains the intention to use various electronic products in different organizational environments. In particular, it has collected empirical evidence, showing that the TAM serves as a valid model for predicting the use of Internet and intranet systems (Horton et al., 2001). Secondly, the core of the model is provided with TAM validated constructs, so that follow-up research is possible. Thirdly, numerous studies have now been published, making the acceptance of TAM proven and guaranteed (Pijpers et al, 2002). Based on the above arguments the TAM will form the basis for this research. However, the variable "attitude" will not be used in this research. Subsequent studies have confirmed that because of the direct effects of both "perceived usefulness" as "perceived ease of use" on "behavioral intention" the TAM is better able to predict user acceptance (Venkatesh, 2000). This can be explained by the assumption that individuals may find a system useful, despite the fact that they have a negative attitude towards the use of a system (Sun and Zhang, 2006).

2.2 Customer Satisfaction

The SERVQUAL model of Parasuraman et al. (1985) is one of the most discussed and applied models in the field of service quality. The quality of service is defined by five quality dimensions, namely: "tangibles", "reliability", "responsiveness", "security" and "empathy" and is measured by 22 items. The difference between the observed and expected quality, the "Gap" (also called disconfirmation judgment) forms the basis for the determination of the service quality as judged by the customer.

A situation of satisfaction arises when expectations and perceptions are equal or the perception exceeds the expectations (Parasuraman et al., 1985; Lovelock and Wirtz, 2011). The SERVQUAL model identifies five gaps. Gap 5 is seen as the difference between expected and experienced service. This difference relates to the shortcomings of the service, as it is experienced by the customer. The remaining gaps 1 to 4 relate to the internal quality weaknesses within the service organization. SERVQUAL is a framework for understanding the quality of service and allows insight in the different gaps by both the company's and the customer's side. Cronin and Taylor (1992) developed the SERVPERF-model which has the same items as SERVQUAL, but only records the performance ratings and not the expected ratings. According to Jain and Gupta (2004) the measure of only the performance evaluations shows a more reliable approach to service quality. Carrillat et al. (2007) shows that SERVQUAL and SERVPERF are equally valid predictors of overall service quality. Adapting the SERVQUAL scale to the measurement context improves its predictive validity; conversely, the predictive validity of SERVPERF is not improved by context adjustments. This implies that SERVQUAL scales require to be adapted to the study context more so than SERVPERF.

2.3 E-service Quality Dimensions

SERVQUAL was developed based on a customer - employee interaction and does not embrace the interactions of online services (Cai and Jun, 2003). Lociacono et al. (2000) by means of an empirical study developed a measuring scale, called WEBQUAL, consisting of 12 dimensions which measure the quality of a website. However, according to Zeithaml, et al. (2002) the WEBQUAL measurement scale lacks some important dimensions as "customer service" and "fulfilment." Zeithaml, et al. (2002, 2005) therefore developed the e-SERVQUAL model covering all phases of customer interaction with a website. e-SERVQUAL is defined as the degree to which a website supports efficient and effective shopping, purchasing and delivery (Zeithaml et al., 2000). The focus is on online shopping by consumers.

The quality model of Ojasalo (2010) is based on eight quality dimensions combined from literature from different studies including the e-SERVQUAL of Zeithaml, et al. (2005). According to Ojasalo (2010) the following eight aspects of quality are proposed as very relevant in the context of e-services (Figure 2): ease of use, webdesign and appearance, personalization, information, responsiveness, communication, security, and reliability. (E-) Service quality takes place before, and has been found to be an important input to customer satisfaction (Caruana and Malta, 2002).

2.3.1 Ease of use

This dimension relates to the issues that help the user, regardless of his or her training or experience to find the necessary information within a reasonable time (Lautenbach et al., 2006). Accessibility of information refers to the ease of connection and speed of access to information on the website (Cox and Dale, 2001). It is also related to easily find and memorize the URL (Ojasalo, 2010). The ease of navigation concerns the ease with which users can search (search function) for information within the (multidimensional) website and quickly and easy to maneuver back and forth through the web pages (Zeithaml et al., 2005). According to Rosenfeld and Morville (2002) investigation a user will click up to 4 or 5 times

