Bachelor Thesis

To what extent do product characteristics and age have an impact on patient's intention to use the artificial pancreas?

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Abstract:

A cross-sectional study has been conducted by analyzing the responses of 414 diabetes type 1 patients regarding the influence of product characteristics and age on the intention to use the Artificial Pancreas. Although, there is a vast amount of literature regarding technology acceptance, there is only limited literature addressing technology acceptance in the context of the Artificial Pancreas and especially the impact of age has not been observed. The theoretical foundation for the Research Model and the Regression Analysis are the Innovation Diffusion Model by Rogers (1983), the Technology Acceptance model by Davis (1989) and the Unified Theory of Acceptance and Use of Technology. The results of the regression analysis show that there is a direct positive effect of perceived usefulness and compatibility on the intention to use as well as a direct negative effect of age on intention to use. However, whether any reportable moderation effect of age nor a direct effect of complexity on intention to use could be found. Thus, it can be stated that the theoretical models cannot be simply translated into the diabetes market. Moreover, a new finding is the direct negative effect of age on intention to use.

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1. INTRODUCTION

All over the world money is invested in medical product development and the pressure to increase the revenues and get the maximum out of the investment increases (Ijzerman & Steuten, 2011). A priority for managers and scholars should understand the perceived value of the customers (MacDonald,Wilson,Martinez and Toossi, 2011). On the basis of Walter, Ritter and Gemünden (2001) MacDonald et al. (2011) indicate that value has an impact on profit and by a higher focus on value, subsequently higher profit will follow. Obviously, by focussing on value the increasing problem of raising pressure to generate revenues in the medical product development might be solved. In other words, it can be assumed that focussing on customer perceived value on the diabetes market could increase the profit.

The diabetes market itself is growing fast and offers a lot of opportunities for potential companies operating in the market. This is supported by the research of Business Insights (2011), stating that the diabetes device market was approximately worth 13.9 bn $ in 2010 and could increase until 2016 by a compound annual growth rate of 6,6 % resulting in a total worth of 19.9 bn $. At the moment the diabetes market is dominated by three products, which are the insulin pen, insulin pump and the sensor augmented insulin pump. However, these products are rather circuitous. Furthermore, Business Insight (2011) stresses the focus on improved accuracy, convenience and strengthen patient proclivity. One device aiming to meet these needs is the Artificial Pancreas (henceforth AP). According to Klonoff, Zimliki, Stevens, Beaston, Pinkos, Choe and Heetderks (2011) an AP is a medical device, which with support of a control algorithm, helps to automatically pump the appropriate amount of insulin into the human body in order to achieve a healthy level of glucose in one's blood. But as the control algorithms can vary significantly, different APs are under development in the health care sector. Although many patients are confident with their state-of-the art treatment, research indicates that many patients would switch to an AP (van Bon, Kohinor, Hoekstra, von Basum and de Vries, 2010). Since 2004, Inreda Diabetic B.V. (forward Inreda) is one of the companies developing an AP. Inreda was founded by Robin Koops, who himself is a type 1 diabetic. Consequently, the AP developed by Inreda is a user-driven innovation. After developing a fourth prototype in 2014, today, Inreda is developing a releasable product and researches how the AP can be brought into market in the best possible way (Inreda Diabetic BV. (n.d.)).

Diabetes itself is an illness, which can occur in different ways. At the moment 382 million people all over the world suffer from diabetes (8.3% of the world population) and the number is still rising (Diabetes ATLAS, 2013). In general it causes a chronical disorder in the regulation or problems in the creation of insulin. The result is a control malfunction of the patients' blood glucose. Type 1 patients do not produce enough insulin resulting in high blood sugar levels,therefore leading to a rejection of incoming glucose by closed cells (Diabetes ATLAS, 2013)

With increasing acceptance of the artificial pancreas it becomes important for Inreda to be able to address a specific target segment and to know if they still have to convince a group with certain demographics. Age is one of the demographics, which can have an influence on the marketing strategy (Holbrock & Schindler, 1996). By identifying whether different age groups impact the intention to use by having different attitudes towards product characteristics, the marketing strategy and customer segmentation might be influenced. Thus, being able to segment the market in a proper way helps Inreda to commercialize the AP. Moreover, Inreda wants to introduce their AP to the market in the 4 Quartile of 2016 (Raesfeld & Oukes ,2015). This plan contradicts with a recent forecast by Meece (2015), who predicts the introduction at the earliest in five-seven years. On the other hand, supporting Inreda marketing wise can help them to prove Meece wrong and gain first movers advantage leading to long-term competitive advantage (Kerin, Varadarajan and Peterson, 1992). Additionally, Ijzerman & Steuten (2011) suggested, extending standard diffusion and acceptance models with more sophisticated market characteristics as a better estimation of marginal value of the new product. Besides, Ijzerman and & Steuten (2011) argue that several studies suggested to study needs and preferences of patients, as this improves the probability for patients to receive full benefits of new medical technologies. Still, observing the influence of age and product characteristics might help to achieve the biggest possible benefits.

By extending the standard models for diffusion and acceptance the research can add beneficial information to the body of knowledge, especially as there is no consensus in the literature regarding the effect of age on the openness towards innovations and technologies. Chung, Park, Wang, Fulk and McLaughlin (2010) have not found any relationship between age and product characteristics and Mitzner, Boron, Fausset, Adams, Charness,Czaja and Sharit (2010) identified a positive relationship between elderly people and new technology, but also point out that the common sense is the adverse attitude of elderly people towards new technology. Moreover, Loera (2008) advises more research in the field of portable medical devices in the context of older people and thus subsequently in the context of the consumers age. Additionally, it would be insightful to check whether there are tendencies that the Unified Theory of Acceptance and Use of Technology, developed by Venkatesh et al. (2003) through observing the technology acceptance in the field of work, could be adaptable for patients and their intention to use new technology in their private life.

To sum it up this paper aims to fill the practical gap for Inreda to evaluate, if the company needs to address different age groups or if the age can be neglected in the marketing plan, respective marketing segmentation.

Besides, this paper also tries to fill the theoretical gap and add evidence to the question whether age can have an influence on the intention to use a specific product in the healthcare sector, but especially in the case of an AP. The research can also push the above mentioned discordance regarding the effect of age on openness towards innovation and technologies into a specific direction. Nevertheless, it can help the body of knowledge towards a verified opinion and distinctiveness when coping with technology acceptance and age, particularly in the health care sector.

In order to successfully fill these gaps the following research question will be answered:

To what extent do product characteristics and age of patients have an influence on patient's intention to use the artificial pancreas?

After the introduction, previous literature will be evaluated and analyzed and the relevant theory for the research will be explained. Subsequently, an insight into the methodology will be given, followed by conducting the empirical research. At the end in the conclusion the main findings will be summarized and an outlook will be presented.

2. THEORY

2.1 Literature Review

2.1.1 Theoretical Models

A major challenge in every sector is the diffusion of innovations (Berwick, 2003).
The innovation diffusion model by Rogers (1983) and the technology acceptance model by Davis (1989) are two models coping with the attributes of innovations and their impact on the acceptance of the innovation or the intention to use the innovation by a possible adopter.
Firstly, Rogers (1983) identified that the perceptions of innovation characteristics by members of a social system have a significant impact on the rate of adoption of the innovation. He points out five attributes of innovations having an impact on the perception of the innovation, namely (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability and (5) observability. The first attribute, relative advantage, is defined by Rogers (1983) as the degree of an innovation of being better than the forerunner. The second attribute, compatibility, is the degree of the fitting between the innovation and the existing values, needs and prior experiences of the potential customer. The higher the degree of compatibility is, the higher is the likeliness of people to adapt the innovation. Furthermore, Rogers defines the third attribute, complexity, as the degree of difficulty to use the innovation. The complexity of an innovation has usually a negative impact on its rates of adoption, thus a higher degree of complexity results in lower degree of adoption (Berwick, 2003). Moreover, successful dissemination includes simplification and local adaption. In a successful process of innovation diffusion, the original innovation changes into many different connected innovations (Berwick, 2003). The definition of the fourth attribute, trialability, is the degree of possible experimentation before the actual adoption of the innovation. Finally, Rogers (1983) defines the last and fifth attribute, observability, as the degree to which the results caused by the innovation can be observed.
In addition to Rogers (1983) model, Davis (1989) introduced the technology acceptance model, in which he described the two attributes perceived usefulness and ease of use as determinants for the usage of computers. Following, these two attributes were also used for the acceptance of other innovations, for example for the acceptance of the AP (van Bon, Brouwer, von Basum, Hoekstra and deVries, 2011). In the paper of Davis (1989) perceived usefulness is defined as the degree to which a person believes that by the usage of a particular product or system one's own performance will increase .Ease of use is defined as the degree of how much effort it costs a person to use the product/system (Davis, 1989). Venkatesh and Davis (2000) additionally confirmed the attributes of perceived usefulness and ease of use and also identified subjective norms as an attribute having a direct influence on the intention to use. Perceived usefulness is in the literature also seen as "first, and most powerful" (p.1971; Berwick, 2003) perception of an innovation.

