

KLICHT POSITION PAPER VR-182

Consumer perception and appreciation of ICT-based health interfaces: A research model and some pilot test

Ir. Oksana Riaboukhina¹
Drs. Sonja Wendel²
Ir. Frans Verhees¹
Prof.dr. Benedict Dellaert²
Prof.dr.ir. Hans van Trijp¹

¹ Marketing and Consumer Behaviour Group, Wageningen University and Research Center, Hollandseweg 1, 6706 KN Wageningen

² Department of Marketing, Maastricht University, Faculty of Economics and Business Administration, PO Box 616, 6200 MD Maastricht

TABLE OF CONTENTS

<u>1. INTRODUCTION</u>	3
<u>2. THEORETICAL BACKGROUND</u>	6
<u>2.1. CONSUMER EVALUATION OF PERSONALISED HEALTH INTERFACES</u>	6
<u>2.1.1. The consumer evaluation constructs in the extended TAM model</u>	8
<u>2.1.2. The effect of the TAM consumer evaluation constructs on Attitude and Intention to Use</u>	11
<u>2.2. THE EFFECT OF PERSONALIZED HEALTH INTERFACE DESIGN</u>	12
<u>2.3. HOW CONSUMER EVALUATIONS DIFFER BY USAGE SITUATIONS</u>	16
<u>2.4. OVERALL CONCEPTUAL MODEL</u>	19
<u>3. EMPIRICAL PILOT STUDIES</u>	20
<u>3.1. QUANTITATIVE PILOT</u>	20
<u>3.1.1. Design factors</u>	20
<u>3.1.2. Methodology</u>	22
<u>3.1.3. Respondents</u>	23
<u>3.1.4. Measures</u>	23
<u>3.1.5. Data analysis</u>	25
<u>3.2. QUALITATIVE PILOT</u>	25
<u>4. RESULTS</u>	26
<u>4.1. SCALE PERFORMANCE FOR TAM CONSUMER EVALUATION CONSTRUCTS</u>	26
<u>4.2. CONVERGENT AND DISCRIMINANT VALIDITY</u>	26
<u>4.3. PREDICTIVE VALIDITY</u>	27
<u>4.4. SENSITIVITY ANALYSIS FOR THE INTERFACE DESIGN FACTOR LEVELS</u>	29
<u>4.5. CONSUMER UNDERSTANDING OF THE INTERFACE DESIGN FACTORS</u>	34
<u>5. CONCLUSION AND IMPLICATIONS FROM PILOT STUDIES</u>	36
<u>5.1. CONCLUSION</u>	36
<u>5.2. IMPLICATIONS</u>	36
<u>REFERENCES</u>	39
<u>APPENDICES</u>	44

1. INTRODUCTION

Recent advancements in the life sciences have yielded valuable insights into individual differences in nutritional needs. Individuals differ substantially in terms of their nutritional needs as a result of differences in lifestyle, nutrient intake and physiological status. Increasingly also, nutritional sciences begin to reveal that the specific impact that nutrients have on the human body may differ substantially between individuals. To some extent this is due to individual differences in genetic makeup (e.g. Willett, 2002). This forms the basis of nutrigenomics and nutrigenetics, the most recent breakthrough in nutritional sciences (e.g. Mueller and Kersten, 2003).

Nutrient intakes differ substantially with food choice and therefore there is a long tradition of providing food recommendations to the general public to help consumers determine and meet their nutritional needs. These recent insights in individual differences in nutritional needs have made it clear however, that personalized food recommendations and food products have the potential to have a major impact on many consumers' nutritional status if a mechanism can be found to provide these to large numbers of individuals (e.g. Coulston et al., 2003). The individual differences in nutritional needs also hold substantial promise for food marketing purposes. For example, 88% of European primary grocery shoppers agreed that "everyone's nutritional needs are different to everyone else's (Health Focus, 2002). Such recognised individual differences may open the way for personalised nutritional advice and food marketing based on individual information on lifestyle, nutritional status, physiological parameters, food intake patterns and genetic makeup (Brug et al., 2003).

The key question that arises is how such personalised advice and marketing offering can best be delivered to maximally and convincingly appeal to consumers while at the same time providing a sustainable business proposition. Small scale examples of personalized advice are already widespread in the dietetic practice where in a personal and intensive interaction between the dietician and the client (ie. Nutritional counseling), individual level nutritional advises are being developed. To date, mass media nutritional education only takes individual difference into account to a limited extent by targeting nutritional advice to specific target groups (e.g. calcium for the elderly, folic acid for pregnant women etc.). Increasingly however, ICT tools are being developed to further tailor this nutritional advice to individual

needs and characteristics (Brug et al., 2003; Oenema et al., 2001). Our research builds on this latter development.

ICT tools hold substantial promise for personalized food marketing and recommendations (e.g. Kreuter et al., 2000). They can allow food marketing to make the shift towards service and relationship marketing on a one-to-one basis (Brug et al., 2003). Examples of this type of marketing that has been referred to as customerization (Wind and Rangaswamy 2001), begin to emerge in nutritional advice. Sciona (www.sciona.com) is a prototypical example in this respect. This UK based company provides personalised nutritional advice on the basis of individual genetic structure. Using a Sciona-provided tool kit, consumers collect their own cheek saliva cells which are sent to Sciona for analysis on the occurrence of nine so called Single Nucleotide Polymorphisms (SNPs). These SNPs are single base individual variations in the human DNA structure that are hypothesized to be responsible for individual variations in response to medicines as well as nutrients. After analysis, Sciona provides consumers with anonymous individual feedback on the prevalence of such SNPs and what their effect is on the body and human health. Building on the nutritional sciences of how the specific genetic constitution affects response to specific nutrients, an individual nutritional advice is provided. Sciona is one example of how personalised nutritional information can be provided. However, as yet only few such services exist and little is known about what drives individuals to look for personalized food recommendations and their intention to use such recommendations (Brug et al., 2003). The available evidence suggests that several factors may contribute to enhanced performance of tailored advice, including personalization of the nutritional education, better exposure to and more intensive cognitive processing of the educational information, greater personal relevance of the messages, and the self-evaluation properties of tailored feedback (Brug et al., 1999; Kreuter et al., 2000; Dijkstra and De Vries, 1999).

The aim of this study is therefore to develop a conceptual framework for the analysis of the consumer appeal of personalised health interfaces in the area of food consumption and to empirically test the relative importance of design characteristics of such personalised health interfaces. In the present context, we define a personalised health interface as *“an information exchange between a consumer and a producer, where the consumer, based on personal health information provided to the producer, receives an individualised food-related solution”*. Our conceptual framework expands the Technology Acceptance Model (TAM) (Davis et al. 1989) by identifying additional evaluative dimensions to the TAM that are particularly relevant for

the more integrative interactive relationships that are at stake here. Also, our research framework extends the TAM in a second direction, which is that of the actual interface design features that bring about the relevant consumer perceptions that underlie consumer attitude toward using the interface.

More in particular the paper addresses three issues in detail:

1. How do consumers evaluate personalised health interfaces in the area of food consumption?
2. What would be the optimal design of such personalised health interfaces?
3. How do consumer evaluations differ by usage situation?

We first develop a conceptual framework as a basis for analysing these questions. This framework is based on previous literature on Technology Acceptance and related research. Next we describe three empirical studies: 1. Two pilot studies on consumer evaluations of personalised health interfaces, focussing on scale development in the area of health interfaces, and consumer understanding of the design features. 2. A main study in which the three research questions are addressed more formally and in more detail. Our findings from these studies are used to address our three research questions. The paper closes with a discussion of our findings, limitations and promising areas for future research.

2. THEORETICAL BACKGROUND

2.1. Consumer evaluation of personalised health interfaces

Personalised health interfaces have not been subject to a lot of research scrutiny. However, we can build on a stream of literature that focuses on how consumers evaluate interfaces in general and ICT-interfaces in particular. Two core models in this domain are the Technology Acceptance Model (TAM) by Davis (1989), and the Triandis model by Triandis (1980). These models are based on the principles of the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980), which states that personal attitudes are determined by outcome beliefs, and that personal attitudes together with subjective norms are determinants of behavioural intention.

TAM is one of the most popular models in addressing individuals' use of Internet-based service interfaces (e.g., Plouffe et al., 2001; Childers et al., 2001; Van der Heijden, 2002). It is an extremely parsimonious model, which characterises the adoption process with just two antecedent consumer evaluation constructs: perceived ease-of-use and perceived usefulness" (Plouffe et al., 2001). The two basic consumer evaluation constructs of TAM are well supported by theory and practice (Karahanna and Straub, 1998; Moon and Kim, 2001) and the model can easily be adjusted to specific situations. TAM (Davis, Bagozzi, and Warshaw, 1989) has been widely used in various research studies that have investigated why people make use of new technologies and services (e.g. Davis, et al.1989, Dabholkar and Bagozzi, 2002). Although this model was developed originally to study the acceptance of computer-based technologies in an organizational context, extant literature provides support for the application of the model in many other contexts including e-commerce (e.g. Chen and Leteney, 2002, Moon and Kim, 2001, O'Cass and Fenech, 2003). The consumer evaluation constructs of the TAM are adapted in the current paper to determine relevant factors influencing consumers' acceptance of (internet-based) interfaces for recommendations for healthy food.

We first review the different components of the TAM. Davis et al. (1989) postulate that the behavioral intention to use a new information system (computer technology) is determined by the individual's attitude towards using this technology. Thus, it is argued that attitude has a

direct, positive effect on a consumer's intention to use the new technology. The two technological variables identified in the technology acceptance model determining a person's attitude towards using a new technology are *perceived usefulness* and *ease of use*. *Perceived Usefulness* is originally defined as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" (Davis et al., 1989: 985). The second external variable *Ease of use* is defined as "the degree to which the prospective user expects the target system to be free of effort" (Davis et al., 1989: 985). In addition to these two early-identified determinants of a consumer's attitude, a third construct: *enjoyment* has been added to the original technology acceptance model (Davis et al., 1992). *Enjoyment* (or fun) is defined as "the extent to which the activity of using the new technology is perceived to provide reinforcement in its own right, apart from any performance consequences that may be anticipated" (Davis et al., 1992).

Although the TAM has been considered an influential research model in the field of new technology (e.g. O'Cass and Fenech, 2003), we propose additional external variables to be included in order to increase the viability of the developed framework in the context that we study. Previous research has also made specific suggestions for extensions to the TAM, depending on its applications. For example, Moon and Kim (2001) and Venkatesh (2000) recommended adding relevant complementary variables to the model to make it more viable in the context of World Wide Web usage and new information system usage respectively.

Building on the literature in this area, we propose two (clusters of) additional variables relating to compatibility and control in our context of health interfaces. Compatibility refers to "the degree to which consumers perceive an innovation as consistent with their needs, values, past experiences and routines" (O'Cass et al., 2003). We argue that the adoption of a new technology has to be compatible with the user's lifestyles and shopping habits. Furthermore, control is identified as an influential determinant of attitude formation towards the computer technology. The factor control consists of three separate consumer evaluation constructs, namely behavioural control, accessibility, and security. Behavioural control refers to the availability of knowledge for using the Interface (Chau and Nu, 2000). Accessibility refers to control over when to access the Interface (Lu and Chuan-Chuan Lin, 2000). The final control construct relates to the security of the Interface, more specifically, the perception of financial risks, including, the access of a credit card number to a third party, or financial details to the user (O'Cass et al., 2003). We postulate that all three consumer evaluation sub-constructs of

control are relevant external factors influencing consumers' attitude towards new technology and eventually intention to adopt this new technology.