to find the information and then give up. Favier (2003) found that the maximum is with two mouse clicks. The interaction with the website gives clear instructions to use forms (Vijayan and Shanmugam, 2003). The forms require minimum information that must be entered by the customer (Zeithaml et al., 2005). A help function, clear error messages, a FAQ and a search function are available to help users (Achour and Bensedrine, 2005).
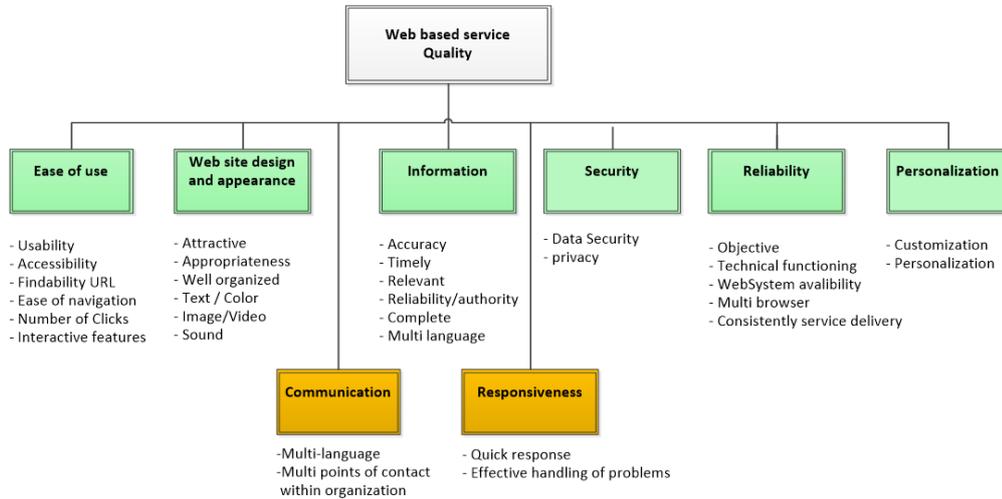

Figure 2. The 8 quality dimensions of Ojasalo

2.3.2 Website Design and Appearance

This dimension refers to the visual characteristics of the design of the website to encourage users to stay longer on the site or to come back. It means that images, colors, texts, sound and video must be sufficiently attractive to the customers and that the design is appropriate to the nature of the website. It is also influenced by how well the website is organized. The website should be pleasing to the eye (Barnes and Vidgen, 2001; Signore, 2005; Tan and Tung, 2003). Some researchers put the web design and appearance as part of the dimension of ease of use (Ma and Zaphiris, 2003).

2.3.3 Information

This dimension refers to the characteristics of the information on the website and is seen as the main source of value to customers (Molla and Licker, 2001). The criteria for assessing the quality of information are: the accuracy, timeliness (up to date), relevance (right level of detail), reliability, completeness (Perdue, 2001), the multilingualism and the authority (Hasan and Abuelub, 2011).

2.3.4 Security

This dimension relates to the protection of users against the risk of fraud and financial loss. It also refers to the protection of privacy data required for online transactions (Zeithaml et al., 2002).

2.3.5 Reliability

This dimension refers to the accurate representation and description of a product or service that corresponds with what was ordered by the customer and is delivered within the promised timeframe. It also refers to the availability and proper functioning of the website (Zeithaml et al., 2005), 7 days a week, 24 hours a day (Delone and McLean, 2003; Gledec, 2005; Molla and Licker, 2001) and a multi-browser support through the website (Abanumy et al., 2005).

2.3.6 Personalization

This dimension refers to the individual attention (one-to-one relationship) between the service provider and the user of the website (Guo and Lu, 2007). It should be based on the user's needs. It also implies the personal thank you notifications.

2.3.7 Communication

This dimension refers to the ability of the user to communicate via different communication channels via the website with the helpdesk (Zeithaml et al., 2005; Ojasalo, 2010). Keep users informed and assist them in the language they can understand (Hasan and Abuelub, 2011). Also the business address, email address, phone number and other business contact information of the organization must be available on the website.

2.3.8 Responsiveness

This dimension refers to the speed at which the Helpdesk responds to questions, problems and suggestions (Zeithaml et al., 2005).