2.1.2 Age in relation to theoretical models

By using the described innovation diffusion model by Rogers (1983), the technology acceptance model by Davis (1989) and several other models of previous literature explaining the intention to use a specific product, Venkatesh, Morris, Davis and Davis (2003) established the Unified Theory of Acceptance and Use of Technology (UTAUT), which explains 70% of the variance in the usage intention. As illustrated in the Appendix (7.1) the UTAUT consists of four independent variables, namely performance expectancy, effort expectancy, social influence and facilitating conditions. According to the Venkatesh et al. (2003) performance expectancy is a result of the constructs perceived usefulness (Davis, 1989; Davis, Bagozzi and Warhsaw, 1989), extrinsic motivation (Davis, Bagozzi and Warshaw, 1992), job-fit (Thompson, Higgins and Howell, 1991), relative advantage (Moore and Benbasat 1991) and outcome expectations (Compeau and Higgins 1995, Compeaut et al.1999). The next variable effort expectancy is a synergy of the constructs perceived ease of use (Davis, 1989; Davis et al. 1989), Complexity (Thompson et al., 1991) and Ease of Use (Moore and Benbasat 1991). Subjective Norm (Ajzen 1991; Davis et al. 1989; Fishbein and Azjen 1975; Mathieson 1991; Taylor and Todd 1995a, 1995b), Social Factors (Thompson et al. 1991) and Image (Moore and Benbasat 1991) contribute to social influence. The last independent variable facilitating conditions is the result of merging perceived behavioural control (Ajzen 1991; Taylor and Todd 1995a, 1995b), facilitating conditions (Thompson et al. 1991), Compatibility (Moore and Benbasat, 1991). In addition, Venkatesh et al. (2003) observed a moderation effect of age on the direct relationship between each of the independent variables performance expectancy, effort expectancy, social influence and the dependent variable behavioural intention to use the technology. For the fourth independent variable facilitating conditions age had only a moderating effect on the actual usage. Regarding performance expectance the effect is stronger for younger people, whereas for effort expectance, social influence and facilitating conditions the effect is stronger for older people. Besides age other variables like gender, experience and voluntariness to use the product had moderating effects as well. Accordingly, a direct effect of the behavioural intention to use the technology on the actual usage of the technology has been stated.
Van Raaij and Schepers (2008) criticize the research by Venkatesh et al. (2003) in matters of the R^2, as they found faulty that the high R^2 of 70% was only achieved through the moderating variables. Since, the focus of this research is on the interaction effect of age, the criticism of van Raaij and Schepers (2008) is rather supporting the authors' research, especially because age was the only variable moderating relationship of all four independent variables.

Next to the work by Venkatesh et al. (2003) there are not only several other literatures that allow the author to assume a moderation effect of age, but also the general opinion of the society, which is that elderly people are often described as technology and innovation adverse. They are reluctant to new technology and feel uncomfortable by using it (Vuori & Holmlund-Rytkönen, 2005; Mitzner et. al, 2010). Furthermore, Loera (2008)

identified that elderly are not very familiar and have little exposure with devices common in the social life of younger people or students, some of these devices are "cell phones, DVD players, and computers"(p.1089; Loera, 2008).
However, by putting the stereotype in relation to the technology acceptance model and the factors of innovation diffusion, the literature shows arguable results regarding elderly people and their attitude towards innovations and new technologies.
For example by further explicating the results of the empirical research Loera (2008) indicates the willingness of elderly to adapt new technologies, if the technologies were affordable and had a high ease of usage. Especially, in the health care sector portable devices, which can monitor the health status of elderly, would be beneficial. It would not only be beneficial for the patients, but also for doctors and nurses in the daily treatment. Finally, as mentioned before, Loera (2008) advises more research in the field of portable medical devices in the context of older people and thus subsequently in context of the consumers age.
Mitzner et al. (2010) also denied the stereotype of technology aversion of elderly people by conducting empirical research. The authors used a sample of 113 people and performed their research in the healthcare sector as well. The results showed a rather positive than negative attitude of older adults towards the perceived benefits of use for models of technology acceptance. Negative attitude towards new technology was especially recognized when there were too many features.
Additionally, the research by Chung et al. (2010) supports Mitzner et al. (2010), as it has not found any relationship between age and perceived usefulness. As described before Cain & Mittmann (2002) argue the more an innovation is compatible with the environment and behavior of a user, the more likely it is that the innovation will be accepted and the diffusion of the innovation will be facilitated. Hence, it can be argued that the behavior and environment of different age groups differ to a certain degree, which has influence on the compatibility with the product and consequently has an effect on the intention to use.
By citing previous work from Zajicek and Hall (2000) Arning and Ziefle (2007) bring attention to the moderating effect of age between perceived usefulness and technology, because older adults have a lower perceived usefulness. According to Zajicek and Hall (2000) the reason therefore is that older adults weigh the perceived usefulness against the time to learn and understand the new technology.
Morris,Venkatesh and Ackermann (2005) also assumed a moderating effect of age on the relationship between perceived usefulness and intention to use and between ease of use and intention to use. With their work they were able to confirm the assumed moderating effect of age on the TAM model. Correspondingly, the results show that on the one side especially men are strongly influenced by perceived usefulness with increasing age and on the other side women are strongly influenced by perceived ease of use with increasing age. Although, the gender of the respondents was taken into account the research shows an interaction effect of age on the TAM. Also Alagöz, Ziefle, Wilkowska and Valdez (2011) observed a possible moderation effect of age on acceptance of medical technology by observing male and female separately. They have found a moderation effect for older women indicating an increased acceptance with higher age.

2.2 Research Model

2.2.1 Product Characteristics

From here on the term product characteristics contains the attributes perceived usefulness and ease of use from the Technology Acceptance Model by Davis (1989) and the attributes relative advantage, compatibility, complexity, trialability and observability from the diffusion of innovation model by Rogers (1983). But due to the fact that the development stage of the AP by Inreda is not far enough to measure the attributes observability and trialabilty, both attributes will be neglected in this research. In addition the terms ease of use and complexity (Venkatesh and Davis, 1996; Schnarr, 2014)) as well as perceived usefulness and relative advantage can be used interchangeably (Schnarr, 2014), whereby the focus will lie on the attributes perceived usefulness, compatibility and complexity. Thus, translating the research by Venkatesh et al. (2003) into the research frame and the data set of the author would mean that age is expected to moderate the relationship between perceived usefulness, compatibility and complexity. This is justified due to the incorporation of perceived usefulness, compatibility and complexity in the independent variables used by Venkatesh et al. (2003) and their proven moderation by age towards intention to use, respectively the actual usage. The direction of H2, H4 and H6 is therefore based on the results by Venkatesh et al. (2003)

2.2.2 Age

Age can be defined as "the length of time that a person has lived or a thing has existed", but also as "a particular stage in someone's life" (Definition of age in English:. (n.d.)). For this research age will be defined as "a particular stage in someone's life", because stages can be tied with differences in the attitude of people, for example different stages in life contribute to different attitudes towards the technological acceptance of the Internet (Porter and Donthu, 2006).