In contrast to Dabholkar and Bagozzi (2002) we do not replace the dimension of usefulness with the alternative dimension of performance, which is defined as “encompassing the reliability and accuracy of the technology-based self-service, as perceived by the consumer” and is comparable to the construct of Mueter et al. (2000) “did its job”. The reason for excluding the factor in our model is caused by the fact that respondents do not interact with the Interface as identified in the study; hence it is not possible to evaluate the reliability and accuracy of the Interface. Respondents can however be asked to evaluate the expected usefulness of the Interface.

In summary, our literature review concerning personal acceptance of technology revealed seven consumer evaluation constructs as important determinants in influencing consumers' attitude towards using new technology services, and are most likely to affect consumers' acceptance of a new personalised health interface in the area of food. We now detail each of the TAM consumer evaluation constructs with their relevant scientific basis.

2.1.1. The consumer evaluation constructs in the extended TAM model

Ease of use and Usefulness

Ease of Use, and Usefulness are the “traditional” consumer evaluation constructs in the TAM. Hence, there exists quite a bit of research evidence of these factors. Ease of use is defined by Davis (1989) as “*the degree to which a person believes that using a particular system would be free of effort*”. Ease of use has been operationalised by various authors (Chau and Nu, 2000; Plouffe et al., 2000; Lowry, 2002; O’Cass and Fenech, 2002; Chen et al., 2002; Van der Heijden et al., 2001; Suh and Han, 2002, Moon and Kim (2001) using different formats (see Appendix 1: section on ease of use). Also, one author (Cheung et al., 2000) has operationalized the construct of complexity, which is essentially the opposite of “ease of use”.

Usefulness has been defined by Davis (1989) as “*the degree to which a person believes that using a particular system would enhance his or her performance*”. Also for usefulness several authors (e.g. Chau and Nu, 2000; O’Cass and Fenech, 2002; Chen et al., 2002; Van der Heijden, 2002; Plouffe et al., 2001; Lowry, 2002; Childers et al., 2001; Suh and Han, 2002;

Bhattacharjee, 2001; Moon and Kim, 2001) have suggested operational measures (see Appendix 1: section on usefulness).

Dabholkar and Bagozzi (2002) argue that ease of use as well as usefulness are important antecedents of attitude in their model on technology-based self-services. Furthermore, the construct ease of use has been used in various research contexts related to the adoption of new technologies. Also Plouffe et al. (2001) argue in their research on the adoption of new smart card-based electronic payment system that ease of use can have an influence on individual's adoption decisions. Furthermore, Suh and Han (2002) as well as Chen et al. (2002) stress the importance of these consumer evaluation constructs when investigating customer acceptance of Internet banking and the factors that entice consumers to use virtual stores respectively. In the field of telemedicine technology Chau and Nu (2002) argue that perceived ease of use and perceived usefulness have an influential impact on attitude. Also O'Cass and Fenech (2002) argue that perceived usefulness and perceived ease of use are influential factors affecting consumers' attitude towards web retailing. Furthermore, Childers et al. (2000) identify the factors usefulness and ease of use as important determinants of consumers' attitude when investigating consumers' motivations to engage in online retail shopping. In extending the TAM Moon and Kim (2001) as well as Van der Heijden (2003) use perceived usefulness as well as perceived ease of use in explaining individuals' acceptance behavior and usage of web sites. Lowry (2002) and Bhattacharjee (2001) provide empirical evidence for the two TAM consumer evaluation constructs in the fields of job assistance and online brokerage respectively. It should also be mentioned that Cheung et al. (2000) used the concept of 'complexity' in their research, which can be seen as a construct measuring the opposite of the factor 'ease of use. Therefore in the context of food related personalised health interfaces we define ease of use *the degree to which a person believes that using a personalised health interface would be free of effort*". We define usefulness as *"the degree to which a person believes that using a personalised health interfaces would enhance his or her healthy nutrition"*.

Fun

Fun and enjoyment are relevant determinants of attitude towards technology-based self-service as argued in the research by Davis et al (1992) and Dabholkar and Bagozzi (2002). In addition, Van der Heijden et al. (2003) investigated factors influencing the usage of web sites and proposed perceived enjoyment to positively influence attitude to use as well as intention

to use. We define fun and enjoyment as “*the degree to which a personalised health interface is perceived as a relatively enjoyable environment*”.

Compatibility

Building on Rogers’ (1983) work, compatibility is defined as “the degree to which consumers perceive an innovation as consistent with their needs, values, past experiences, and routines” (Rogers, 1983 in O’Cass and Fenech, 2003).

Lowry (2002) argues in his research that compatibility is a relevant determinant of attitude towards job assistance services. Furthermore, compatibility as an influential determinant of an individual’s adoption decision related to electronic payment systems has been investigated by Plouffe et al. (2000). Also, Chen et al. (2002) argue in their research that compatibility is an influential factor affecting consumers’ attitude towards a new technology in a virtual store context. O’Cass and Fenech (2003) argue that Internet users’ web experiences, which are measured by consumers’ self-efficacy, security, satisfaction, and compatibility have a positive effect on perceived ease of use and perceived usefulness, which in turn influences individuals’ attitude towards web retailing. Therefore in the context of food related personalised health interfaces we define it as “*the degree to which the personalised health interface is perceived as relatively compatible with food related routine of respondent*”

Behavioural control

Behavioural control is defined as “*the degree to which the personalised health interface is perceived as being simple to control and make use of*”. Chau and Hu (2000) argue in their research on health care professionals’ decisions to accept telemedicine technology that perceived behavioural control is a relevant determinant of behavioural intention towards telemedicine technology. Also, Lim (2003) shows that behavioural control is a determinant to the intention to adopt negotiation support systems.

Accessibility

Accessibility of the system has been suggested as a relevant determinant of using the web (Lin and Lu, 2000). It is conceptually defined as “*the degree to which the personalised health interface is perceived as relatively easy to access and make contact to*”.

Security

O’Cass and Fenech (2002) examine Internet users’ adoption of the web for retail usage and hypothesize web users’ experiences, measured by self-efficacy, security, satisfaction, and compatibility to positively influence perceived ease of use and perceived usefulness. It is stated that perceived web security is one relevant consumer characteristic to better understand the adoption of web retailing by Internet users. We conceptually define the concept of security as *“the degree to which the personalised health interface is perceived as relatively safe for providing sensitive personal information”*.

2.1.2. The effect of the TAM consumer evaluation constructs on Attitude and Intention to Use

Figure 1 summarizes the TAM consumer evaluation constructs graphically and how they are expected to influence consumers’ attitude towards using the personalized health interface. It also illustrates how attitude and intention to use are related. We define attitude and intention to use in the context of our study as follows. We define consumer attitude towards the personalised health interfaces as *“the degree of personal evaluative judgement about the personalised interactive interface”*. We define an intention towards using interactive interfaces as *“the degree to which person is willing to accept the personalised health interface for usage”*.

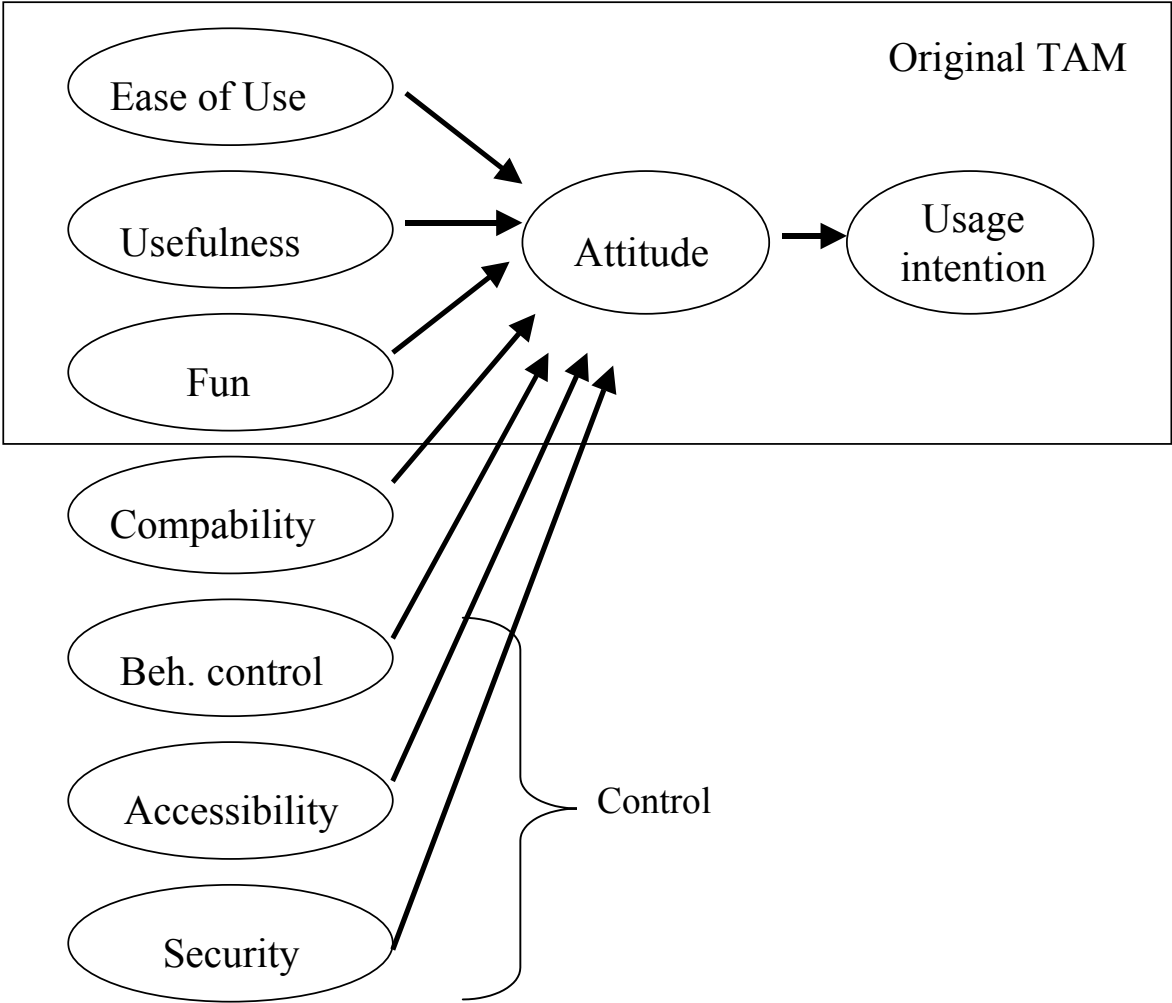
Attitude towards using the Interface

The construct ‘attitude towards using’ has been addressed by numerous researchers such as for example by Moon and Kim (2001) in their study regarding the extension of the TAM for use in a WWW context, by Chen et al. (2002) investigating what entices consumers to use virtual stores, by van den Heijden et al. (2003) exploring factors influencing the usage of web sites, and by Suh and Han (2002) in their search investigating factors effecting customer acceptance of Internet banking. O’Cass and Fenech (2002) and Childers (2001) examine determinants of attitude in the area of web retailing, whereas Cheung et al. (2000) identify ‘affect’ as an important determinant of Internet/WWW usage.

Overall, we test the extended model for consumer evaluations of personalised health interfaces as depicted in Figure 1 and test its added value against the TAM, including only the “original” consumer evaluation constructs of perceived ease of use, perceived usefulness and

fun. Building on existing literature, we will develop and test measures for the TAM consumer evaluation constructs in the pilot study and apply them in the main study.