2.4 An Integrated Model of e-service Quality, Customer Satisfaction and TAM

Customer satisfaction and technology acceptance are research domains that evolved in parallel. According to Wixom and Todd (2005), these two streams of research must be integrated because both contribute to the information system success. Customer satisfaction of the use of a particular information system results in more usage and is preferable for a measurement of the success of information systems (Baroudi et al. 1986). On the other hand, the technology acceptance theory provides explanations for why users accept or reject new information systems. The relationship between user satisfaction and usage can be explained as follows: For a belief or attitude to be directly predictive of behavior, it needs to be consistent in time, target, and context with the behavior. User satisfaction therefor needs to be recognized as an object-based attitude (Ajzen and Fishbein, 1980) whereby it serves as an external variable with influences on intention and behavior that are fully mediated by behavioral beliefs and attitudes (Ajzen and Fishbein 1980; Eagly and Chaiken, 1993). For example, one's satisfaction with the customization and personalization of a system does not directly impact whether one will use the system.
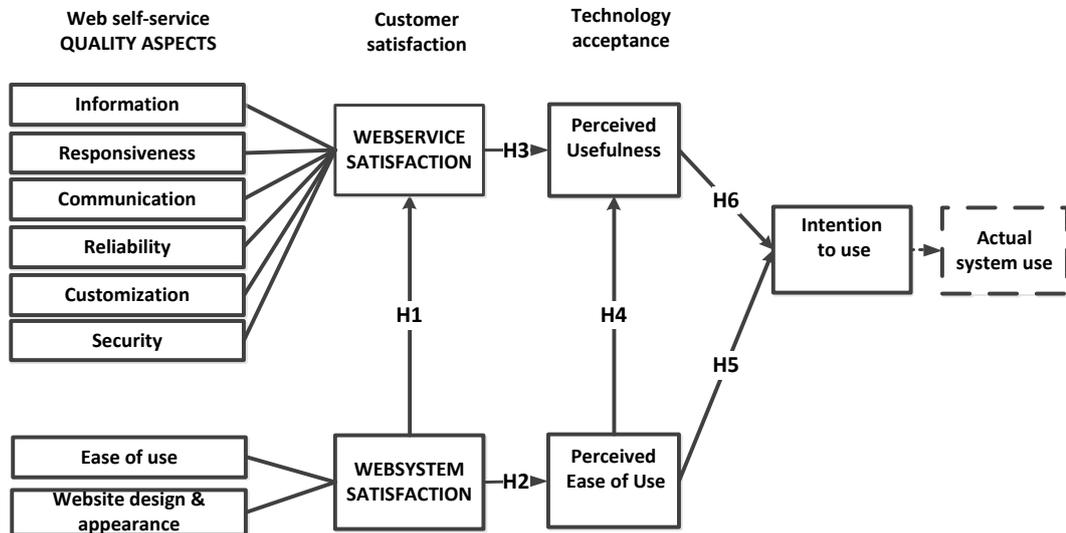
Figure 3. Conceptual model of e-Service Quality, Customer Satisfaction and Technology Acceptance

Based on the previous theoretical considerations a conceptual model based on e-Service Quality, Customer Satisfaction and Technology Acceptance has been developed (see Figure 3). The model is constructed to be able to answer our research question. Based on the relations in our conceptual model, the following hypotheses were formulated:

Hypothesis 1: The satisfaction of the customers with the quality of the Web (self-service) system has a significant positive relation on the satisfaction with the Web (self-service) services.
Hypothesis 2: The satisfaction of the customers with the quality of the Web (self-service) system has a significant positive relation on the perceived ease of use.
Hypothesis 3: The satisfaction of the customers with the quality of the Web (self-service) services has a significant positive relation on the perceived usefulness.
Hypothesis 4: The perception of ease of use has a significant positive relation on the perception of usefulness.
Hypothesis 5: The perception of ease of use has a significant positive relation on the intention to use.
Hypothesis 6: The perception of usefulness has a significant positive relation on the intention to use.

3. RESEARCH METHODOLOGY

3.1 Data Collection

The customers of the Web self-service system were the employees of the organization. In total 1674 employees were approached by email with the request to fill in the online survey, which consisted of open and closed questions. The survey was distributed on January, 2015. Twelve days later 199 surveys had been received (12%), of which 149 (75%) were finished completely. The other surveys have proven to be unusable as too much questions were left unanswered. While this response rate can be considered low, it is not uncommon. Shih and Fan (2009) found in their meta-analysis of 35 e-mail and paper surveys similar or lower rates of response to a questionnaire than in our study. Of the respondents, 65% were male and 35% were female. 15.5% of the respondents had an age of less than 40 years, 33.1% between 40 and 50 years, and 51.4% more than and 50 years.

3.2 Instrument Validation

Below the measurement of the five variables of the conceptual model are described. Furthermore the results of construct validity and reliability testing are presented.