2.2.3 Perceived Usefulness

In the context of this research perceived usefulness can be defined as the degree to which people tend to use or not use the AP because they believe it will help them to improve their quality of life. Previous healthcare literature already indicates that integration into existing health and psychosocial support infrastructure of the patient is a trigger for perceived usefulness (Winkelman, Leonard and Rossos 2005).
Particularly, the research conducted in the field of the AP shows that patients are already open-minded towards the AP and believe in its usefulness in order to cope in a better way with their disease (van Bon et al., 2011). Therefore, H1 expects a positive influence of perceived usefulness on intention to use.
Due to the high influence of perceived usefulness on the adoption of new technologies (Deng, Mo and Liu, 2013; Nikou, 2015), H2 helps to test whether age has a significant effect on the important relationship of perceived usefulness and intention to use in the context of technology adoption.

H1: Perceived Usefulness has a positive influence on the intention to use the AP.
H2: Age has a moderating effect on the positive influence of perceived usefulness on the intention to use the AP, such that the effect will be stronger for younger people.

2.2.4 Compatibility

The adjusted definition of compatibility for undertaking the research is the degree of fit between the AP and the existing values, needs and previous experiences of the potential adopter. Berwick (2003) considers compatibility as crucial in order to adapt a technology. The innovation needs to match with the existing values and beliefs as well as with past history and current needs of each individual in order to diffuse rapidly. Hence, H3 expects a direct positive relationship between compatibility and intention to use.
According to Deng et al. (2014), elderly people are more likely to keep their familiar habits, lifestyle and behavior. This is called technology anxiety phenomena (Lim and Lee, 2010), resulting in the assumption of H4, that age has a moderating effect between compatibility and intention to use, as it is more difficult to achieve the compatibility of a product with the habits, lifestyles and behavior of elderly people, who are more reluctant to change..

H3: Compatibility has a positive influence on the intention to use the AP.
H4: Age has a moderating effect on the influence of compatibility on the intention to use the AP, such that the effect will be stronger for older people.

2.2.5 Complexity

The definition of complexity according to the research is the degree to which understanding and using the artificial pancreas is difficult.
According to Berwick (2003) simple innovations are spread faster than complicated innovations. For example, Nikou (2015) identified the ease of use as an influential factor regarding the adoption of a mobile device. Thus, H5 expects a negative influence of complexity on intention to use.
Particularly elderly people have more problems by using new technologies and are rather skeptical regarding the ease of use of new technologies (Carlfjord, Lindberg, Bendtsen, Nilsen and Andersson, 2010),which leads to the assumption of H6 that the age might moderate the original relationship between complexity and intention to use. Similar to perceived usefulness the moderation effect of age on complexity towards the intention to use is expected to be the same for the healthcare sector as for that what industries formerly used.

H5: Complexity has a negative influence on the intention to use the AP.
H6: Age has a moderating effect on the influence of complexity on the intention to use the AP, such that the effect will be stronger for older people.

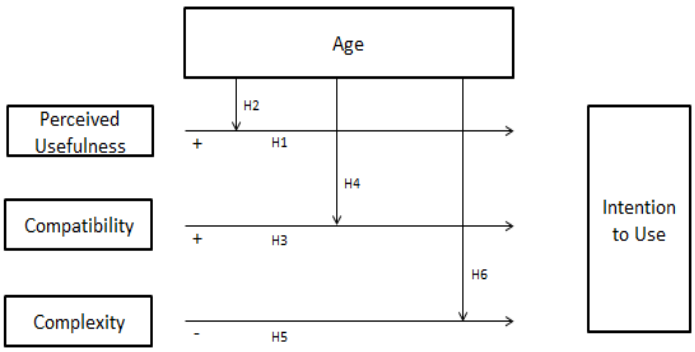

Figure 1. Moderating effect of age on the relationship between product characteristics and intention to use

3. METHODOLOGY

3.1 Study Context

The study is conducted in the diabetes market observing the perception of diabetes type 1 patients of the AP. The dutch company Inreda tries to launch the AP in 206 in order to improve the treatment situation for the diabetes type 1 patients. Hence, the preliminary text of the questionnaire was a contribution of Inreda as the questionnaire is tailored towards their AP. However, it is still possible to use the outcome of this research for other businesses operating in the diabetes market.

Due to the fact that the AP has not been introduced into the market yet and is a relatively new device there is only limited literature handling the acceptance of the AP by users and as far as the author is concerned no literature at all observing the role of patients age in context of the AP.

The study focuses mainly on three models, namely the innovation diffusion model by Rogers (1983) the technology acceptance model by Davis (1989) and the unified theory of acceptance and use of technology by Venkatesh et al. (2003). Whereas the models by Rogers (1983) and Davis (1989) are the frame of the research model and the theory by Venkatesh et al. (2003) is used as basis of the moderation effect.

3.2 Subjects for study

The subjects for the research study are 601 Diabetes Type I patients, who are potential users of the Artificial Pancreas. As the Diabetes type I patients face daily obstacles and circumstances linked to their disease, they are relevant in order to assess the perceived usefulness of the artificial pancreas and consequently their intention to use the pancreas. With the help of the Inreda Diabetic B.V. 601 patients were identified. Due to their willingness to participate in research a high number of responses were achieved. 71.8 % of the surveys were answered, which means 432 out of 601 respondents filled in the survey. According to Baruch and Holtom (2008) the average response rate lies at 35.7% for surveys performed by organizations. Thus, the response rate of 71.8% lies well above the average. The distribution of the survey took place in June 2014 and the majority of the patients are Dutch while there are also respondents from Germany and Belgium.

3.3 MEASUREMENT

An overview of the variable construction can be found below in Table 1.

3.3.1 Product Characteristics

The independent variables of the study are the several indicators for product characteristics. These indicators are some of the attributes for product characteristics, namely perceived usefulness, compatibility and complexity. These attributes were in the questionnaire quantitatively measured by using a Likert 7 point scale. The respondents had to assess the several product characteristics by answering questions to each attribute. The possibilities range from 1=”totally disagree” to 7= “totally agree”. The assessed statements can be found in Table 1 on and rely on Venkatesh et al. (2003); Venkatesh & Davis (2000); Thompson et. al.(1991) and Moore & Benbasat (1991).

3.3.2 Intention to use

The dependent variable of the study is the intention to use

Table 1: Item Overview

Variables	Definition	Statements	Sources
Perceived Usefulness	Perceived usefulness can be defined as the degree to which people tend to use or not use the artificial pancreas, because they have believe it will help them perform better (Davis, 1989).	I expect that using the artificial pancreas would enable me to accomplish tasks more quickly.	Venkatesh et al. (2003); Venkatesh & Davis (2000)
		I expect that using the artificial pancreas improves my performance in daily life.	
		I expect that using the artificial pancreas in my daily life increases my productivity.	
		I expect that using the artificial pancreas enhances my effectiveness in daily life.	
		I expect that using the artificial pancreas would make it easier for me to accomplish my daily activities.	
		I expect that the artificial pancreas will be useful in my daily life.	
Compatibility	Compatibility can be defined as the degree to which the artificial pancreas is aligned with existing values, past experiences and needs of the patients (Rogers, 1983).	I expect that using the artificial pancreas is compatible with all aspects of my life, including work as well as free time activities.	Venkatesh et al. (2003); Thompson et al. (1991); Moore & Benbasat (1991)
		I think that using the artificial pancreas fits well with the way I like to live and work.	
		I expect that using the artificial pancreas fits into the way I perform my daily duties.	
Complexity	Complexity can be defined as the degree to which understanding and using the artificial pancreas is difficult (Rogers, 1983).	I expect that using the artificial pancreas will take too much time from my normal duties.	Venkatesh et al. (2003); Thompson et al. (1991); Moore & Benbasat (1991)
		I expect that working with the artificial pancreas is so complicated, it is difficult to understand what is going on.	
		I expect that using the artificial pancreas involves too much time doing mechanical operations.	
		I expect that it takes too long to learn how to use an artificial pancreas to make it worth the effort.	
Intention to use	Intention of the patients to use the AP.	Assuming I have access to an artificial pancreas, I intend to use it.	Venkatesh & Davis (2000)
		Assuming I have access to the system, I predict that I would use it	
Age		What is your age? In years (0-99)	

the artificial pancreas. The outcomes of evaluating the responses for product characteristics will be set into relation to the answers made, associated with the intention to use the AP. Again the answers in the questionnaire regarding intention to use will be measured quantitatively on a 7 point Likert scale. There are two questions measuring the intention to use, which both are based on previous research by Venkatesh & Davis (2000).