Figure 1:
Proposed model structure: The extended technology acceptance model for consumer evaluations of personalised health interfaces



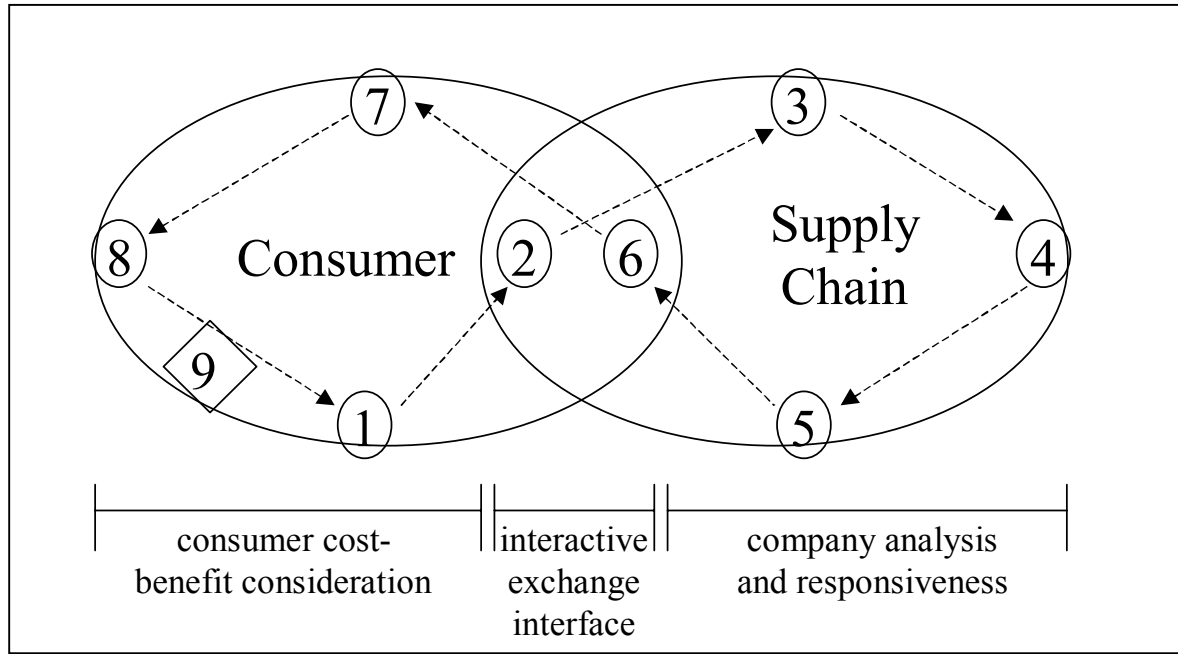
2.2. The effect of personalized health interface design

Personalised health interfaces can differ in how they are designed to deliver the relevant consumer perceptions and usage intention. Building on the work of Blake and Mason (1990), we develop a research model for the different stages in consumer personalised health interfaces. It is built on the principle of value exchange between the consumer and the supply

chain, and therefore we labelled as the “give and take” model. The model is depicted in Figure 2.

Figure 2:

A provisional framework for the cost and benefit perspective on consumer-business interfaces



We identify nine stages of the exchange process in personalized health recommendations. Some support for the model can be found in the literature on web site and online shopping experiences of consumers.

1. For a given usage situation, consumers make available certain personal and possibly sensitive information to share with a supply chain (e.g. lifestyle info, genetic make-up, attitude ratings, health status, zip code, and biomedical information such as blood samples). Privacy, dependency, and fear to learn unpleasant confrontational information about oneself are expected to influence the users attitude towards the consumer interface (e.g. Moon, 2000).
2. Consumers provide information using a physical interface that subsumes a certain format in which the information is exchanged (this can be physical (health kiosk, in hospital, market research survey, in home testing) as well as digital (electronic questionnaires, electronic ratings etc) or a combination of both. Efficiency and effectiveness of information processing (Ariely, 2000) and the (emotional) quality of the exchange per se reflected in flow, fun, control, engagement and task involvement (e.g. Childers et al 2001,

Hoffman and Novak, 1996; Shih, 1998, Meuter et al. 2000, Tafarodi et al., 2002) will influence the user's perception of the interface.

3. The receiver of the information (the supply chain) may protect it at a certain level of privacy and anonymity and may or may not provide direct feedback on credence information (e.g. health status). Privacy, responsiveness and real time interaction are important for consumer's use of interfaces (Wolfenbarger and Gilly 2002, Zeithaml, Parasuraman and Malhotra 2000, Dholakia et al 2000)
4. The receiver will have a decision tool that transforms the personal information into a personalised solution / advice and this decision model will be of certain quality and reputability (e.g. scientific backing). Dholakia et al (2000) and Zeithaml, Parasuraman and Malhotra (2000) show that personalisation contributes to the perceived quality and use of interfaces. Also, credibility and trust are two key variables that also affect (ict-service) exchange relations (e.g., Hennig-Thurau, Gwinner and Gremler 2002, Hoffman, Novak and Peralta 1999, Luo 2001, Morgan and Hunt 1994).
5. From the decision model, the supply chain will design or select a personal solution for this particular client. Wolfenbarger and Gilly, 2001 show that personal solutions may contribute to the success of an interface because it offers superior need satisfaction. This solution may be of different nature such as a lifestyle advice, an advice at the product category level (e.g. eat more veggies) or at the specific level of recommended brand choices (use product X more often).
6. Subsequently, the advice (product, service, information) is communicated along a certain user interface (send products home, give email advice, provide i-mode advice in supermarket, send personal nurse etc.).
7. The consumer receives the advice with a certain context around it (e.g. credibility, practicality, persuasiveness etc) and will decide whether it is worth "obeying to". Within the Technology Acceptance model, ease of use and usefulness (eg. Venkatesh and Davis 2000) and fun (Dabholkar and Bagozzi 2002) are identified as crucial determinants in consumer willingness to adopt a new service technology. Note that the latter are also important in stage 6.
8. After following the advice, the consumer will want to evaluate the added value to life and improvement vis-à-vis the situation before the advice was followed. Consumer interfaces are no exception to the rule that success is determined by the perceived added value of the interface (e.g. Efficiency (Amit and Zott 2001, Meuter et al 2000), complementarities (Amit and Zott 2001), and solved needs (Meuter et al 2000)).

9. Based on this first interaction, the consumer may decide to go back into the value exchange or not (Dholakia et al. 2000). Over time, as the number of interactions between consumer and firm increases shifts may occur in consumer confidence and trust in the exchange relationship.

To illustrate the feasibility of the model, we map two personalised health interfaces currently in the market place onto the stages of the give and take model. The health interfaces can be found under www.sciona.com and www.vitunique.nl (in Dutch).

www.sciona.com

1. Make available cheek saliva for DNA testing
2. Through a kit from drug store and send off through mail
3. Sciona analysis it and sends personal feedback on polymorphism status
4. Sciona relate the DNA profile to a database for nutrient needs
5. Sciona puts together a personalised nutritional advice (report) on what (not) to eat
6. Report made available to consumer through regular mail
7. Consumer can implement recommendation in daily life
8. Consumer feel reward (health status or reassurance)
9. Consumer may do next test with Sciona through (1)

Www.vitunique.nl

1. Make available food intake information
2. Through food frequency questionnaire on internet
3. Send to Vitunique for personal feedback on nutrient status
4. Vitunique validates the information against a database of specific RDA (-> gaps)
5. Puts together a personalised nutritional advice to close the nutrient gap
6. Report is sent through Internet
7. Consumer can implement recommendation in daily life
8. Consumer feels reward (health status or reassurance)
9. Consumer can monitor status again through (1)

In this study, we develop a design scheme for personalised health interfaces along the lines suggested by Blake and Mason (1990) and detailed out in the nine steps of our framework (Figure 2) for consumer–business interfaces. Clearly, there are many options for specific

design of personalised health interfaces and we will base our choices for design features on discussion with experts and initial assessments from consumers (see pilot study).

2.3. How consumer evaluations differ by usage situations

In addition to the extended model for consumer evaluation of personalized health interfaces we propose expectations of situational influences on consumers' evaluations of personalised health interfaces. In the past decade many firms have spend considerable effort to try and enhance their relationships with customers. However, when analyzing consumer behavior with respect to their own products and services firms have often ignored the broader context in which consumers make choices when buying and using their products and services (Seybold 2001). At the same time the purchase and usage context is growing in importance in the value creation process, because the arrival of interactive media such as the Internet made it possible to deliver more tailored products, services and information to consumers at relatively low costs. Firms can now more easily address the unique situational demands and needs of their customers (Kenny and Marshall 2000).

Initially, research applications incorporating usage situational influences were limited due to a lack of a comprehensive taxonomy of situational characteristics. The seminal work in this area was a definition of situation proposed by Belk (1974, 1975) and based on objective measures. He defined the term situation as “all those factors particular to a time and place of observation, which do not follow from a personal (intra-individual) and stimulus (choice alternative) interface design factors, and which have a demonstrable and systematic effect on behavior” (Belk 1974, p.157). In operationalizing this definition, the following five dimensions of a consumption situation were distinguished by Belk (1975):

1. *Physical surroundings*: these are often the most easily observed characteristics of a situation such as the weather, décor, sounds, etc.,
2. *Social surroundings*: these provide additional more detailed information about other individuals around the individual, e.g., other people present, their characteristics, their role, etc.,
3. *Temporal perspective*: this dimension refers to the arrangement of events in time, it can be specified in different units such as time of day, season, or number of weeks between events,

4. *Task definition*: includes the intent to select, to purchase or get information about a general or specific purchase (for instance to buy for a birthday), and
5. *Antecedent states*: include momentary moods such as anxiety or momentary conditions such as illness, rather than chronic individual traits.

Lutz and Kakkar (1975) added to the work of Belk a subjective (psychological) perspective and stressed the fact that the definition of a situation depends on the consumers' perception of the situation dimensions. Specifically, they applied theories developed in environmental psychology (Mehrabian and Russel 1974) to develop their framework. This framework is based on three internal state variables, namely pleasure, arousal, and dominance that mediate the influence of the situation on behavior. As a consequence, Lutz and Kakkar provided the following definition of a situation: "The situation relevant for the understanding of consumer behavior is the psychological situation, which may be defined as an individual's internal responses to, or interpretation of, all factors particular to a time and place of observation which are not stable intra-individual characteristics or stable environmental characteristics, and which have a demonstrable and systematic effect on the individual's psychological processes and/or overt behavior". This view complements the objective measurement approach that restricts itself to features of the situation that are present before a consumer interprets the situation (Belk 1974a).

From the literature it is not apparent what the main impact of situation is as a moderator or a direct effect on the intention decision construct. Furthermore, often it is not very clear if the situation is outside the service being offered, part of the service itself or perhaps part of the implementation of the service. This issue is further complicated by the fact that it is unclear how a service is defined. Therefore, it may also be unclear at what stage the situation may impact a consumer's decision.

For the study at hand we are dealing with three situational effects. First, one way in which the usage situation was manipulated was related to the task definition (Belk, 1975). More specifically, the following two situations which seemed most appropriate for the context of consumers' evaluation of personalized health interfaces were manipulated:

Situation 1: You were at your doctor for a regular check-up and your doctor recommends that you might feel fitter if you follow a personalized food advice.

Situation 2: You have heard that you can get a personalized food advice and you would like to try it out.

Further situational influences are three scenario-based effects. The first two effects involve the interface design factors related to the way the information is provided (through fitness club, hospital, and general practitioner) and the way the intermediary delivers the advice to the consumer (Internet, fitness club, general practitioner). Both interface design factors can be linked to the physical and/or social dimension as identified by Belk (1975). The third effect concerns the interface design factor related to the way the advice can be incorporated into the daily routine. First, it might not be apparent how the situation might be related to this interface design factor, however, it can be argued that based on how the advice can be incorporated into the daily routine of the consumer it can be situational in nature. The situation can then be seen as part of the implementation of the service.