Web service satisfaction and Web system satisfaction were measured with scales developed by Loiacono et al. (2002), and Swaid and Wigand (2009). Factor analysis was performed to analyze the construct validity of 8 items. Principal component analysis (PCA) with varimax rotation resulted in a two-factor solution with own values of 3.09 and 2.20, accounting for 38.6% and 27.4% of the explained variance. The factor loadings were between 0.925 and 0.598, which can be considered as being significant (Hair et al., 1998). The reliability of the two scales – a six-item Web service satisfaction scale and a two-item Web system satisfaction scale – was confirmed by Cronbach's alpha value of 0.816 and 0.846 respectively. Since the components have a Conbrach's alpha coefficient higher than 0.7 score, the results of the scale variables can be regarded as trustworthy (Nunnally and Bernstien, 1994).

Perceived usefulness (Davis, 1989), Perceived ease of use (Davis, 1989; Venkatesh and Davis, 2000), and Intention to use (Davis, 1989) were measured by one item.

In the survey a 5-point Likert scale has been used. This was done because the employees at the financial organization were already familiar with this scale as this was also used for weekly customer satisfaction surveys. A pre-test of the survey questions has been performed with four employees and based on their feedback the questionnaire was slightly modified.

4. RESULTS

Before presenting the subsequent results of the correlation and regression analyses, we checked that both the dependent variables and the independent variables were not skewed in their distribution. The correlations between the variables are shown in Table 1. The correlation

between all the variables in the conceptual model are significant with a p <0.05 or p<0.01 and have a positive direction.

Table 1. Correlations between variables (* = p<.05; ** = p<.01)

	Perceived usefulness	Web system satisfaction	Perceived ease of use	Intention to use	Web service satisfaction
Perceived usefulness	1	,314**	,365**	,544**	,437**
Web system satisfaction	,314**	1	,542**	,209*	,545**
Perceived ease of use	,365**	,542**	1	,393**	,421**
Intention to use	,544**	,209*	,393**	1	,329**
Web service satisfaction	,437**	,545**	,421**	,329**	1

The way the hypotheses were tested is shown in Figure 3. The one-way-directed arrows in the figure represent the significant (standardized) regression (beta) coefficients. For the four OLS regression models applied, the potential problem of multicollinearity was investigated by computing VIF factors for each predictor in the regression model. Although in some cases correlations between independent variables were relatively high, VIF factors in none of the three models exceeded 3, which is below the commonly applied threshold of 5 (Hair et al., 1998; Rogerson, 2001).
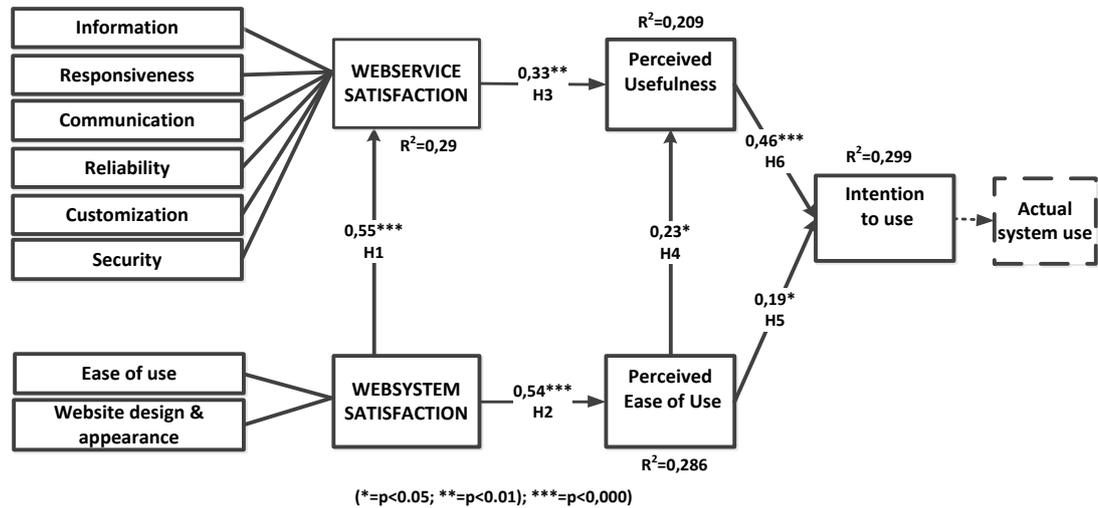

