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Abstract. Medical teleconsulting applications improve the accessibility, increase the quality and reduce the costs of healthcare services especially for elderly people. Despite these benefits, such applications are still at an early state of diffusion. As the intention to use teleconsulting applications depends on the users' satisfaction, we aim to reveal the application features of teleconsulting applications that lead to user satisfaction. Based on the theory of attractive quality, we argue that application features can be classified into different categories, depending on how well they achieve user satisfaction. We identify 17 application features and conduct a quantitative study with 87 elderly people for categorization. The results show how each application feature affects elderly peoples' satisfaction and dissatisfaction with teleconsulting applications, and we derive recommendations for future teleconsulting application development.

Keywords: Telemedicine, elderly people, Kano analysis, theory of attractive quality (TAQ), application features.

1 Introduction

Overburdening the health care system through excessive visits to physicians, a shortage of specialists and health workers [1], an increase in chronic diseases due to the demographic change [2], and a global pandemic – the challenges that face the health care system are manifold [3]. A digital solution in the form of medical teleconsulting applications are a possibility to relieve the burden on the health care system as these applications have several positive potentials: improve the accessibility, increase the quality, and reduce the costs of healthcare services [4]. For the US, it is expected that 4.3 billion US dollars can be saved annually [5]. However, not all studies confirmed these positive effects [6], highlighting a need to better understand the use of teleconsulting applications. Teleconsulting applications, connecting physicians and patients, offer a virtual visit to a physician via the mobile smart device and physicians can examine and make a diagnosis of patients describing their symptoms, which might be supported by live video and further application features [5]. Teleconsulting applications become increasingly important in the existing Covid-19 pandemic [7] as they prevent infections associated with person-to-person visits to physicians, but their

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widespread implementation in daily practice is still pending and several promising applications are at an early stage of diffusion [4]. For elderly people, teleconsulting applications are a double-edged sword as their usage decreases the risk of infection, but their usage comes with challenges due to the new technology [8]. A key factor for the success of technologies, i.e. teleconsulting applications in daily practice, is that the users, i.e. patients, need to be satisfied with the technology [9]. There is a consensus in previous research showing that only satisfied users have intentions to use the technology, so that it is relevant to unfold which factors drive user satisfaction [10].

Therefore, our approach is to examine the factors that are relevant for user satisfaction by identifying and categorizing different application features of teleconsulting applications. In terms of potential patients, we focus on the baby boomer generation (1946-1969), a subpopulation of the elderly people, which already represents a large part of the population [11] and will be a major challenge for health systems in the future due to age-related health problems [12]. Thus, we ask:

> *Which application features are relevant for elderly peoples' satisfaction with teleconsulting applications?*

We base on the theory of attractive quality (TAQ) [13] to reveal how the application features are related to user satisfaction and dissatisfaction and conduct a Kano analysis, which enables to reveal unexpressed wishes of the elderly people regarding the application features. The findings on the respective features make a relevant contribution to the design of teleconsulting applications, the exploitation of the potentials of teleconsulting, and the improvement of the application development.

2 Theoretical Background

In this section, we will outline prior research in the stream of telemedicine and illustrate specific aspects of elderly people that are relevant for the satisfaction with technologies such as teleconsulting applications.

2.1 Telemedicine

Telemedicine refers to the delivery of health care services from a distance, where health care professionals and patients exchange valid information for diagnosis, treatment and prevention of diseases and injuries by using technologies [14]. Thus, telemedicine enables the evaluation, diagnosis, treatment, monitoring, counselling and follow-up care of patients without geographical limitations [15]. There is evidence of the feasibility of telemedicine as a clinically effective substitute for personal care in an increasingly wide range of applications and environments. In terms of diagnostic accuracy, for example, there is substantial empirical indication of the equivalence of virtual and personal physician visits [16].