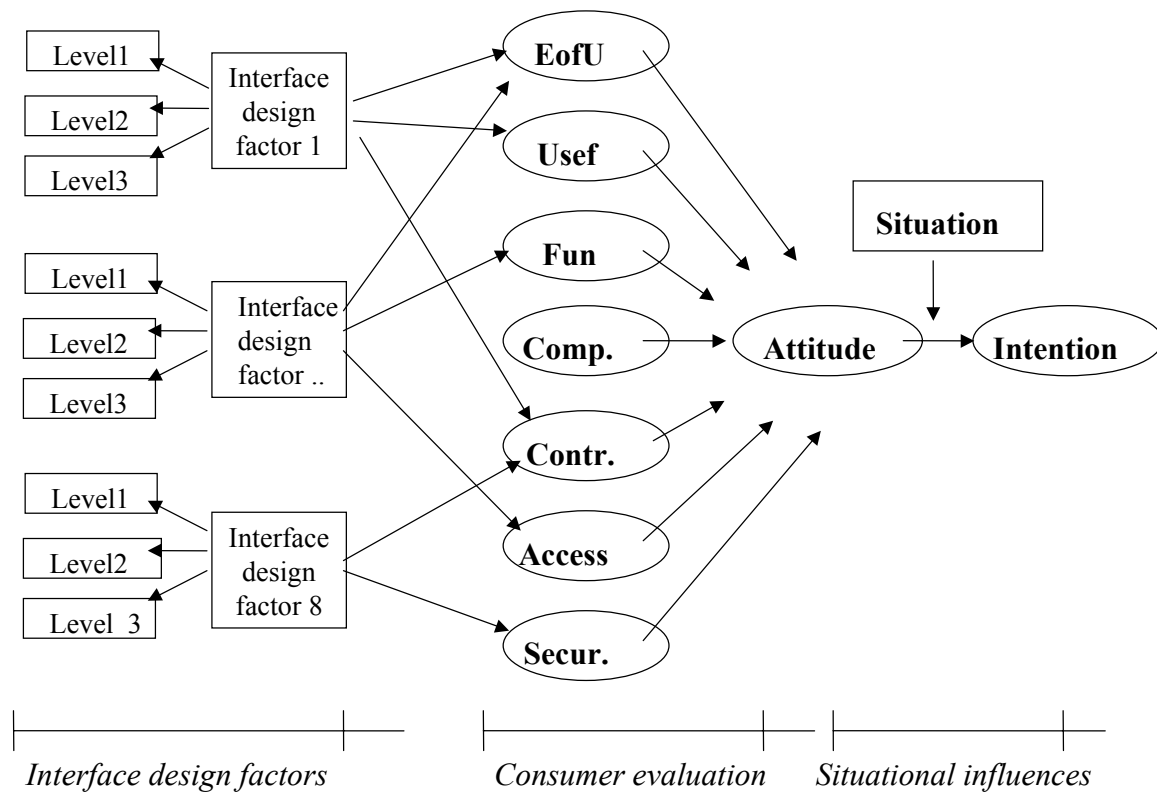
Third, we argue that individual specific features may also operate as a situation. An example is consumers' food and health concern. It can be argued that a consumer who does not feel well is more concerned about food and health issues, which in turn may operate as a situation and is related to the dimension of antecedent state as identified by Belk (1975).

2.4. Overall conceptual model

Overall we provide an integral test of consumer evaluations of different personalised health interfaces. The overall research model is depicted in Figure 3.

Figure 3:

Overall conceptual model



3. EMPIRICAL PILOT STUDIES

As pre-work for our ambition to develop and test consumer perception and evaluation of personalised health interfaces, we conducted two pilot studies: one quantitative and one qualitative in nature. The aim of the pilot studies was threefold:

1. Develop and test appropriate consumer measures for personalized health interface evaluations through the combination and refinement of scales found in the literature.
2. Develop relevant levels for each of the interface design factors and assess whether these are properly understood by consumers (qualitative pilot)
3. Assess whether the consumer measures are sensitive enough to differentiate consumer perceptions between the features levels of the design factors.

3.1. Quantitative pilot

In the quantitative pilot study, respondents evaluate the design factor levels on the TAM consumer evaluation constructs of the extended TAM model. These ratings are then used to (1) assess scale reliabilities and refinement of the scales when necessary, and (2) to assess whether the consumer measures in the extended TAM model are sensitive enough to differentiate consumer perceptions between the interface design factor levels (see Table 1).

3.1.1. Design factors

Based on discussions with experts in academia and the participating company we identified three levels for each interface design factor. The interface design factor and their levels are summarised in Table 1. Note that the numbering corresponds to the steps identified in our conceptual framework (Figure 2).

Table 1

Interface design factors and factors' levels for pilot study

Interface design factors	Factors' levels
1. The type of information provided	1 Resent diseases 2 Blood parameters 3 Genetic information
2. The way the information is provided	1 Via the Internet 2 In the pharmacy 3 In the hospital
3. The way the personal information is treated	1 Anonymously 2 You and your doctor 3 Any company/organisation interested
4. Who composes the personalised advice	1 Commercial company 2 Insurance company 3 Department of Health, Education and Welfare
5. Specificity of the personalised advice	1 Broad product category 2 Subcategory/product 3 Brand specific
6. How personalised advice is received	1 Via the Internet 2 In the pharmacy 3 In the hospital
7. Incorporation into daily life	1 No restrictions for consumption 2 Combine with regular meals 3 Strict schedule
8. Information feedback about improvements	1 No feedback 2 Optional feedback 3 Obligatory feedback

3.1.2. Methodology

Given the sheer size of the rating task, 3 levels for each of 8 interface design factors (to be rated on 8 (ease of use to security, including attitude) TAM consumer evaluation constructs identified in the extended TAM model (Figure 3), every respondent only evaluates a subset of the interface design factors. Every respondent evaluated three interface design factors at each of its three levels on four TAM consumer evaluation constructs plus attitude toward using an interface with that design factor level. Selection of the interface design factors and the TAM consumer evaluation constructs was done at random. Data were collected through paper-and-pencil task.

First, the respondent was given a short introduction as background on the personalised health interfaces: “Imagine the existence of an interactive informational system, which works with functional food products. Users make their personal information available for this System. To do that they answer the questions or make some health tests or something like that. Based on the information the system provides each customer with personal recommendations about nutrition and especially about functional products.”

Then the respondent was given an introduction about one specific interface design factor to probe for perception of its level on the TAM constructs. For example, about feedback about health improvement:

“You follow recommendations of the Interface. After that the Interface can test if your situation has changed and give you a feedback on that. For instance, whether a level of your cholesterol decreased. Various kinds of feedback are possible. The interface can give you no feedback at all. So you have no information about an effect of advice on your health. Feedback can be optional in which it is up to you to ask for a test. Or feedback can be obligatory. You have to make tests and you get informed about results.”

Finally, then the respondent was presented with questions about each specific interface design level: “If I receive **no feedback** on my situation from the Interface, it would...” after which the respondent would rate the semantic differential scales of four of the TAM constructs (see Appendix 2). The same task was then repeated for the other two levels of this particular interface design factor: “If I can get an **optional feedback** on my situation from the Interface,

it would...”, and “If I can get an **obligatory feedback** on my situation from the Interface, it would...”. For every level of each interface design factor, respondents then also rated their attitude on the four-item attitude scale. A full example of the questionnaire can be found in Appendix 2.

3.1.3. Respondents

Respondents were 108 undergraduate and postgraduate students of Wageningen University. They were invited to participate in this quantitative pilot survey as part of marketing course assignments. Each respondent received a small reward after performing the task.

3.1.4. Measures

All measures were collected on 9 point semantic differential scales. Appendix 1 provides an overview of the existing scales for these TAM consumer evaluation constructs from which we drew. Table 2 provides an overview of all the measures.

Table 2

Measures of tam consumer evaluation constructs used in pilot study

<i>Ease of use (6 items)</i>	
1. difficult to understand what is going on in the Interface	- simple to understand what is go on in the Interface
2. very few mechanical operations	- too many mechanical operations
3. easy to learn what to do	- difficult to learn what to do
4. simple to use the Interface for my needs	- complex to use the Interface for my needs
5. ease to get what I want	- difficult to get what I want
6. easy to remember what to	- difficult to remember what to do
<i>Usefulness (7 items)</i>	
1. be useless for my shopping	- be useful for my shopping
2. be useless for my food consumption	- be useful for my shopping
3. be of no influence on my shopping	- be critical for my shopping
4. simplify my shopping	- complicate my shopping *
5. slow my shopping	- speed my shopping up *
6. disturb my shopping	- improve my shopping
7. disturb my food consumption	- improve my food consumption

Compatibility (5 items)

- | | |
|---|--|
| 1. not in my style | - very in my style |
| 2. incompatible with the way I decide my purchases | - compatible with the way I decide my purchases |
| 3. not fitting the way I like to choose goods and do shopping | - fitting the way I like to choose goods and do shopping |
| 4. unusual information exchange | - usual information exchange |
| 5. incompatible with my shopping | compatible with my shopping |
-

Behavioural control (3 items)

- | | |
|--|---|
| 1. no ability to use the Interface for info seeking and shopping for info seeking and shopping | - complete ability to use the Interface for info seeking and shopping for info seeking and shopping |
| 2. no control over using the Interface | - entire control over using the Interface |
| 3. no knowledge to make use of the Interface | - complete knowledge to make use of the Interface of the Interface |
-

Accessibility (4 items)

- | | |
|--|--|
| 1. easy to make a contact with interface | - difficult to make a contact with interface |
| 2. short to wait each time I want to contact the Interface each time I want to contact the Interface | - long to wait each time I want to contact the Interface each time I want to contact the Interface |
| 3. few possibilities for me many possibilities for me to make use of the Interface | - many possibilities for me to make use of the Interface to make use of the Interface |
| 4. easy to find access to the Interface | - difficult to find access to the Interface |
-

Security (3 items)

- | | |
|--|--|
| 1. insecure about giving up my personal info | - secure to giving up my personal info |
| 2. insecure about giving up my health info | - secure to giving up my health info |
| 3. that the Interface is unsafe for info | - that the Interface is safe for info |
-

Fun (4 items)

- | | |
|------------------|----------------|
| 1. boring | - interesting |
| 2. dull | - entertaining |
| 3. not fun | - fun |
| 4. not enjoyable | - enjoyable |
-

Attitude towards the interface (5 items)

- | | |
|-----------------|--------------|
| 1. foolish | - wise |
| 2. unpleasant | - pleasant |
| 3. bad | - good |
| 4. unattractive | - attractive |
| 5. not my will | - my will |
-

* - item was excluded from scales based on scale analysis

In addition we included seven items for measuring consumer's health concern. These items were evaluated on 9 point Likert scales with end poles labelled agree to disagree: (1) I am very concerned about my health, (2) It is important to pay constant attention to my health, (3) My health conditions are fine, (4) My health conditions are lower than average, (5) My health conditions are better than average, (6) I do not think, that I need a special health care, (7) Balanced nutrition is essential for health.

3.1.5. Data analysis

Scale performance was assessed through exploratory factor analysis and reliability analysis (Cronbach's alpha) and the scales were purified on the basis of item-to-total correlations. Convergent and discriminant validity of the scales was assessed from correlational analysis between the TAM consumer evaluation constructs. Predictive validity was assessed from the correlations between the TAM consumer evaluation constructs and attitude toward using the interface. Sensitivity analysis was conducted through one way analysis of variance with SNK post-hoc tests for each of the TAM consumer evaluation constructs across the three levels of each interface design factor.

3.2. Qualitative pilot

This second pilot, qualitative in nature was designed to explore in a more in-depth and exploratory way how consumers interpret and understand the interface design factors included in this study. Also within this pilot study, consumers were probed for a number of situational scenarios considered for inclusion in the design of the main study. This pilot study was conducted as an open interview with respondents while provided with the questionnaire. Respondents were probed for open spontaneous responses as well as more specific targeted interview questions.

4. RESULTS

4.1. Scale performance for TAM consumer evaluation constructs

Based on the results from reliability analysis (see Table 3), our analyses confirm that most of these scales (drawn from the literature) show good to very good performance. The measures for usefulness and accessibility, require slight modification. Based on low item-to-total correlations two items were excluded from the original usefulness scale and one item from the accessibility scale (marked with asterix in Table 2).