Figure 4. The conceptual model and hypothesis tested: significant standardized regression coefficients (one-way arrows between the boxes)

The results from the four regression models show that:

- Web system satisfaction holds a significant relation with Web service satisfaction, which confirms hypothesis 1. The explained variance of the regression model (adjusted R²) is 29.0% (F=39.781, df=95, p=.000) for Web service satisfaction as a dependent variable.
- Web system satisfaction holds a significant relation with Perceived ease of use, which conform hypothesis 2. The explained variance of the regression model (adjusted R²) is 28.6% (F=14.023, df=94, p=.000) for Perceived ease of use as a dependent variable.
- Web service satisfaction and Perceived ease of use hold a significant relation with Perceived usefulness, which confirms hypothesis 3 and 4. The explained variance of the regression model (adjusted R²) is 20.9% (F=13.275, df=93, p=.000) for Perceived usefulness as a dependent variable.
- Perceived usefulness and Perceived ease of use hold a significant relation with Intention to use, which confirms hypothesis 5 and 6. The explained variance of the regression models (adjusted R²) is 29.9% (F=20.212, df=90, p=.000) for Intention to use as a dependent variable.

From the open questions of the survey, we found that 36% of all who responded have said they had never used the Web self-service before. The reasons being, in this order, never had a reason for, never knew there is such a thing as Web self-service and considers Web self-service complicate to use.

The respondents gave as recommendations for improvement:

- Engage in the media campaign more and promote Web self-service;
- Avoid use of technicalities and talk the language of the end-user better - simplify and make it friendlier;
- Ensure a better resolution time;
- Make it more personal;
- Build in a better search engine;
- More attention for after care;
- Provide a mobile Web self-service via an app.

5. CONCLUSION, LIMITATIONS AND FURTHER RESEARCH

This research has provided insight into the variables that influence the acceptance and satisfaction of Web self-service within a financial institution in the Netherlands. Different behavioral models and concepts from IS research and customer satisfaction were brought together to develop a conceptual model. Data was collected from a survey among 149 respondents from the case study organization. This resulted in the construction of valid and reliable measurements and constructs as defined in the conceptual model. Correlation and regression analysis showed that significant relations were found and that all hypotheses were confirmed. It was shown that (1) Web system satisfaction is a key determinant for Perceived Ease of Use and Web service satisfaction, (2) Web service satisfaction and Perceived Ease of

Use are main drivers for Perceived Usefulness and (3) Perceived Usefulness and Perceived Ease of Use are main determinants of Intention to use.

From these results we can argue that customer's first choice for a Web self-service system is usefulness and secondly perceived ease of use. Both variables are influenced by the satisfaction with the web system and –service. Therefore we can conclude that the relationship is as follows: the higher the satisfaction of the customer with regard to a Web self-service system, the more the perceived usefulness is enhanced. If one is dissatisfied with a Web self-service system, then the strength of the perceived usefulness and / or perceived ease of use will be less. Suggestions to improve the satisfaction are: (1) Engage end-users in the development and improvements of the Web self-service system to make it more users friendly, (2) Offer various self-service channels such as chat, web form, knowledge base as well as mobile apps, (3) Allow easy escalation to live agents via forms or chat from the self-service page at any point, and (4) Take initiative to help customers find their way into the Web self-service system.

Although the research was designed carefully, there are some limitations. The research has focused only on the client side of Web self-service system and - services and was limited to one financial organization in the Netherlands. Furthermore, it should be noted that the financial institution limited the number of items for questioning the employees. This has resulted in a minimum number of questions per variable. Nevertheless, the results obtained in the study provide a good view on the consistency of the acceptance and satisfaction factors. The results are largely in line with the results of earlier conducted research (Wixom and Todd, 2005). For financial institutions, the results can be used as a diagnostic tool in order to develop interventions to improve customer satisfaction and the acceptance of Web self-service systems and services. The relationships in the conceptual model have been tested on the basis of factor analysis, correlation analysis and (multiple) regression analysis. The model can be input for further research in the combined customer satisfaction and Technology acceptance research domains. A possibility to validate our findings further is to estimate the complete model using Structural Equation Modeling (SEM).

In follow-up research it would be good to broaden the conceptual model with one or more variables. For example, not only examining the cognitive variables but also view the more hedonistic variables. Hedonic variables focus on the sensory pleasure. There is for example the variable perception of entertainment. In an on-line shop environment it has been found that this has a significant relationship with the intention to use (Wixom and Todd, 2005).

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