3.3.3 Age

After measuring the original relationship between product characteristics and the intention to use the AP by patients, the moderating variable "age" will be included into the research setting. The age of the patients who filled out the questionnaire ranges from 3 to 85 of age. As young children were not able to fill out the questionnaire by themselves the parents of the younger children answered in duty of their children. These facts will be neglected in the further research.

3.4 Data collection method

The necessary data has been collected by using an online survey created via the system "Lime Survey". The respondents received the survey via E-Mail. The data was gained within 13 days from the 3rd June until the 16th June. The survey was filled out once per patient, thus the research can be described as a cross-sectional study (Babbie, 2013).

The possible respondents were accomplished via emails generated by Lime Survey. In the first email they were nicely asked to fill in the questionnaire. In order to understand the context the email contained a short explanation due to the purpose of the research as well as the goal and why the research is important. The questionnaire itself begins by explaining the AP and introducing the respondent into the topic of the AP and what it is. Within the questionnaire responds were able to cease and continue later. The questionnaire also allowed reviewing of the answers and correction if necessary. Once the respondent finalized their survey the responses were saved and the date was notified.

The questionnaire was originally sent to 601 patients. 506 responded and answered the questionnaire. However, due to incomplete responses regarding the age of the patients and some diabetes type 2 respondents only a valid sample size of 414 patients was suitable. Finally, in order to utilize the results gathered by the questionnaire, the statistics tool SPSS was used. The responses were easily transferable from the LimeSurvey system to SPSS

3.5 Data Analysis

The collected data will be analyzed by using a regression analysis. With the regression analysis it can be identified whether there is a significant relationship between the independent variables on and intention to use as well as whether age has an interaction effect on this relationship.

Consequently, it will be explained how the results originated. In order to utilize the results gathered by the questionnaire, the statistics tool SPSS was used. After the constructs are tested for validity and reliability the conduction of a correlation analysis and regression analysis is possible.

To test the contribution of the independent and moderating variable to intention to use the beta value (B) and the p-value are important. The beta value represents the weight of each variable on the model and the p-value indicates that the weight of the variable is significant when $p<.05$.

The outcome of the regression analysis will be later used to verify or reject the hypothesis.

Table 2: Revised Pattern Matrix

	Component		
	1	2	3
VN_01	,816		
VN_02	,855		
VN_03	,915		
VN_05	,864		
VN_06	,778		
COM_01			,931
COM_02			,897
COM_03			,797
ING_01		,771	
ING_02		,903	
ING_03		,809	
ING_04		,886	

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

3.6 Validity

To assess the validity of the relevant items used in the questionnaire several tests were conducted with the help of SPSS. According to Babbie (2010) a factor analysis generates artificial dimensions out of highly correlated variables, which are independent from one another. For this reason, a factor analysis is advisable in order to group the items (questions) and following, create valid independent variables. Firstly, the Kaiser-Meyer-Olkin measure of sampling adequacy is used to show and test the correlation between the variables. For every result above 0.5 Field (2009) approves the later application of a factor analysis. Moreover, the significance factor of the Bartlett's test of sphericity should be .000. Additionally, the eigenvalue of each factor should be above 1, as "an eigenvalue above 1 represents a substantial amount of variation" (Field p.640, 2009). Besides, the result should also be confirmed by the curve of a scree plot (Field, 2009). To affirm the validity the factor analysis itself also has to be conducted. Here every item needs to have a component loading above 0.5 (Field, 2009) for creating valid dimensions, which subsequently will be used as an independent variables.

After performing these steps it can be asserted, that the research construct is valid. The KMO of perceived usefulness, complexity and compatibility is .880 (see Appendix 7.4), which is according to Field (2009) a great value. The significance of the Bartlett's test of Sphericity

Table 3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	414	3,00	85,00	39,14	16,01
Perceived Usefulness	414	1,00	7,00	5,98	0,90
Compatibility	414	1,00	7,00	6,20	0,86
Complexity	414	1,00	7,00	2,14	1,04
Intention to Use	414	2,00	7,00	6,49	0,82
Valid N (listwise)	414				

is .000 (see Appendix 7.4) and approves the validity as well. The number of three independent variables is confirmed by three eigenvalues lying above 1 (5.746, 2.210 and 1.059; see Appendix 7.5). This finding is supported by the flattened curve after the fourth eigenvalue in the scree plot (see Appendix 7.6).

As illustrated in Appendix 7.7 it became obvious that after the first factor analysis there was one question identified, which had a too low factor loading (.449). The question "I expect that the artificial pancreas will be useful in my daily life." was due to the too low factor loading of .449 left over. After excluding item VN_04 the factor loadings of all other questions were still more than sufficient, therefore, the validity of the research construct can be approved by taking a look at Table 2. The table shows that the compound loadings of perceived usefulness, compatibility and complexity range from .778 to .915, from .797 to .931 and from .771 to .903.

3.7 Reliability

The reliability has been observed by calculating the Cronbach's alpha of each variable. The Cronbach's alpha of each variable should be above 0.7 in order to demonstrate scale reliability.

The output of the reliability analysis (see Appendix 7.9) indicates that the scale reliability is given, as the

independent variables perceived usefulness with .905, compatibility with .886, complexity with .864 and the dependent variable intention to use with .867 have a sufficient Cronbach's Alpha to confirm the reliability. As identified during the exploratory factor analysis, one item of perceived usefulness was left out. To achieve theses suitable results there was no need to cancel another item.

As the reliability and validity have been confirmed the independent and dependent variables could be created by using the fitting items and the correlation and regression can be analyzed.

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4. RESULTS

4.1 Descriptive Statistics

The questionnaire was originally sent to 601 patients. 506 responded and answered the questionnaire. However, due to incomplete responses regarding the age of the patients and some diabetes type 2 respondents only a valid sample size of 414 patients was suitable. Table 3 shows the descriptives of the relevant variables used in this research including number of respondents, minimum and maximum of age variable, the mean and the standard deviation.

As moderating variable the age of the patients also plays an important role in the context of the research. As illustrated in table 3 the age of the respondents ranged from 3 to 85 of age, which indicates that there is a wide range between the ages. The mean of the respondents was 39 years, which represents almost the middle between the two extremes 3 and 85. Additionally, the standard deviation of age is 16, 01. Next it is observable that both extremes of the Likert scale were picked by at least one respondent for each independent variable as the minimum is 1 and the maximum is 7. The mean for perceived usefulness is 5, 98, which implies a high usefulness of the AP. The standard deviation of perceived usefulness amounts for up to 0, 90. Compatibility even achieved a higher mean with a result of 6, 20 and a lower standard deviation of 0, 86. The mean of the last independent variable, complexity, adds up to a mean of 2, 14 and to a standard deviation of 1, 04. On the other side of the research construct is intention to use having a mean of 6, 49 and a deviation of 0, 82.

4.2 Assumptions

In order to decide which test is applicable to analyze the correlation of the variables it needs to be checked whether a normal distribution of the variables is given (Field, 2009). By taking a look at the histograms in Appendix 7.22 it can be observed that each variable is

Table 4: Correlation Matrix

		1	2	3	4	5
1	Intention to Use	1				
2	Perceived Usefulness	,525**	1			
3	Compatibility	,580**	,667**	1		
4	Complexity	-,402**	-,367**	-,477**	1	
5	Age	-,021	,099*	,120*	-,017	1

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

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

Table 5: Regression Analysis explaining Intention to Use

Model	B	Std. Error	Beta	t	Sig.
(Constant)	3,018	,318		9,494	,000
Perceived Usefulness	,175	,045	,191	3,925	,000
Compatibility	,437	,050	,454	8,779	,000
Complexity	-,052	,034	-,066	-1,524	,128
Age	-,004	,002	-,083	-2,111	,035
(Constant)	3,565	,874		4,078	,000
Perceived Usefulness moderated by Age	,000	,003	-,040	-,102	,919
Compatibility moderated by Age	,002	,004	,319	,650	,516
Complexity moderated by Age	,001	,002	,067	,463	,644

a. Dependent Variable: IntentiontoUse

struggling with the normal distribution. Supporting, the Shapiro-Wilk test (Appendix 7.22) also indicates a rejection of the normal distribution. Hence, a Spearman's Rho test will be conducted.