Table 3

Reliability measures for consumer evaluation constructs for pilot study

Tam consumer evaluation constructs	Original # items	Alpha	Refined # items	Final alpha
Ease of use (neg)	6	0.871	6	0.871
Usefulness	7	0.808	5	0.885
Compatibility	5	0.934	5	0.934
Beh. control	3	0.914	3	0.914
Accessibility	4	0.741	3	0.780
Security	3	0.939	3	0.939
Fun	4	0.930	4	0.930
Attitude	5	0.951	5	0.951

In conclusion, these results justify the use of the construct measures in the main study.

4.2. Convergent and discriminant validity

Based on bivariate Pearson correlations between the construct measures, an exploratory assessment of convergent and discriminant validity among the TAM consumer evaluation constructs was made. Table 4 shows the results of this analysis. Strongest correlations are observed between the original consumer evaluation constructs of the TAM model, specifically

between ease of use and usefulness ($r=0.65$) and ease of use and fun ($r=0.51$). Also behavioural control ($r=0.46$) and perceived security ($r=0.41$) correlate substantially with ease of use.

Overall, our results show that the additional TAM consumer evaluation constructs of compatibility, behavioural control, accessibility, and security have sufficient discriminant validity among themselves to hold potential to improve the predictive validity of the model. However, some of our additional TAM consumer evaluation constructs seem more strongly related to the original TAM consumer evaluation constructs, particularly behavioural control (related to both ease of use and fun) and security (related to ease of use).

Table 4

Convergent and discriminant validity (expressed in Pearson bivariate correlations with significance levels in parentheses) on TAM construct measures from pilot study

	Ease of use	Usefulness	Fun	Compatibility	Behavioural control	Accessibility	Security
Ease of use	1	-0.648 (0.001)	-0.514 (0.010)	0.233 (0.274)	-0.455 (0.025)	0.249 (0.241)	-0.408 (0.048)
Usefulness		1	0.267 (0.207)	0.211 (0.322)	0.116 (0.588)	-0.198 (0.354)	0.225 (0.290)
Fun			1	0.057 (0.792)	0.457 (0.025)	-0.225 (0.290)	0.364 (0.080)
Compatibility				1	0.064 (0.766)	-0.097 (0.654)	0.085 (0.693)
Behavioural control					1	0.008 (0.970)	0.316 (0.132)
Accessibility						1	0.089 (0.681)
Security							1

4.3 Predictive validity

We assessed predictive validity of the consumer evaluation TAM constructs as their contribution to explaining consumer attitude toward the personalised health interface. For this

purpose we estimated bivariate correlations between the TAM consumer evaluation constructs and attitude (Table 5). In addition, we estimated two regression equations. The first regression equation regresses attitude on the original TAM consumer evaluation constructs (ease of use, usefulness and fun) and the second regression analysis included the additional consumer evaluation as explanatory variables (Table 6).

Table 5

Predictive validity measures for pilot study: bivariate Pearson correlations with attitude.

Tam consumer evaluation constructs	Correlation	Significance
Ease of use	-0.548**	0.006
Usefulness	0.527**	0.005
Fun	0.602**	0.002
Compatibility	0.444*	0.030
Behavioural control	0.602**	0.002
Accessibility	0.220*	0.012
Security	0.527**	0.005

* p < 0.005; ** p<0.001

Table 6

Key parameter estimates (standardised regression coefficients) for original and extended TAM model for pilot study

Construct	Original model		Extended model	
	Coefficient	Prob.	Coefficient	Prob.
Ease of use	-0.126	0.504	0.042	0.656
Usefulness	0.461	0.013	0.274	0.006
Fun	0.508	0.002	0.360	0.002
Compatibility			0.350	0.000
Behavioural control			0.112	0.172
Accessibility			-0.148	0.136
Security			0.317	0.001
Adjusted R-sqr	0.63		0.92	

The results show that, with the exception of accessibility, the additional TAM consumer evaluation constructs strongly correlate with attitude in the same range as the original TAM consumer evaluation constructs (0.50-0.60). The regression analyses further show that the extension of TAM with addition constructs significantly ($F=53.36$; $p<0.01$) improve the predictive validity of the model for attitude and that this improvement is primarily due to the extended-TAM constructs of compatibility ($\beta = 0.350$) and perceived security ($\beta=0.317$). Contrary to expectation, both in the original and extended TAM model consumer perceptions of ease of use (reversed scale where low scores mean high ease of use) do not significantly contribute to the explanation of attitude. Given the high bivariate correlation of ease of use with attitude ($r=-0.548$) reported in Table 5, this is due to multi-collinearity of ease of use with the other TAM constructs.

Overall, these results on predictive validity build support for the inclusion of the additional consumer evaluation constructs in the main study. This will allow us to more formally test the appropriateness of a more extended TAM model for consumer evaluation of personalised health interfaces.

4.4. Sensitivity analysis for the interface design factor levels

An important goal of the pilot study is also to assess the sensitivity of the TAM consumer evaluation constructs for the different levels within the interface design factors. In other words are the consumer evaluation constructs sensitive enough to meaningfully differentiate between the different ways in which consumer may provide personal information to the personalised health interface (genetic information, blood parameters, recent diseases). To assess this sensitivity, we conducted one way analysis of variance for each interface design factor (with three levels) and consumer evaluation construct separately. This allows us to assess whether the mean ratings on the TAM consumer evaluation constructs differ for the levels of the interfaces design factor. Through post hoc tests (SNK in this case), we are able to check whether these differences are statistically significant. However, given that this is a relatively small scale pilot study and the design is huge, the power of these tests is low. As we only have 7 to 15 observations per cel, the significance levels are taken as an indication only. The exception is the attitude construct which was assessed for every set of interface design factor levels ($N=58$ to 71).

Tables 7-14 show the average consumer perceptions on the levels of each of the design factors, with differences between feature levels tested through Student Newman Keuls tests.

Table 7

Means on TAM consumer evaluation constructs for interface design factor “The type of information provided”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
Resent disease	-0.33	0.31	0.15	-0.07	0.00	-0.14	-0.03	0.23
Blood parameters	0.31	0.08	0.18	0.07	-0.16	0.27	0.02	0.06
Genetic info	0.38	0.06	0.68	-0.11	-0.29	0.07	-0.44	-0.12
N	10	12	8	15	7	10	9	62-71
F-value	1.415	0.093	0.904	0.199	0.222	0.400	0.703	2.308
Sign.	0.292	0.912	0.420	0.820	0.803	0.674	0.505	0.103

Table 8

Means on tam consumer evaluation constructs for interface design factor “The way the information is provided”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
Via the Internet	0.24	0.07	0.12	-0.81	0.40	-1.02 ^a	-0.56 ^a	-0.14 ^a
In the pharmacy	0.28	0.05	0.00	-0.06	0.16	0.75 ^b	0.39 ^{ab}	0.26 ^b
In the hospital	0.17	0.26	-0.23	0.10	-0.03	0.98 ^b	1.27 ^b	0.29 ^b
N	10	10	9	9	7	10	10	64-65
F-value	0.036	0.079	0.519	2.429	0.641	7.556	7.420	3.814
Sign.	0.965	0.924	0.601	0.110	0.538	0.005	0.006	0.024

Table 9

Means on tam consumer evaluation constructs for interface design factor “The way personal information is treated”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
Anonymously	0.58 ^b	-0.25 ^{ab}	0.62 ^b	0.52 ^b	-0.39	-0.69	0.34	0.54 ^b
You and your doctor	-0.82 ^a	0.41 ^b	-0.13 ^a	0.40 ^b	-0.05	-0.47	0.32	0.63 ^b
Any company	1.38 ^b	-0.96 ^a	-0.65 ^a	-1.27 ^a	-0.44	0.44	-1.67	-1.53 ^a
N	11	10	9	9	12	9	11	67-69
F-value	14.01	4.649	7.086	15.608	0.090	2.766	12.187	113.954
Sign.	0.000	0.018	0.005	0.000	0.915	0.095	0.001	0.000

Table 10

Means on tam consumer evaluation constructs for interface design factor “Who composes the personal advice”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
Commercial company	-0.37	0.42	0.12	0.07	-0.78	-0.05	-0.91 ^a	-0.56 ^a
Insurance company	-0.36	-0.22	-0.41	0.66	-0.54	-0.34	-0.29 ^{ab}	-0.50 ^a
Department of HEW	0.15	0.58	0.18	0.81	0.05	-0.46	0.60 ^b	0.61 ^b
N	7	7	9	9	7	11	10	59-60
F-value	0.571	1.713	0.882	3.121	1.220	0.256	5.585	25.078
Sign.	0.575	0.208	0.427	0.074	0.319	0.778	0.009	0.000

Table 11

Means on tam consumer evaluation constructs for interface design factor “Specificity of the personalised advice”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
Product category	-0.73	0.38	0.50 ^b	-0.56	0.07	0.09	-0.14	-0.22 ^a
Product subcategory	-0.13	0.40	-0.33 ^a	0.17	0.54	-0.07	0.30	0.37 ^b
Brand specific	-0.21	-0.25	0.45 ^a	-0.33	-0.19	-0.34	0.15	-0.14 ^a
N	11	7	7	11	8	7	9	58-60
F-value	0.783	0.905	4.547	1.370	1.323	0.345	0.947	7.067
Sign.	0.479	0.422	0.025	0.270	0.288	0.713	0.402	0.001

Table 12

Means on tam consumer evaluation constructs for interface design factor “How personalised advice is received”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
Via Internet	-0.11	-0.34	0.64	0.77	0.03	-0.42 ^a	-0.29	0.24
In pharmacy	0.39	-0.04	-0.11	-0.58	0.26	-0.37 ^a	0.49	0.11
In the hospital	-0.42	0.29	-0.70	-0.64	0.25	0.74 ^b	0.50	0.17
N	8	10	8	10	9	10	12	66-67
F-value	1.988	0.900	2.515	1.467	0.335	4.105	2.308	0.266
Sign.	0.162	0.418	0.105	0.281	0.720	0.028	0.142	0.767

Table 13

Means on tam consumer evaluation constructs for interface design factor “Incorporation into daily life”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
No restrictions	-0.50	-0.24	0.44	0.55	-0.23	-0.44 ^a	0.24	0.05 ^{ab}
With regular meal	-0.46	-0.33	0.32	0.39	0.27	-0.45 ^a	0.72	0.32 ^b
Strict schedule	0.20	0.34	-0.68	-0.12	-0.15	0.75 ^b	0.78	-0.24 ^a
N	10	8-9	9	8	12	7	10	59-65
F-value	1.768	1.040	2.525	0.959	0.834	6.575	0.942	6.282
Sign.	0.190	0.372	0.101	0.400	0.443	0.007	0.417	0.002

Table 14

Means on tam consumer evaluation constructs for interface design factor “Information feedback about improvements”

	Ease of use	Usefulness	Fun	Compatibility	Behav. control	Accessibility	Security	Attitude
No feedback	1.11 ^b	-0.12	-1.45 ^a	0.47 ^{ab}	-0.88 ^a	0.64	-1.42 ^a	-1.18 ^a
Optional feedback	-0.48 ^a	-0.01	0.36 ^b	0.88 ^b	1.26 ^b	0.09	-0.17 ^b	0.57 ^c
Obligatory feedback	-0.43 ^a	-0.11	0.71 ^b	-0.38 ^a	0.64 ^b	0.06	0.55 ^b	0.09 ^b
N	8	9	10	10	7	10	9	63
F-value	16.57	0.037	13.691	4.129	6.797	3.946	8.718	49.46
Sign.	0.000	0.964	0.000	0.037	0.006	0.048	0.005	0.000

In conclusion, we observe substantial variation in the mean ratings of interface design factor levels on the TAM consumer evaluation constructs. With the exception of the way in which the personal nutritional advice is received (internet, pharmacy or hospital) and type of information provided (on recent diseases, blood parameters or genetic information) all factor levels differentiate on attitude. For the other TAM consumer evaluation constructs, and despite the small number of observations, we see clear patterns of differentiation. This is particularly true in terms of perceptions of accessibility and security. The way the data are

treated (anonymously, shared with your doctor and shared with companies) and the degree of feedback in the interface (no feedback, optional feedback and obligatory feedback) affect almost all TAM consumer evaluation constructs significantly.