A more specific form of telemedicine are teleconsulting applications, which belong to mHealth [15], i.e. medical and public health services that are supported by mobile

smart devices such as smartphones [17]. With teleconsulting applications, a virtual visit to the physician is made possible via the mobile smart device as this system offers physicians the possibility to examine patients' symptoms by real-time interaction, e.g. video conferencing [5, 18]. Thus, the teleconsulting application supports the remote exchange between the physician and the patient. This form of telemedicine has reduced the technological barriers and costs for the development of telemedicine applications, as a smartphone is available to an increasing part of the population.

2.2 Elderly People and Technologies

An important user group of teleconsulting applications are elderly people, as they already represent a large part of the population [11] and their health provision will be a major challenge for health systems in the future due to the demographic change and age-related health problems [12]. Elderly people differ from younger people in terms of technology adoption and usage as on average especially elderly people are more likely than younger ones to try to maintain their status quo [19], e.g. person-to-person visits of physicians, evade new innovations due to fear of technology [8]. Moreover, although elderly people are a diverse societal group and there are interindividual differences, research finds that they are mainly driven by utilitarian factors, e.g. effectiveness and utility of the technology, rather than hedonic factors to adopt and use technology [8]. Research highlighted the importance of age-sensitive design of technologies as an important aspect of IS research [20]. In terms of teleconsulting applications, the design can differ between the applications due to the implementation of different application features, e.g. whether patients can exchange their experience with other patients who have a similar state of health in the application.

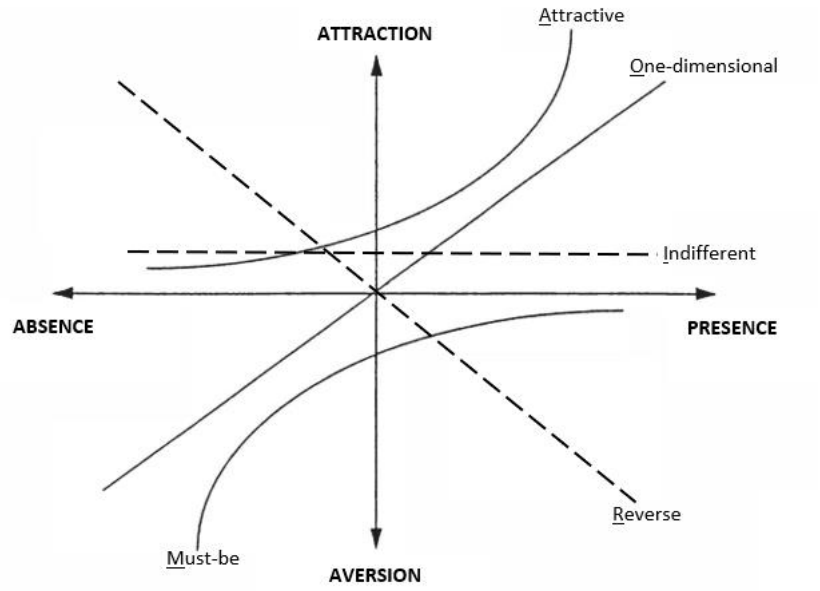
Due to these aspects, we focus on elderly people as one user group of teleconsulting applications and aim to reveal application features that lead to user satisfaction of elderly people. User satisfaction increases the intention to use the technology [9], which is the requirement for the widespread deployment of the teleconsulting potentials. In specific, we focus on the baby boomer generation, a subpopulation of elderly people, of which 81 percent use a smartphone [21] and thereby have an access to the teleconsulting application. To reveal how the application features are related to user satisfaction, we rely on the theory of attractive quality (TAQ) and conduct a Kano analysis, which is an established way to study factors relevant for satisfaction and dissatisfaction.