According to Field (2009) assumptions need to be checked in order to be able to generalize the results and to adopt them for other cases. The VIF value of the independent variables can be observed as well. Hence, every VIF is below 10 before the moderation (Appendix 7., multicollinearity can be ruled out. By looking at the histogram and the normal p-p plot it can be seen that the residuals are still normally distributed, although the distribution is not perfectly normal (see Appendix Graph 7.18). It was tried to improve the distribution of the residuals by using a logistic regression analysis, but the results did not show any improvements in the distribution. As a consequence the linear regression analysis is explainable for the given outcome. Finally, the scatterplot in Appendix 7.20 shows some signs of homoscedasciticty as the residuals accumulate in the lower-right corner of the scatterplot. Thus, the trustworthiness of the results is limited due to biased standard errors (Statistics Solutions, n.d.)).

4.3 Comparing Construct

Regarding the correlation between the several variables Table 4 shows a significant correlation between every independent variable and intention to use can be stated. Beyond, a significant correlation among the independent variables is mentionable as well. The table indicates the strength of the correlations as well as the significance level. Thus, it can be observed that the strongest correlation of all variables is the correlation of the two independent variables of perceived usefulness and compatibility (.667). All variables correlate at a significance level of 0.01. Remarkable is the negative correlation between complexity and the other variables, which was expected by the hypotheses. However, complexity has the weakest correlation of the independent variables with intention to use by having a value of -.402. Perceived usefulness and intention to use have with .525 a stronger correlation. But, with a value of .580, the strongest correlation between towards intention to use can be found between compatibility and intention to use, which is only slightly weaker than the correlation between perceived usefulness and compatibility. The correlation of the moderating variable age towards compatibility is the only at a significance level of 0.05 with .120. The correlation between age and perceived usefulness is significant at the same level of 0.05 with .099. The two relationships between age and complexity as well as intention to use are insignificant with -.017 and -.021.

4.4 Model Testing

As mentioned earlier a linear regression analysis was conducted in order to check the proposed research model. The R-Square of the regression analysis shows that the three independent variables and the moderating variable age contribute to 37,9 % of the dependent variable intention to use (Appendix 7.17). Therefore, perceived usefulness, complexity, compatibility and age have a rather high influence on intention to use.

The results of the regression analysis are illustrated in Table 5. Here can be seen that perceived usefulness, with a beta of .191, has a restrained positive effect on intention to use. *Although, perceived usefulness has a restrained positive effect the results still justify a confirmation of Hypothesis 1 "Perceived Usefulness has a positive influence on intention to use the AP".* As can be seen in Table 5 compatibility has, with a beta of .454, a rather strong positive effect on the dependent variable. *Hence, also Hypothesis 3 "Compatibility has a positive influence on the intention to use the AP" is verifiable.* The significance level of both confirmed hypotheses are .000.
The only independent variable with a direct insignificant effect on intention to use is complexity, because the p-value of .128 is above 0.05. *Therefore, Hypothesis 5 "Complexity has a negative influence on the intention to use the AP" needs to be rejected.*

Including the moderating variable age produces different results for the independent variables. Because of the interaction effect of age perceived usefulness has now a negative effect on intention to use with a beta of -.040, but as it has a p-value of .919 the result is insignificant. *For that reason the results for age moderating perceived usefulness can be neglected and Hypothesis 2 "Age has a moderating effect on the positive influence of perceived usefulness on the intention to use the AP, such that the effect will be stronger for younger people" is rejected.*

The result for compatibility shows no variation in the direction of the effect and is still positive, although it is weaker with a beta of .319. Nevertheless, compatibility also becomes insignificant and has a p-value of .516 after

Table 6: Hypotheses Evaluation

Nr.	Hypothesis	Evaluation	Direction,Magnitude & Significance
H1	Perceived Usefulness has a positive influence on the intention to use the AP	*confirmed*	positive, weak, significant
H2	Age has a moderating effect on the positive influence of perceived usefulness on the intention to use the AP, such that the effect will be stronger for younger people	*rejected*	negative, weak, insignificant
H3	Compatibility has a positive influence on the intention to use the AP	*confirmed*	positive, strong, significant
H4	Age has a moderating effect on the positive influence of compatibility on the intention to use the AP, such that the effect will be stronger for older people	*rejected*	positive, strong, insignificant
H5	Complexity has a negative influence on the intention to use the AP	*rejected*	negative, weak, insignificant
H6	Age has a moderating effect on the negative influence of complexity on the intention to use the AP, such that the effect will be stronger for older people	*rejected*	positive, weak, insignifivant

introducing age. *As the age moderating compatibility is also insignificant Hypothesis 4 "Age has a moderating effect on the positive influence of compatibility on the intention to use the AP, such that the effect will be stronger for older people" needs to be rejected, too.* Complexity moderated by age has now a positive direction. However, its beta of .067 is also insignificant, since the result of the p-value is .644, which leads to a rejection of Hypothesis 6 "Age has a moderating effect on the negative influence of complexity on the intention to use the AP, such that the effect will be stronger for older people".A summary of the evaluation of the Hypotheses can be found in Table 6. Outstanding is the insignificance of every variable after the moderating variable age was introduced and subsequently the rejection of H2, H4 and H6. Therefore, two of the three direct relationships and their directions are confirmed.

Not in the hypotheses represented and thus surprising is the negative significant direct relationship of the moderating variable age on intention to use. The proof is displayed in Table 5 where age can be found with a beta of -.083, a weak negative effect and a significant p-value.

5. DISCUSSION

Finally, the research question

To what extent do product characteristics and age of patients have an influence on patient's intention to use the artificial pancreas?

will be evaluated:

The results predominantly confirm the literature by Rogers(1983) and Davis (1989), the positive influence of perceived usefulness and compatibility has been confirmed and further the direction of complexity is as expected, although not significant. But the influence of perceived usefulness on intention to use is not strong, which is, in comparison to the strong relation observed by Davis et al. (1992),Morris and Dillon (1997) ,Deng et al (2013) and Nikou, (2015), surprising. An explanation for the weaker relation might represent the industry, because this observation is the only one carried out in the health care sector. Opposing, the influence of compatibility is stronger than in the literature (Mallat,Rossi,Tuuainen and Öömi, 2006; Tung and Chang, 2008).Thus, Inreda should keep their focus particularly on making the AP as compatible as possible with the environment and the culture of the patients. Since, complexity did not have a significant relationship with intention to use, complexity is not that important for further product development of the AP. Not expected by hypotheses is the significant relationship between age and intention to use. The relationship shows a slight negative relationship between the age of the patients and their willingness to adapt the AP, following the use of the AP decreases slightly with the age of the customer.

The rejection of the moderating hypothesis contradicts previous literature as a significant moderating effect of age on the influence of each of the independent variables or connected variables on intention to use was found. A reason for the moderating effect of age for perceived usefulness and compatibility on intention to use, found by Venkatesh et.al (2003), might be the different construction of their variables in comparison to the variable construction in this research. Besides, a mediation effect within the research might compensate the moderating effect of age. The same might explain the not existing moderating effect of age on the relationship between compatibility and age, which is also contradictory to the literature by Venkatesh et al. (2003) and Lim and Lee (2010). The literature also contradicts with the not found moderation effect of age on the influence of complexity and intention to use. Consequently, the research brings a new facet on the literature regarding the moderating effect of age on the relation between product characteristics and intention to use. In addition the significant relationship between age and intention to use might indicate a possible moderating effect between other attributes and the intention to use.