As an overall conclusion, the results confirm that the scales are generally sensitive enough to differentiate between the levels of the interface design factors that we distinguish in our design of personalised health interfaces.

4.5 Consumer understanding of the interface design factors

The second part of the pilot study was a small-scale qualitative analysis. This pilot study was conducted to test multiple aspects, including consumer perception and comprehension of the interface design factors as well as possible interactions between these interface design factors and situational scenarios. For this qualitative pre-test a convenience sample of eleven people was used. The sample consisted mainly of employees of the University of Maastricht. Respondents were provided with the questionnaire and asked to indicate if the descriptions of the interface design factors as well as the levels are understandable. Respondents were also asked to indicate if they could imagine being in the identified situations and if they saw interaction effects between the situations and the given interface design factors.

The outcome of the interviews related to the questionnaire and the description of the interface design factors showed that not all aspects were clear to the respondents. First, it became apparent that the terminology used in the questionnaire was not always clear to respondents. Especially, the meaning of ‘functional foods’ and ‘interactive informational system’, ‘knowledge system’, ‘personal information’ was not clear to respondents. Regarding the specific interface design factors, respondents commented that it was not obvious how the provide blood via the Internet or via email. Furthermore, especially the interface design factor related to ‘Feedback’ was not comprehensible. Respondents thought that this was the first time they receive advice from the interface. Additionally, it was commented that the term ‘doctor’ is too general. A difference should be made between family doctor or a doctor working at the hospital.

Respondents were also presented with four usage situations and asked to indicate if they could imagine being in such a situation, and if they saw interaction effects between these situations and the given interface design factors. These were the four usage situations identified:

- 1.) You heard about functional foods and you would like to try it out (curiosity).
- 2.) You are at your doctor for a regular check up and your doctor recommends (advises) you might feel fitter if you try (use) functional foods.
- 3.) You are not feeling energetic (fit) and you would like to use functional foods
- 4.) Your friend has recommended functional foods.

First, the results reveal that every respondent was able to imagine being in the four situations. Second, the interviews showed that situation 1 and situation 4 are very similar in respondents' perceptions. Basically, respondents argued that in situation 1 you could have heard about functional foods from a friend as well. Additionally, the interviews indicated the occurrence of many interactions between the situation and the different interface design factors. For all interface design factors respondents indicated possible interactions (see Appendix 3). However in comparing the interactions, relatively fewer interactions were indicated for situation 1 and situation 3. However, still more respondents indicated interactions for all interface design factors than no interactions. Based on these results, it was decided to use situation 1 and situation 3 in the main study.

5. CONCLUSION AND IMPLICATIONS FROM PILOT STUDIES

5.1. Conclusion

Overall, the first quantitative pilot study has confirmed the reliability of the proposed scales to measure the TAM consumer evaluation constructs. These scales, after refinement are now ready for use in the main study.

Also, the quantitative pilot study has confirmed that the consumer evaluation measures are sufficiently sensitive in their ability to differentiate between the interface design factor levels distinguished in this study.

Further the qualitative pilot study has been instrument in the selection of the two descriptions of the situational scenarios that will be introduced in the main study as experimental variable.

However, the results from the qualitative pilot study in which we discussed the research design and questionnaire with consumer, also suggests a number of adjustments to be made in the definition of the design feature levels.

5.2. Implications

Overall the results from the pilot study and based discussions within the project team and with external experts, has resulted in the set of design features to be included in the main study that is summarized in Table 16.

Table 16

Interface design factors and factor levels for main study

Interface design factors	Factors' levels
1 The type of information provided	1 Blood composition 2 DNA/genetic makeup 3 Food consumption habits
2 The way the information is provided	1 Through fitness club 2 Through a hospital 3 Through a general practitioner
3 The way the personal information is treated	1 Fully anonymous 2 Shared with patient and general practitioner 3 Available to commercial food company
4 Who composes the personalised advice	1 Commercial food company 2 Insurance company 3 Governmental Nutritional Centre (Voedingcentrum)
5 Specificity of the personalised advice	1 Ingredient level 2 Food product groups 3 Special branded products
6 How personalised advice is received	1 Through email 2 Through fitness club 3 Through general practitioner
7 Incorporation into daily life	1 Existing meal patterns 2 Add specific products to regular meals 3 Prepare own adjusted meals
8 Information feedback about improvements	1 No feedback for verification 2 Possibility of feedback for verification 3 Obligatory feedback for verification

Also, based on the results of the pilot study we have designed the following two situational descriptions to be included in the main study.

Situation 1:

“You have heard that you can get a personalised food-advice and you would like to try it”.

Situation 2:

“You went to your doctor for your regular check-up and your doctor advised you that you could feel better if you would get a personalised food-advice”

Finally, the pilot studies have yielded a set of validated scales on TAM consumer evaluation constructs for use in the main study (please refer to section 4.1. and Table 2).

REFERENCES

1. Amit, R. and C. Zott (2001), "Value creation in e-business," *Strategic Management Journal*, 22, 493-520
2. Ariely, D. (2000), "Controlling the information flow: effects on consumers' decision making and preference," *Journal of Consumer Research* 27 (September), 233-248
3. Belk, R.W. (1975), "Situational Variables and Consumer Behavior," *Journal of Consumer Research*, 2, 157-164
4. Blake, I. and R.O. Mason (1990), "Can Information Technology Revitalize Your Customer Service?," *Academy of Management Executive* 4(4), 52-69
5. Brug, J., M. Campbell and P. Van Assema (1999), "The application and impact of computer-generated personalized nutritional education: a review of the literature", *Patient Education and Counseling*, 36, 145-156.
6. Brug, J., A. Oenema and M Campbell (2003), "Past, present and future of computer-tailored nutritional education", *American Journal of Clinical Nutrition* 77 (suppl), 1028S-1034S.
7. Chau P.Y.K. and P.J.-H. Hu (2002), "Investigating healthcare professionals' decisions to accept telemedicine technology: an empirical test of competing theories," *Information & Management*, January, vol. 39(4), 297-311
8. Chen, L, M.L. Gillenson, and D.L. Sherrell (2002), "Enticing online consumer: an extended technology acceptance perspective," *Information & Management*, 39, 705-719
9. Cheung. W., M. K. Chang and V. S. Lai (2000), "Prediction of Internet and World Wide Web usage at work: a test and an extended Triandis model," *Decision Support System* 30, 83-100

10. Childers, T.L., C.L. Carr, J. Peck and S. Carson (2001), "Hedonic and Utilitarian Motivations for Online Retail Shopping Behavior," *Journal of Retailing* 77(3), 511-535
11. Coulston, A.M., M.J. Feeney and L. Hoolihan (2003), "The challenge to customize", *Journal of the American Dietetic Association*, 103 (4), 443-444.
12. Dabholkar, P.A. and R.P. Bagozzi (2002), "An Attitudinal Model of Technology-Based Self-Service: Moderating Effects of Consumer Traits and Situational Factors, *Journal of Academy of Marketing Science*," 30 (3), 184-201
13. Davis, F.D (1989), "Perceived Usefulness, Perceived Use, and User Acceptance of Information Technology," *MIS Quarterly* 13 (3), 319-340
14. Davis, F.D., R.P. Bagozzi and P.R. Warshaw (1989), "User acceptance of computer technology: a comparison of two theoretical models," *Management Science* 35 (8), 982-1003. (2000)
15. Dholakia, R.R, M. Zhao, N. Dhlolaia, and D.R. Fortin (2000), "Interactivity and revisits to websites: a theoretical framework," *RITIM*
16. Dijkstra, A. and H. De Vries (1999), "The development of computer-generated tailored interventions", *Patient Education and Counseling*, 36, 193-203.
17. Helander, M.G. and H.M. Khalid (2000), "Modelling the customer in electronic commerce," *Applied Ergonomics* 31, 609-619
18. Hennig-Thurau, T., K.P. Gwinner and D.D. Gremler (2002), "Understanding Relationship Marketing Outcomes: An Integration of Relational Benefits and Relationship Quality," *Journal of Service Research* 4(3), 230-247
19. Hoffman, D.L. and T.P. Novak (1996), "Marketing in hypermedia computer-mediated environments: conceptual foundations," *Journal of Marketing* 60 (July), 50-68
20. Hoffman D.L., T.P. Novak and M. Peralta (1999), "Building consumer trust online," *Communications of the ACM* 42(4), 80-85

21. Karahanna. E. and D. W. Straub (1998), "The psychological origins of perceived usefulness and ease-of-use. *Information and Management* 35, 237-250
22. Kreuter, M., D. Farrell, L. Olevitch and L. Brennan (2000), "Tailoring health messages: customizing communication with computer technology. Mahwah (NJ): Lawrence Erlbaum.
23. Lin J. C.-C. and H. Lu (2002) "Predicting customer behavior in the market-space: a study of Rayport and Sviokla's framework", *Information & Management*, October, 40, (1), 1-10
24. Luo, X. (2002), "Trust production and privacy concerns on the Internet: A framework based on relationship marketing and social exchange theory," *Industrial Marketing Management* 31, 111-118
25. Meuter, M.L., A.L. Ostrom, R.I. Roundtree, and M.J. Bitner (2000). "Self-service technologies: understanding customer satisfaction with technology-based service encounters," *Journal of Marketing* 64, 50-64
26. Moon, Y. (2000), "Intimate exchanges: using computers to elicit self-disclosure from consumers," *Journal of Consumer Research* 26 (March), 323-339
27. Moon, J.-W. and Y.-G. Kim (2001). "Extending the TAM for a World-Wide-Web context," *Information and Management* 38 217-230
28. Morgan, R.M. and S.D. Hunt (1994), "The Commitment-Trust Theory of Relationship Marketing," *Journal of Marketing* 58 (July), 2-38
29. Mueller, M and S. Kersten (2003), "Nutrigenomics: goals and strategies," *Nature Reviews Genetics*, 4 (april), 315-322
30. O'Cass, A. and T. Fenech (2003), "Web Retailing Adoption: Exploring the Nature of Internet Users Web Retailing Behavior," *Journal of Retailing and Consumer Services*, March, 10(2), 81-95
31. Oenema, A., J. Brug and L. Lechner (2001), Web-based computer-tailored nutrition education: results of a randomised-controlled trial. *Health Education Research*, 16, 647-660.