3 Theory of Attractive Quality

Kano [13] developed the theory of attractive quality (TAQ) to better explain the influence of different attributes on customer satisfaction. The theory is based on the assumption that customer satisfaction is not necessarily proportional to the functionality of a product. This means that customers are not necessarily the more satisfied the more functional the product is or the more dissatisfied the less functional the product is [22]. An essential feature of this theory is that it categorizes different attributes according to

how well they are able to achieve customer satisfaction [23]. The attributes can be grouped into five different categories, each of which has a different impact on customer satisfaction [24] (see Figure 1). Customers take must-be (M) attributes for granted as long as they are fulfilled. However, if the product does not sufficiently meet these attributes, customers will be dissatisfied. In the case of one-dimensional (O) attributes, their fulfilment is positively and linearly related to the degree of customer satisfaction. The higher the degree of fulfillment, the higher the degree of customer satisfaction and vice versa. The fulfillment of attractive (A) attributes, leads to a disproportionate level of satisfaction. However, the absence of these attributes does not lead to dissatisfaction, as customers do not expect them [23]. Indifferent (I) attributes are indifferent towards the customer, i.e. the customer is neither satisfied nor dissatisfied with whether the product meets this attribute or not. Reverse (R) attributes indicate that the judgment of functional and dysfunctional was the opposite of what the customer expects. With questionable (Q) attributes, there is a contradiction in the customer's answers to the questions [22].

Figure 1. The supplemented Kano model of customer satisfaction [22]



The TAQ offers an opportunity to investigate attributes that lead to satisfaction with a product and provides a valuable orientation in tradeoff situations during the product development phase to achieve satisfaction [25]. Existing research has shown the usefulness of basing on the TAQ for studying product features and their influence on user satisfaction in information systems research such as mobile feedback tool features [26] as well as mobile security and antivirus features [27]. In our paper, we focus on attributes, i.e. application features, which lead to customer satisfaction, i.e. user satisfaction with the product, i.e. teleconsulting applications. A high level of

satisfaction has a positive effect on the acceptance and the intention to use the teleconsulting applications. Accordingly, meeting the application features that are relevant for user satisfaction is an important means for the diffusion of teleconsulting applications.

4 Method

To study application features that are relevant for the satisfaction of elderly people with teleconsulting applications we base on the TAQ and follow the main steps of a Kano analysis [28]. The Kano analysis is an appropriate means to identify application features of teleconsulting applications and to study the also non-proportional relationship between the features and user satisfaction. This is based on the fact that the analysis is theoretically grounded in the TAQ and enables the categorization of the application features into the different before mentioned categories. Closely linking theory and method provides an essential understanding of the features' relevance for user satisfaction from a research, but also a practice perspective [29].

4.1 Identification of Application Features

The starting point for the Kano analysis is the identification of application features of teleconsulting applications. For doing so, we took a three-step exploratory approach consisting of a literature search, review of the applications and their functionalities available in the application store and expert interviews, which led to a comprehensive list of application features (see Table 1).

Within the literature search, the database Business Source Ultimate, the Top 3 Health IS Journals (Journal of American Medical Informatics Association, International Journal of Medical Informatics, Journal of Medical Internet Research), the Senior Scholars' Basket of Journals as well as the proceedings of the conferences ICIS, ECIS, HICSS, PACIS and AMCIS were searched with the search terms telemedicine, mobile applications, and remote diagnosis to extract relevant application features. Based on the literature search, we identified and focused on one article [30] to be especially relevant for identifying the application features due to its content relevance and publication in a leading Health IS journal (JAMIA), where the major contributions are likely to appear [31]. The list of relevant application features was extended based on a review by reading through the functional descriptions inside the teleconsulting applications that are available in the application store. Subsequently, three expert interviews were conducted to verify the application features of the two prior steps and to identify further application features. Two of the interviewees do research in the field of telemedicine and one interviewee is responsible for the strategic assurance of a telemedicine project in practice. The main areas of responsibility of the latter interviewee include the operative project management of the telemedicine project, i.e. operation, further development, problem solving, preparation and support. An overview of all identified application features is given in Table 1.