Summarizing, the product characteristics have mostly a direct influence on the willingness of patients to use the artificial pancreas. Accordingly, product characteristics influence the intention to use the AP to a large extent

5.1 Practical Implications

Practical Implications

The results of this study carry some practical implications for businesses in the health care sector. As the study observes the Artificial Pancreas the implications might be especially insightful for business operating in the diabetes market and consequently for Inreda. The implications should shed light on how patients perceive the product characteristics of the AP in the context of their age. Subsequently, it can assist to increase the number of customers having the intention to use the AP.

The observed direct effect of age on intention to use the AP could have great value for Inreda and other businesses, as this finding is in accordance with the general stereotype that elderly are more reluctant to new devices. Inreda should consider further into investigate this relationship, which can influence the marketing strategy (Holbrock and Schindler, 1996) and the market segmentation by Inreda. Due to the negative relationship Inreda might focus on bringing the AP closer to older customers and explaining them the AP's advantages in detail. Hence, it is important for Inreda to choose the

right communication with the customers in order to attract as many potential customers as possible. The positive direct effects of compatibility and perceived usefulness on intention to use should be also helpful for Inreda, since the company has the implication to make the AP as useful and compatible as possible and transport the usefulness and compatibility by marketing channels to the customers.

5.2 Theoretical Implications

This study is based on three main models. The innovation diffusion model by Rogers (1983) and the technology acceptance model by Davis (1989) build the basis for the assumed direct effects of the independent variables on intention to use the artificial pancreas. The independent variables compatibility and complexity are derived from the innovation diffusion model and the independent variable perceived usefulness from the technology acceptance model. The third model, namely the unified theory of acceptance and use of technology conduces as the basis for the assumed moderation effect of age.

Firstly, a possible explanation for the insignificant effect of complexity on intention to use might be the fact that research involving the TAM was mainly conducted in the field of information systems and information technology (Lee, Kozar & Larsen, 2003) and thus adapting the technology acceptance model and the innovation diffusion model into the health care sector is only to a limited extend possible, as the variable complexity shows no significant relationship towards intention to use.This finding supports the claim by Alagöz et al. (2011), that traditional acceptance models including the TAM are not simply translatable and adoptable for the health related technologies. Although, the study shows that those traditional acceptance models are not simply adapted into the health care sector, it is still possible to do so. The study can conduce as a proof for the adaptability, because perceived usefulness and intention to use are transferrable as well as compatibility.

The results also allow the author to assume that the moderation effect of the UTAUT is not translatable into the health care sector. However, it needs further observation to take this implication for granted, hence the theory was broken down and, due to the context of the research, only some of the constructs used in the UTAUT have been used in this research. Nonetheless, the results show a first direction regarding the adaptability.

Lastly, as the diabetes market is growing and the AP is gaining more and more attention the outcomes of this research, especially the new finding that age has a direct effect on intention to use the AP, can be used as well as further extended by future research.

5.3 Limitations

By carrying out this project value has been added to the body of knowledge. Nonetheless, there are some factors which limited the research having more value. Firstly, the sample size consists only of Inreda patients being familiar with the company and maybe even with the AP. Following, their objectivity might be not given. Secondly, the responses provided were mainly from Dutch patients and consequently the research is geographically constrained. If the questionnaire would have been filled in by a response group with a different cultural background other results might have been possible. Another limitation is the fact that the assumption regarding homoscedascity has been violated and consequently limits the trustworthiness of the results as the standard errors are biased (Statistic Solutions, (n.d.)). Also mentionable is the limitation that it was not possible to check the applicability of the whole UTAUT in the context of the research, thus it was not possible to give clear evidence whether the UTAUT is translatable into the context of the health care sector, especially the diabetes market.

5.4 Further Research

This research is just a tiny puzzle piece in the context of the artificial pancreas and following future research should continuously discover several characteristics of the AP and its surroundings. Some of them are the consequences of the research and it's before mentioned limitations. Although, the sample size was sufficient, future research could try to gain more data by using a bigger sample. Besides, the sample was mainly Dutch; by having a more geographically diverse sample a more general view might be created. Additionally, different countries and their attitudes towards the intention to use the AP, the product characteristics and individual characteristics could be set in relation to Hofstede's dimensions (Hosftede, Hofstede and Mankov, 1997). Furthermore, it is strongly advisable to continue and explore the relationship of age and intention to use, as the regression analysis shows a significant influence of age on intention to use. This could be done by using other theoretical models instead of using those for product characteristics, for example individual characteristics. Furthermore, an Anova analysis might help to cluster the patients into age groups and consequently segment the customer.

But it is also possible that future research stays within Technology Acceptance Models and observes the two attributes left out within this research. Lastly, the sample was only observed at one point of time, it might be as well valuable if the survey would be filled in before and after getting an introduction into the AP by physicians or Inreda.

5.5 Acknowledgments

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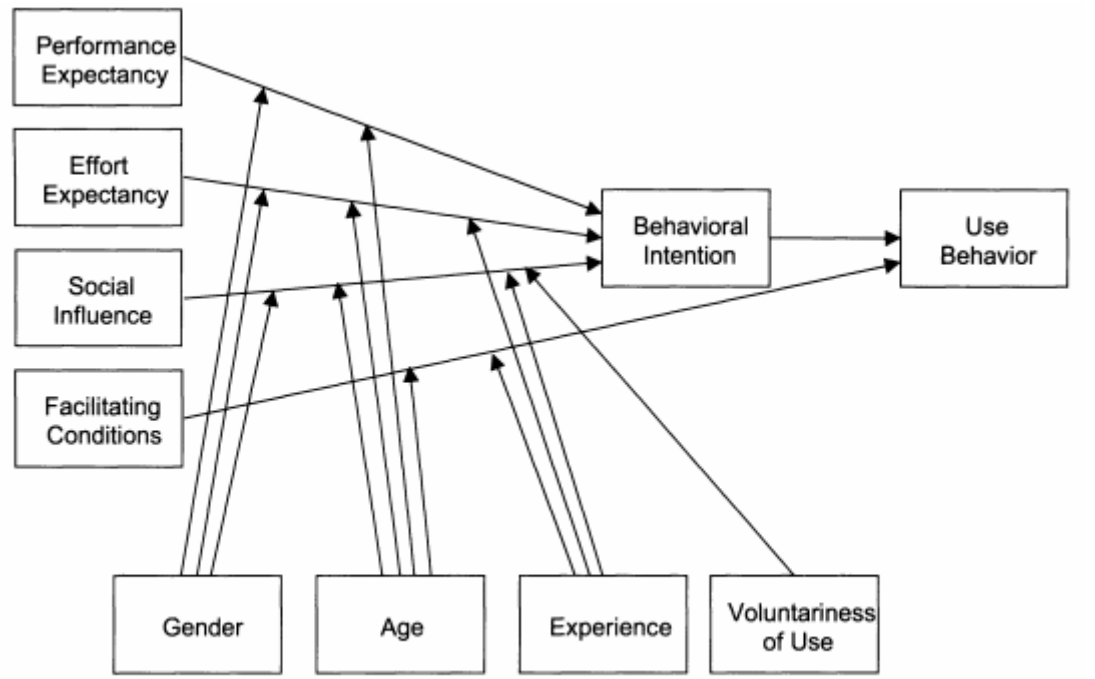
7. APPENDIX

7.1 Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)



7.2 Syntax first factor analysis

```
FACTOR
  /VARIABLES VN_00_VN_01 VN_00_VN_02 VN_00_VN_03 VN_00_VN_04
VN_00_VN_05 VN_00_VN_06 COM_00_COM_01 COM_00_COM_02
COM_00_COM_03 ING_00_ING_01 ING_00_ING_02 ING_00_ING_03 ING_00_ING_04
  /MISSING LISTWISE
  /ANALYSIS VN_00_VN_01 VN_00_VN_02 VN_00_VN_03 VN_00_VN_04
VN_00_VN_05 VN_00_VN_06 COM_00_COM_01 COM_00_COM_02
COM_00_COM_03 ING_00_ING_01 ING_00_ING_02 ING_00_ING_03 ING_00_ING_04
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT BLANK(.4)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

7.3 Syntax second factor analysis