32. Pine II, B.J. and J.H. Gilmore (1999), *The Experience Economy: work is theatre and every business a stage*. Boston, Ma: Harvard Business School Press
33. Plouffe, C.R., M. Vandenbosch and J. Hulland (2001) "Intermediating technologies and multi-group adoption: A comparison of consumer and merchant adoption intention toward a new electronic payment system," *Product Innovation Management* 18, 65-81
34. Shih, E. C. Fong (1998), "Conceptualizing consumer experiences in cyberspace," *European Journal of Marketing* 32(7/8), 655-663
35. Suh, B. and I. Han (2002), "Effect of trust on customer acceptance of the Internet banking," *Electronic Commerce Research and Applications, Electronic Commerce Research and Applications, Autumn-Winter, 1*, 247-263
36. Tafarodi, RW, S. Mehranvar, R.L. Panton and A.B. Milne (2002), "Putting oneself in the task: choice, personalization and confidence," *Personality and Social Psychology Bulletin* 28(5), 648-658
37. Van der Heijden, H. (2002), "Factors influencing the Usage of Websites: the Case of a Generic Portal in The Netherlands," *Information and Management* 2014, 1-9
38. Van Trijp, JCM (2000), personal communication.
39. Venkatesh, V. and F.D. Davis (2000), "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science* 46, 186-204.
40. Willett, W.C. (2002), *Balancing life-style and genomics research for disease prevention*. *Science*, 296, 695-698.
41. Wind, J and A. Rangaswamy (2000), "Customerization: the next revolution in mass customization," MSI working paper # 00-108. Cambridge, Ma: Marketing Science Institute
42. Wolfinbarger, M. and M.C. Gilly (2001), "Shopping online for freedom, control and fun," *California Management Review* 43 (2), 34-55

43. Wolfinbarger, M. and M.C. Gilly (2002), “.comQ: dimensionalizing, measuring and predicting quality of the e-tail experience,” MSI working paper #02-100. Cambridge, Ma: Marketing Science Institute

44. Zeithaml, VA, A. Parasuraman and A. Malhotra (2000), “A conceptual framework for understanding e-service quality: implications for future research and managerial practice,” MSI working paper # 00-115. Cambridge, Ma: Marketing Science Institute

APPENDICES

- 1. Operationalisations of TAM constructs found in the literature**
- 2. Questionnaire used in the quantitative pilot study**
- 3. Detailed results from the qualitative pilot study**

Appendix 1: Operationalisations of TAM constructs found in the literature

Ease of use

P.Y.K. Chau and P.J.-H. Nu, 2000:

Learning to operate telemedicine technology would not be easy for me
I would find it easy to get telemedicine technology to do what I need it to do in my patient care and management
It is not easy for me to become skilful in using telemedicine technology
I find telemedicine technology easy to use

C.R. Plouffe et al, 2000:

Learning to use the Exact card was easy for me
I find it easy to get the Exact card to do what I want it to do
Using an Exact card is easy and understandable
I find the Exact card easy to use

G. Lowry, 2002:

I believe that it is easy to get the Building Management System (BMS) to do what I want it to do
Overall, I believe that the BMS is easy to use
Learning to operate the BMS is easy for me

A. O’Cass and T. Fenech, 2002:

I find shopping on the World Wide Web easy to do
Web for personal shopping is foolish – wise
Web for personal shopping is unpleasant – pleasant

L.-d. Chen et al, 2002:

My interaction with (name of virtual store) is clear and understandable
I find (name of virtual store) to be flexible to interact with
It is easy for me to become skilful at using (name of virtual store)
I find (name of virtual store) easy to use

H. van der Hijden, 2002:

It is easy to navigate around the site. (Wholly disagree/wholly agree)
I can quickly find the information that I need. (Wholly disagree/wholly agree)
I think it is a user-friendly site. (Wholly disagree/wholly agree)

T.L. Childers et al, 2001:

Technology assisted shopping (TAS) would be clear and understandable
TAS would not require a lot of mental effort
TAS would be easy to use

B. Suh, and I Han, 2002:

It is easy for me to learn hoe to utilise this Internet banking site
I find it easy to get this Internet banking site to do what I what it to do
It is easy to remember how to use this Internet banking site
My interaction with this Internet banking site is clear and understandable
I find this Internet banking site easy to use

J.-W. Moon, Kim, 2001:

It will be impossible to use WWW without expert help
Learning to operate WWW is easy for me
It is difficult to learn how to use WWW
I find it easy to get WWW to do what I want it to do

It takes too long a time to learn to use WWW
It is easy to remember how to use WWW
Using WWW requires a lot of mental effort
My interaction with WWW is clear and understandable
It is easy for me to become skilful at using WWW

W. Cheung et al (2000):

They used a concept of 'complexity', which is opposite to 'ease of use'. They measured it with items:

Working with the Internet/WWW is complicated, it is difficult to understand what is going on
Using the Internet/WWW involves too much time doing mechanical operations (i.e, data input)
It takes too long to learn how to use the Internet/WWW to make in worth the effort
In general, the Internet/WWW is very complex to use

Usefulness

P.Y.K. Chau and P.J.-H. Nu, 2000:

Using telemedicine technology cannot improve my patient care and management
Using telemedicine technology cannot enhance my effectiveness in patient care and management
Using telemedicine technology can make my patient care and management easier
I would find telemedicine technology not useful for my patient care and management

A. O'Cass and T. Fenech, 2002:

Using the World Wide Web enables me shop more efficiently
Using the World Wide Web makes it easier to do my shopping
I find the World Wide Web useful for my shopping

L.-d. Chen et al, 2002:

Using (name of the virtual store) would improve my performance in shopping or information seeking (e.g. save time or money)
Using (name of the virtual store) would increase my productivity in shopping or information seeking (e.g. make purchase decision or find product information within the shortest time frame)
Using (name of the virtual store) would enhance my effectiveness in shopping or information seeking (e.g. get the best deal or find the most information about a product)
Using (name of the virtual store) would make it easier for me to shop or find information
I find (name of the virtual store) very useful in my shopping or information seeking

H. van der Hijden, 2002:

I find this portal overall a useful site. (Wholly disagree/wholly agree)
The Information on the site is interesting for me. (Wholly disagree/wholly agree)
I find this is a site that adds value. (Wholly disagree/wholly agree)

Plouffe et al, 2001:

Using an exact card improves the quality of my transactions with merchant
Using the Exact card system gives me greater control over my purchasing transactions
Using an Exact card enables me to make purchases more quickly
Using an Exact card enhances my effectiveness in making purchases
Using an Exact card makes shopping easier for me

G. Lowry, 2002:

Using a BMS enables me to accomplish tasks more quickly
Using a BMS improves the quality of the work I do
Using a BMS makes it easier to do my job
Using a BMS enhances my effectiveness on the job
Using a BMS gives me greater control over my work

T.L. Childers et al, 2001:

Technology assisted shopping (TAS) would improve my shopping productivity
TAS would enhance my effectiveness in shopping
TAS would improve my shopping ability

B. Suh, and I Han, 2002:

Using this Internet banking site enhances the productivity of my banking activities
Using this Internet banking site has a critical role in supporting my banking activities
Using this Internet banking site makes it easier to do my banking activities
Using this Internet banking site enables me to accomplish banking activities more quickly
Using this Internet banking site improves my performance of banking activities
I find this Internet banking site useful for my banking activities

A. Bhattacharjee, 2001:

Using my online brokerage (OLB) helps me improve my performance in managing personal investments
I think that my OLB use improves my productivity in managing personal investments
In my opinion, using my OLB increases my effectiveness in managing personal investments
I find my OLB useful in managing personal investments

J.-W. Moon, Y.-G. Kim, 2001:

Using the WWW improves my task quality
Using the WWW improves the performance of my tasks
Using the WWW supports the critical part of my tasks
Using the WWW enables me to have more accurate information
Using the WWW enables me to access a lot of information
Using the WWW enables me to access the newest information
Using the WWW enables me to acquire high quality information

Compatibility

G. Lowry, 2002:

Using the BMS is compatible with all aspects of work
I think using a BMS fits well with the way I like to work
Using a BMS fits into my work style

Plouffe et al, 2000:

Using an Exact card is compatible with all the ways I like to pay for purchases
I think that using an Exact fits well with the way I like to pay for goods and services
Using an Exact card fits with my style as a consumer

L.-d. Chen et al, 2002:

Using (mane of the virtual store) fits my lifestyle
Using (mane of the virtual store) fits well with the way I like to shop or seek product information

A. O’Cass and T. Fenech, 2002:

Web for purchases compatible with all my shopping
Web for purchases fit well with way I shop
Web for purchases fits into my shopping style

Behavioural control

P.Y.K. Chau and P.J.-H. Nu, 2000:

I would have the ability to use telemedicine technology in my patient care and management
Using telemedicine technology would be entirely within my control
I would not have knowledge to make use of telemedicine technology in my patient care and management

Accessibility

J. Chuan-Chuan Lin, H.Lu, 2000:

- It is easy for me to find a computer to link to the Web
- I don't have to wait on line to use computer
- There are enough computers for me to use to browse the Web

Security

A. O'Cass and T. Fenech, 2002

- I feel secure sending personal/financial info across web
- I feel safe providing personal/financial info about me to Web retailers
- Web is safe environment to provide personal/financial info

Fun

P.A. Dabholkar and R.P. Bagozzi, 2002:

- Using a touch screen for self-service...
- Will not be interesting
- Will be entertaining
- Will not be fun
- Will be enjoyable

L.-d. Chen et al (2002) and H. van der Heijden (2002) used concept close to fun – enjoyment.

L.-d. Chen et al, 2002:

- Shopping with TAS would be fun for its own sake
- Shopping with TAS would make me feel good
- Shopping with TAS would be boring
- Shopping with TAS would involve me in the shopping process
- Shopping with TAS would be exciting
- Shopping with TAS would be enjoyable
- Shopping with TAS would be uncomfortable
- Shopping with TAS would be interesting

H. van der Heijden, 2002:

- I find this portal overall an entertaining site. (Wholly disagree/wholly agree)
- I browse the site for pleasure. (Wholly disagree/wholly agree)
- Browsing this portal is an agreeable way of passing time. (Wholly disagree/wholly agree)

Attitude towards using the Interface

J.-W. Moon and Kim, 2001:

- Using WWW is a (good /bad) idea
- Using WWW is a (wise/foolish) idea
- Using WWW is a (pleasant/unpleasant) idea
- Using WWW is a (positive/negative) idea

L.-d. Chen et al, 2002:

- Using (name of the virtual store) is convenient
- Using (name of the virtual store) saves me time
- The fact that I cannot see actual products makes me think twice about using (name of the virtual store)
- Using (name of virtual store) is not secured (insecurity of financial transactions)

P.Y.K. Chau and P.J.-H. Nu, 2000:

- Using telemedicine technology in patient care and management is a good idea
- Using telemedicine technology in patient care and management is unpleasant
- Using telemedicine technology is beneficial to my patient care and management

T.L. Childers et al, 2001:

Bad/Good
Inferior/Superior
Unpleasant/Pleasant
Poor/Excellent

H. van der Hijden, 2002:

I have a positive attitude towards this portal
I intend to visit the portal frequently
How often do you visit the portal (Hardly or never/very often)

B. Suh, and I Han, 2002:

Using this Internet banking site is a good idea
Using this Internet banking site is a wise idea
Using this Internet banking site is a pleasant idea
Using this Internet banking site is a positive idea
Using this Internet banking site is an appealing idea

W.Cheung et al, 2000:

Enjoyable/Disgusting
Dull/Exciting
Pleasant/Unpleasant
Interesting/Boring

A. O’Cass and T. Fenech, 2002:

Web for personal shopping is bad – good
Web for personal shopping is foolish – wise
Web for personal shopping is unattractive – attractive
Web for personal shopping is unpleasant – pleasant

Appendix 2: Questionnaire used in the quantitative pilot study

Name.....

Date

Time

A. Your concern about your health

	Disagree						Agree
1. I am very concerned about my health	1	2	3	4	5	6	7
2. It is important to pay a constant attention to the health	1	2	3	4	5	6	7
3. My health conditions are fine	1	2	3	4	5	6	7
4. My health conditions are lower then average	1	2	3	4	5	6	7
5. My health conditions are better then average	1	2	3	4	5	6	7
6. I do not think, than I need a special health care	1	2	3	4	5	6	7
7. Balanced nutrition is essential for a health	1	2	3	4	5	6	7

B. Imagine the existence of an interactive informational system, which works with functional food products. Users make their personal information available for this System. To do that they answer the questions or make some health tests or something like that. Based on the information the system provides each customer with personal recommendations about nutrition and especially about functional products.