```
FACTOR
```

```
 /VARIABLES VN_00_VN_01 VN_00_VN_02 VN_00_VN_03 VN_00_VN_05
VN_00_VN_06 COM_00_COM_01 COM_00_COM_02 COM_00_COM_03
ING_00_ING_01 ING_00_ING_02 ING_00_ING_03 ING_00_ING_04
 /MISSING LISTWISE
 /ANALYSIS VN_00_VN_01 VN_00_VN_02 VN_00_VN_03 VN_00_VN_05
VN_00_VN_06 COM_00_COM_01 COM_00_COM_02 COM_00_COM_03
ING_00_ING_01 ING_00_ING_02 ING_00_ING_03 ING_00_ING_04
 /PRINT INITIAL KMO EXTRACTION ROTATION
 /FORMAT BLANK(.4)
 /PLOT EIGEN
 /CRITERIA MINEIGEN(1) ITERATE(25)
 /EXTRACTION PC
 /CRITERIA ITERATE(25) DELTA(0)
 /ROTATION OBLIMIN
 /METHOD=CORRELATION.
```

7.4 KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,878
Bartlett's Test of Sphericity	Approx. Chi-Square	3522,887
	df	66
	Sig.	0,000

7.5 Eigenvalue

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5,746	47,884	47,884	5,746	47,884	47,884	4,781
2	2,210	18,413	66,297	2,210	18,413	66,297	3,671
3	1,059	8,825	75,122	1,059	8,825	75,122	4,190
4	,726	6,047	81,169				
5	,484	4,030	85,199				
6	,374	3,114	88,313				
7	,323	2,690	91,004				
8	,303	2,525	93,529				
9	,257	2,141	95,669				
10	,206	1,719	97,388				
11	,170	1,417	98,805				
12	,143	1,195	100,000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

7.6 Eigenvalue Scree Plot

7.7 Revised Pattern Matrix

Pattern Matrix[a]

	Component		
	1	2	3
VN_00_VN_01	,800		
VN_00_VN_02	,851		
VN_00_VN_03	,900		
VN_00_VN_04			,449
VN_00_VN_05	,870		
VN_00_VN_06	,790		
COM_00_COM_01			,935
COM_00_COM_02			,903
COM_00_COM_03			,804
ING_00_ING_01		,770	
ING_00_ING_02		,908	
ING_00_ING_03		,811	
ING_00_ING_04		,877	

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 5 iterations.

7.8 Original Pattern Matrix

Pattern Matrix[a]			
	Component		
	1	2	3
VN_00_VN_01	,816		
VN_00_VN_02	,855		
VN_00_VN_03	,915		
VN_00_VN_05	,864		
VN_00_VN_06	,778		
COM_00_COM_01			,931
COM_00_COM_02			,897
COM_00_COM_03			,797
ING_00_ING_01		,771	
ING_00_ING_02		,903	
ING_00_ING_03		,809	
ING_00_ING_04		,886	
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.			
a. Rotation converged in 4 iterations.			

7.9 Reliability

Reliability Statistics

Variable	Cronbach's Alpha	N of items
Perceived Usefulness	.905	5
Compatibility	.886	3
Complexity	.864	4
Intention to use	.867	2

7.10 Syntax Reliability Perceived Usefulness

```
RELIABILITY
  /VARIABLES=VN_00_VN_01 VN_00_VN_02 VN_00_VN_03 VN_00_VN_05
VN_00_VN_06
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL.
```

7.11 Syntax Reliabilty Compatibility

```
RELIABILITY
  /VARIABLES=COM_00_COM_01 COM_00_COM_02 COM_00_COM_03
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL.
```

7.12 Syntax Reliability Complexity

```
RELIABILITY
  /VARIABLES=ING_00_ING_01 ING_00_ING_02 ING_00_ING_03 ING_00_ING_04
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL.
```

7.13 Syntax Reliability Intention to Use

```
RELIABILITY
  /VARIABLES=ITU_00_ITU_01 ITU_00_ITU_02
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL.
```

7.14 Syntax Correlations

```
CORRELATIONS
  /VARIABLES=PerceivedUsefulness Compatibility Complexity IntentiontoUse
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

7.15 Original Correlation Matrix

		What is your age?	PerceivedUsefulness	Compatibility	Complexity	IntentiontoUse
What is your age?	Pearson Correlation	1	,104*	,122**	,010	-,009
	Sig. (1-tailed)		,017	,006	,418	,431
PerceivedUsefulness	Pearson Correlation	,104*	1	,596**	-,298**	,473**
	Sig. (1-tailed)	,017		,000	,000	,000
Compatibility	Pearson Correlation	,122**	,596**	1	-,432**	,586**
	Sig. (1-tailed)	,006	,000		,000	,000
Complexity	Pearson Correlation	,010	-,298**	-,432**	1	-,320**
	Sig. (1-tailed)	,418	,000	,000		,000
IntentiontoUse	Pearson Correlation	-,009	,473**	,586**	-,320**	1
	Sig. (1-tailed)	,431	,000	,000	,000	

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

7.16 Syntax Regression

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT IntentiontoUse
  /METHOD=ENTER PerceivedUsefulness Compatibility Complexity AGE
  /METHOD=ENTER PerceivedUsefulnessAge CompatibilityAge ComplexityAge.
```

7.17 R-Square

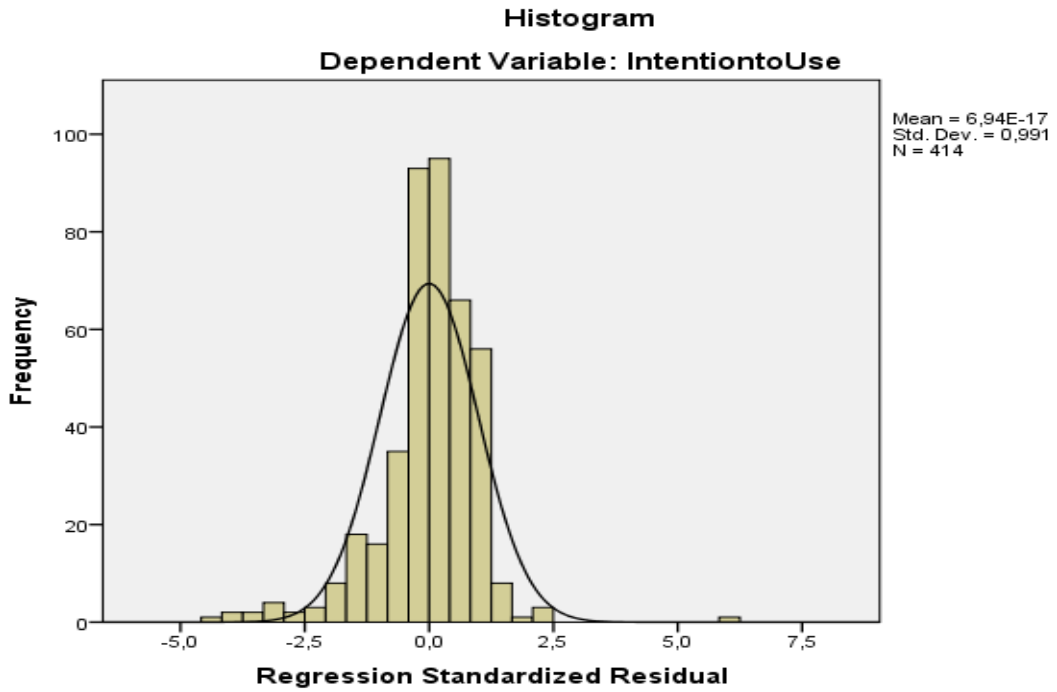
Model Summary

Model	R	R Square	Adjusted R Square
1	,615[a]	,379	,372
2	,616[b]	,379	,369

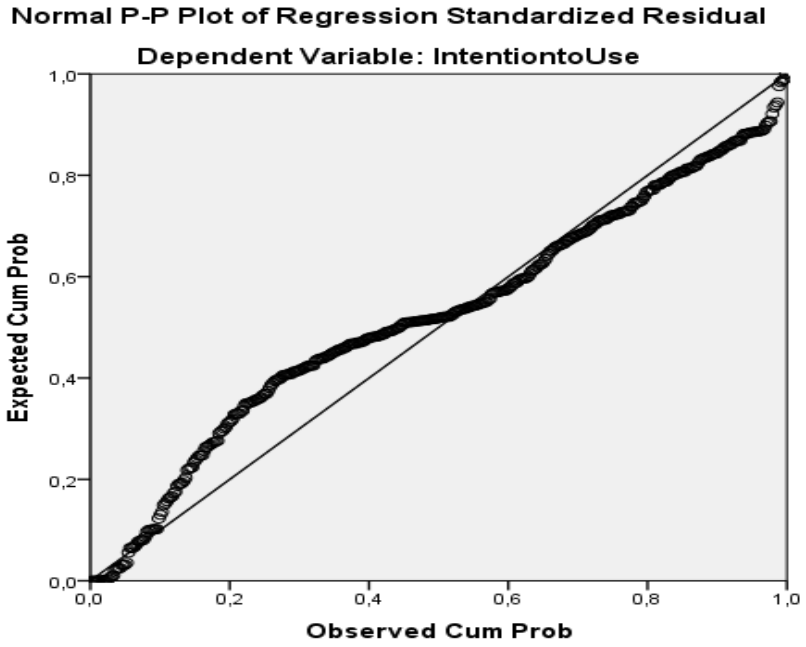
a. Predictors: (Constant), Wat is uw leeftijd?, Complexity, PerceivedUsefulness, Compatibility

b. Predictors: (Constant), Wat is uw leeftijd?, Complexity,

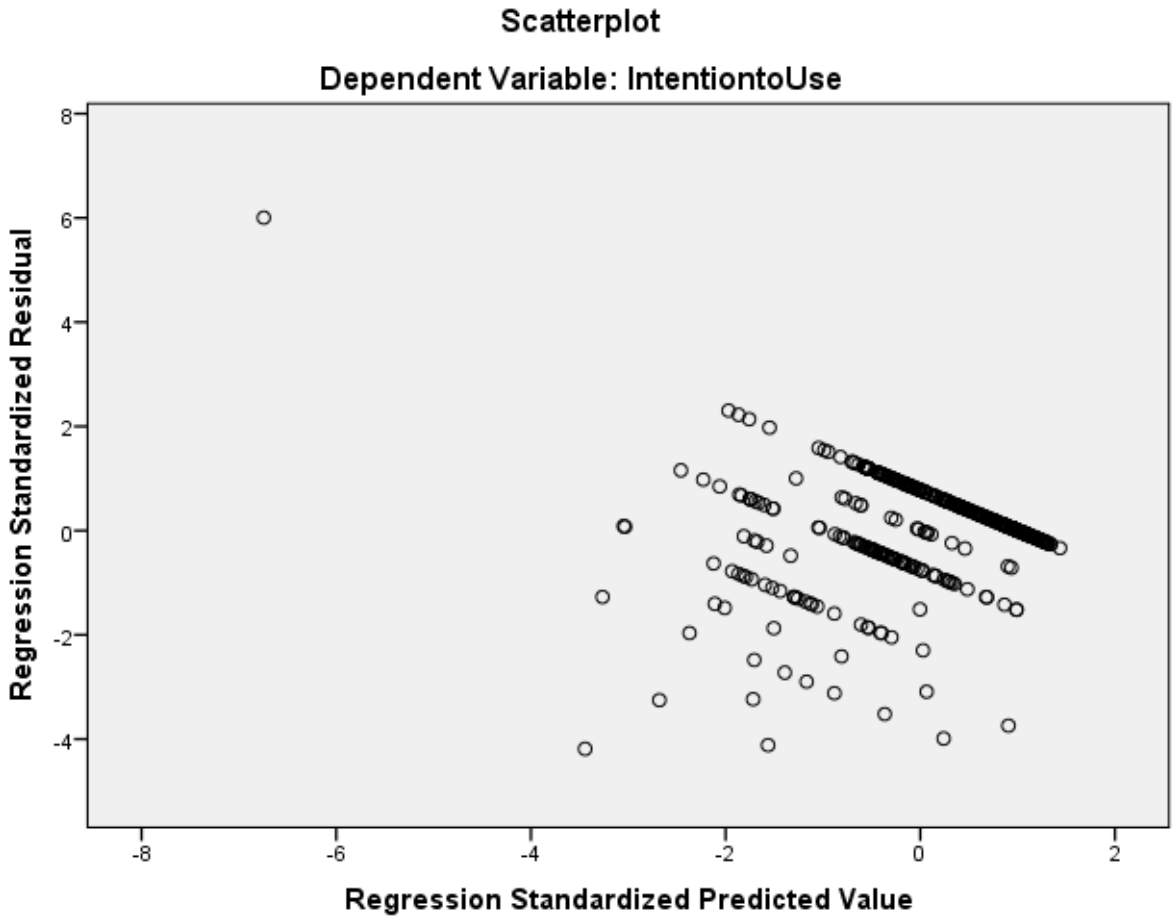
7.18 Histogram of Residuals



7.19 Normal P-P Plot



7.20 Scatterplot

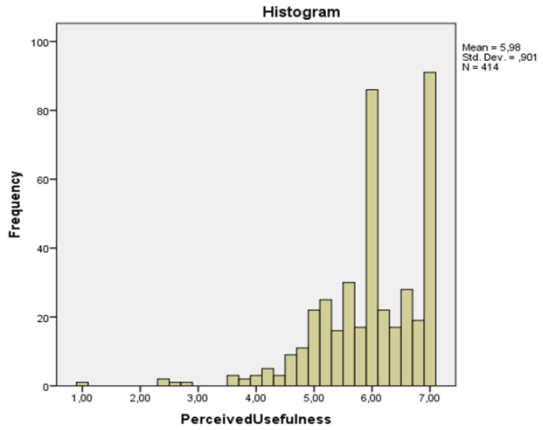


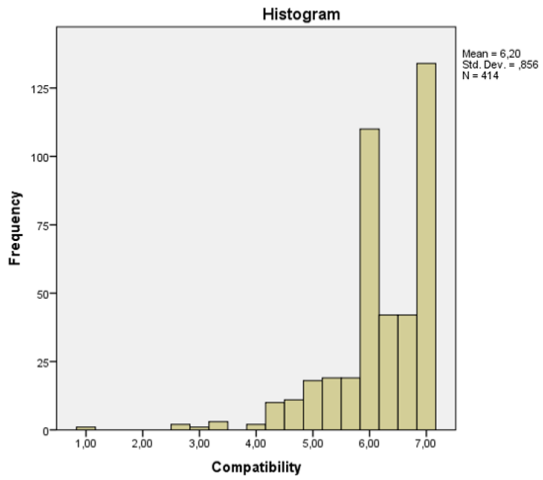
7.21 VIF

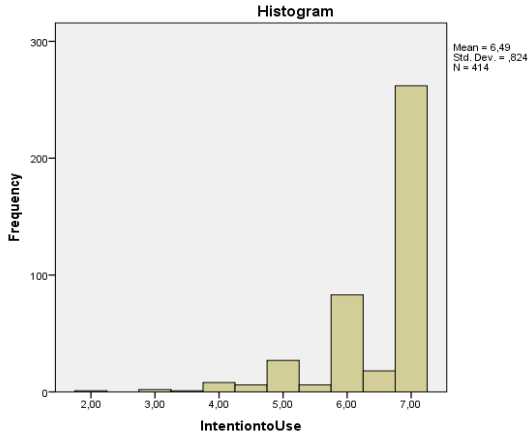
Coefficients[a]					
Model		Standardized Coefficients		Collinearity Statistics	
		Beta	Sig.	Tolerance	VIF
	PerceivedUsefulness	,191	,000	,641	1,560
	Compatibility	,454	,000	,568	1,760
	Complexity	-,066	,128	,806	1,240
	Age?	-,083	,035	,978	1,022
	Perceived Usefulness and Age	-,040	,919	,010	101,740
	Compatibility and Age	,319	,516	,006	158,237
	Complexity and Age	,067	,644	,072	13,896

a. Dependent Variable: IntentiontoUse

7.22 Normal Distribution







Tests of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
IntentiontoUse	0,668	414	.000
PerceivedUsefulness	0,892	414	.000
Compatibility	0,825	414	.000
Complexity	0,87	414	.000