Question 1 “Feedback”

You follow recommendations of the Interface. After that the Interface can test if your situation has changed and give you a feedback on that. For instance, whether a level of your cholesterol decreased. Various kinds of feedback are possible. Interface can give you **no feedback** at all. So you have no information about an effect of advice on your health. Feedback can be **optional**. It is up to you to ask for a test. Feedback can be **obligatory**. You have to make tests and you get informed about results

->If I receive **no feedback** on my situation from the Interface, it would

be useless for my shopping

1 2 3 4 5 6 7 8 9

be useful for my shopping

be useless for my food consumption

1 2 3 4 5 6 7 8 9

be useful my food consumption

be of no influence on my shopping

1 2 3 4 5 6 7 8 9

be critical for my shopping

simplify my shopping

1 2 3 4 5 6 7 8 9

complicate my shopping

slow my shopping

1 2 3 4 5 6 7 8 9

speed my shopping up

disturb my shopping

1 2 3 4 5 6 7 8 9

improve my shopping

disturb my food consumption

1 2 3 4 5 6 7 8 9

improve my food consumption

->Using the Interface **without feedback** about my situation (other parameters are equal)

would be

foolish 1 2 3 4 5 6 7 8 9 wise

unpleasant 1 2 3 4 5 6 7 8 9 pleasant

bad 1 2 3 4 5 6 7 8 9 good

unattractive 1 2 3 4 5 6 7 8 9 attractive

unattractive 1 2 3 4 5 6 7 8 9 attractive

not my will 1 2 3 4 5 6 7 8 9 my will

->If I get an **obligatory feedback** on my situation from the Interface, it would

be useless for my shopping 1 2 3 4 5 6 7 8 9 be useful for my shopping

be useless for my food consumption 1 2 3 4 5 6 7 8 9 be useful my food consumption

be of no influence on my shopping 1 2 3 4 5 6 7 8 9 be critical for my shopping

simplify my shopping 1 2 3 4 5 6 7 8 9 complicate my shopping

slow my shopping 1 2 3 4 5 6 7 8 9 speed my shopping up

disturb my shopping 1 2 3 4 5 6 7 8 9 improve my shopping

disturb my food consumption 1 2 3 4 5 6 7 8 9 improve my food consumption

->Using the Interface with **obligatory feedback** about my situation (other parameters are equal) would be

foolish 1 2 3 4 5 6 7 8 9 wise

unpleasant 1 2 3 4 5 6 7 8 9 pleasant

bad	1	2	3	4	5	6	7	8	9	good
unattractive	1	2	3	4	5	6	7	8	9	attractive
not my will	1	2	3	4	5	6	7	8	9	my will

Question 2 “Giving the information”

The Interactive Interface can be developed in various formats. You are presented with 3 formats. For instance in can be a **hospital** you visit to make tests. It can be a common **pharmacy**, where you come with your complains and provide your personal information. Or you can deliver your personal data via the **Internet**.

-> If you have to provide your personal info via the **Internet**, it would be

boring	1	2	3	4	5	6	7	8	9	interesting
dull	1	2	3	4	5	6	7	8	9	entertaining
not fun	1	2	3	4	5	6	7	8	9	fun
not enjoyable	1	2	3	4	5	6	7	8	9	enjoyable

->Using the Interface where you can provide your personal info via the **Internet** (other parameters are equal) would be

foolish	1	2	3	4	5	6	7	8	9	wise
unpleasant	1	2	3	4	5	6	7	8	9	pleasant
bad	1	2	3	4	5	6	7	8	9	good

unattractive 1 2 3 4 5 6 7 8 9 attractive

not my will 1 2 3 4 5 6 7 8 9 my will

->If you have to provide your personal info in the **pharmacy**, it would be

boring 1 2 3 4 5 6 7 8 9 interesting

dull 1 2 3 4 5 6 7 8 9 entertaining

not fun 1 2 3 4 5 6 7 8 9 fun

not enjoyable 1 2 3 4 5 6 7 8 9 enjoyable

->Using the Interface where you can provide your personal info in the **pharmacy** (other parameters are equal) would be

foolish 1 2 3 4 5 6 7 8 9 wise

unpleasant 1 2 3 4 5 6 7 8 9 pleasant

bad 1 2 3 4 5 6 7 8 9 good

unattractive 1 2 3 4 5 6 7 8 9 attractive

not my will 1 2 3 4 5 6 7 8 9 my will

-> If you have provide my personal info from in the **hospital**, it would be

boring 1 2 3 4 5 6 7 8 9 interesting

dull 1 2 3 4 5 6 7 8 9 entertaining

incompatible with the way I decide my purchases

1 2 3 4 5 6 7 8 9

compatible with the way I decide my purchases

not fitting the way I like to choose goods and do shopping

1 2 3 4 5 6 7 8 9

fitting the way I like to choose goods and do shopping

unusual information exchange

1 2 3 4 5 6 7 8 9

usual information exchange

incompatible with my shopping

1 2 3 4 5 6 7 8 9

compatible with my shopping

Using the Interface with advices based on the **disease** information (other parameters are equal) would be

foolish 1 2 3 4 5 6 7 8 9 wise

unpleasant 1 2 3 4 5 6 7 8 9 pleasant

good 1 2 3 4 5 6 7 8 9 bad

unattractive 1 2 3 4 5 6 7 8 9 attractive

not my will 1 2 3 4 5 6 7 8 9 my will

-> If I gave to the Interface my **blood parameters** and based on that the Interface gave me an advice, it would be

not in my style

1 2 3 4 5 6 7 8 9

very in my style

incompatible with the way I decide my purchases

1 2 3 4 5 6 7 8 9

compatible with the way I decide my purchases

not fitting the way I like to choose goods and do shopping

1 2 3 4 5 6 7 8 9

fitting the way I like to choose goods and do shopping

unusual information exchange

1 2 3 4 5 6 7 8 9

usual information exchange

incompatible with my shopping

1 2 3 4 5 6 7 8 9

compatible with my shopping

->Using the Interface with the advices based on the **genetic information** (other parameters are equal), it would be

foolish 1 2 3 4 5 6 7 8 9 wise

unpleasant 1 2 3 4 5 6 7 8 9 pleasant

good 1 2 3 4 5 6 7 8 9 bad

unattractive 1 2 3 4 5 6 7 8 9 attractive

not my will 1 2 3 4 5 6 7 8 9 my will

Question 4 "Receiving the advice"

The Interactive Interface can be developed in various formats. You are presented with three formats. For instance in can be a **hospital** you visit to ask for advice and prescription. It can be a common **pharmacy**, where you come for advice and solution of your problem. Or you can receive your personal advice via the **Internet**.

-> If I could get my personal advice from the Interface via the **Internet** I would have

no ability to use the Interface for info seeking and shopping												complete ability to use the Interface for info seeking and shopping
--	--	--	--	--	--	--	--	--	--	--	--	--

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

no control over using the Interface												entire control over using the Interface
-------------------------------------	--	--	--	--	--	--	--	--	--	--	--	---

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

no knowledge to make use of the Interface												complete knowledge to make use of the Interface
--	--	--	--	--	--	--	--	--	--	--	--	--

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

->Using the Interface where you can get your personal advice from the Interface via the **Internet** (other parameters are equal) would be

foolish	1	2	3	4	5	6	7	8	9	wise
---------	---	---	---	---	---	---	---	---	---	------

unpleasant	1	2	3	4	5	6	7	8	9	pleasant
------------	---	---	---	---	---	---	---	---	---	----------

bad	1	2	3	4	5	6	7	8	9	good
-----	---	---	---	---	---	---	---	---	---	------

unattractive	1	2	3	4	5	6	7	8	9	attractive
--------------	---	---	---	---	---	---	---	---	---	------------

not my will	1	2	3	4	5	6	7	8	9	my will
-------------	---	---	---	---	---	---	---	---	---	---------

->If I could get my personal advice from the Interface in the **pharmacy**, I would have

no ability to use the Interface for info seeking and shopping												complete ability to use the Interface for info seeking and shopping
--	--	--	--	--	--	--	--	--	--	--	--	--

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

no control over using the Interface												entire control over using the Interface
-------------------------------------	--	--	--	--	--	--	--	--	--	--	--	---

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

no knowledge to make use
of the Interface

complete knowledge to make use
of the Interface

1 2 3 4 5 6 7 8 9

->Using the Interface where you can get your personal advice from the Interface in the **pharmacy** (other parameters are equal) would be

foolish 1 2 3 4 5 6 7 8 9 wise

unpleasant 1 2 3 4 5 6 7 8 9 pleasant

bad 1 2 3 4 5 6 7 8 9 good

unattractive 1 2 3 4 5 6 7 8 9 attractive

not my will 1 2 3 4 5 6 7 8 9 my will

-> If I could get my personal advice from the Interface in the **hospital**, I would have

no ability to use the Interface
for info seeking and shopping

complete ability to use the Interface
for info seeking and shopping

1 2 3 4 5 6 7 8 9

no control over using the Interface

entire control over using the Interface

1 2 3 4 5 6 7 8 9

no knowledge to make use
of the Interface

complete knowledge to make use
of the Interface

1 2 3 4 5 6 7 8 9

->Using the Interface where you can get your personal advice from the Interface in the **hospital** (other parameters are equal) would be

foolish	1	2	3	4	5	6	7	8	9	wise
unpleasant	1	2	3	4	5	6	7	8	9	pleasant
bad	1	2	3	4	5	6	7	8	9	good
unattractive	1	2	3	4	5	6	7	8	9	attractive
not my will	1	2	3	4	5	6	7	8	9	my will

C.

1. Your age.....

2. Male Female.....

3. Vegetarian Not vegetarian.....

Cooking experience Not at all... A Little... Enough... Good... Excellent...

Appendix 3: Detailed results from the qualitative pilot study

Attribute 1 (The format of the information provided): in general in situation 2 respondents would be more willing to provide blood parameters and genetic information as compared to situation 1 and 3, one respondent indicated to provide blood and genetic parameters, two respondent indicated to provide information on recent diseases in situation 1 and situation 3

Attribute 2 (The way you provide the information): one respondent did not see an interaction effect, however, some respondents would in case of situation 2 and 3 provide their information via the pharmacy or hospital and in situation 1 through the Internet, one respondent also indicated that he would provide information via the pharmacy or hospital in situation 1

Attribute 3 (Data Treatment): in situation 2 it was indicated by some respondents that the data treatment should be between you and your doctor. In situation 1 the data treatment should be anonymously. One respondent indicated anonymous data treatment in situation 1 and 3. Two respondents did not see an interaction regarding situation 1 and situation 3.

Attribute 4 (The owner of the information): most respondents prefer the department of health to be the owner of their information in all 3 situations. However, one respondent indicated that only the insurance should be the owner and one respondent indicated in situation 1 and 3 the commercial company, three respondents did not see an interaction in situation 1, and two respondents did not see an interaction effect in situation 3

Attribute 5 (The format of advice): some respondents saw no interaction. Some respondents indicated that they would like in situation 1 and 3 broad category advice or subcategory advice, one respondent indicated subcategory advice and brand specific advice in situation 3

Attribute 6 (The way the advice is provided): comparable to attribute 2. In situation 2 consumers would like to receive the information from the pharmacy or hospital. One respondent indicated that she would like to receive the information via the Internet in situation 1 and 3. One respondent did not see an interaction effect in situation 1 and 3

Attribute 7 (The way an advice fits daily routine): in situation 2 and 3 most respondents indicated they would follow a strict schedule. In situation 1 either no restriction or optional feedback was indicated, one respondent mentioned combined with regular meal in situation 3, one respondent indicated no interaction in situation 1 and no restriction in situation 1

Attribute 8 (The feedback on the personal progress): most respondents indicated optional or obligatory feedback in situation 2, or optional feedback in all 3 situations, respondents also mentioned no feedback in situation 1, one respondent did not see an interaction for situation 3.