Table 1. Overview of identified application features

#	Identified application feature
#1	Emergency service/outpatient call button that makes a direct request for medical assistance [2,3]
#2	(Push) notifications of further individual information/recommendations on the diagnosed disease [2,3]
#3	Reminder messages about the times for taking medication [2,3]
#4	Information possibility about data protection [2,3]
#5	Adding data on health status (e.g. blood pressure, sugar) and medication [3]
#6	Transmission of messages/information to the own family physician [2,3]
#7	Exchange of experience with other patients who have a similar state of health [1,3]
#8	Information on health care facilities and pharmacies in the surrounding area (e.g. address, occupancy) [3]
#9	Direct orders from online pharmacies [2,3]
#10	Reminder messages about required examinations/post-treatments [2,3]
#11	Issuing (online) prescriptions [2,3]
#12	Time graphs with progress and objectives for the patient [1,3]
#13	Possibility of sending image/video material to simplify the diagnosis for the physician [2,3]
#14	Evaluation of the physician/physician contact [2,3]
#15	Summary display of the examination results [1,3]
#16	Practical/clear menu navigation [3]
#17	Choice of diagnostic paths in the form of a chat, telephone call or video call [2,3]
Note: [1] Literature search; [2] Review of applications; [3] Expert interviews; # number of application feature	

4.2 Construction of Kano-Questionnaire

After the identification of application features, we develop a questionnaire to classify each feature. We ask a functional question "What would you say if the application met [feature x], how would you feel?" and a dysfunctional question "What would you say if the application did not meet [feature x], how would you feel?" [29] for each feature with the five answer alternatives "I like it that way", "It must be that way", "I am neutral", "I can live with it that way", and "I dislike it that way". In addition, the user evaluates how important the application feature is ("self-stated importance") (from 1 to 5) to derive priorities for product development and improvement measures [28]. At the beginning, the questionnaire contained a short introduction to the topic, explanations on the use of data and processing instructions.

4.3 Data Collection

We collected data in the form of a paper-based survey from 87 persons of the baby boomer generation (see Table 2). To recruit participants, we followed two approaches. Participants of the respective target age group were recruited based on own contacts and forwarded based on a snowball sampling strategy. In addition, questionnaires were laid out in a physician's practice, which were filled out while waiting for the physician appointment. Our sampling resulted in a total of 100 completed questionnaires in the period from February to March 2020. Due to incomplete data sets and inconsistent user statements, the final sample consists of 87 questionnaires. All participants are from Germany, but more precise information about the particular residential area was not recorded.

Table 2. Demographic data of survey participants

Age (in years) Mean: 57.5, SD: 5.12	Minimum	50	**Experience with medical teleconsulting applications**	Yes	3.5%
	Maximum	72		No	96.5%
Sex	Male	63.2%	**Health status**	Excellent	3.5%
	Female	36.8%		Very good	27.9%
	Diverse	0.0%		Good	55.8%
Average duration of smartphone usage per day (in hours)	< 1	35.6%		Less good	12.8%
	1 - 2	48.3%		Poor	0.0%
	2 - 3	13.8%			
	>3	2.3%			

5 Results

The evaluation approach for the collected data consists of five main steps [32, 33], which are explained in the following sub-sections.

5.1 Categorization According to Classification Scheme, Frequencies, and Rules

First, the 17 application features are categorized according to the classification scheme provided by Kano (see Table 3) [22] for each participant based on the answers to the functional and dysfunctional questions.

Table 3. Evaluation table according to Kano [28]

Application feature		**Dysfunctional question**				
		like	**must-be**	**neutral**	**live with**	**dislike**
Functional question	**like**	Q	A	A	A	O
	must-be	R	I	I	I	M
	neutral	R	I	I	I	M
	live with	R	I	I	I	M
	dislike	R	R	R	R	Q
Note: A = attractive; I = indifferent; M = must-be; O = one-dimensional; Q = questionable; R = reverse						

Then, the frequency of each category per application feature is calculated across all participants. Usually, a particular application feature is assigned to the category with the highest frequency, as this is the predominant view of the participants. If features cannot be uniquely assigned to one of the six categories because two or more frequencies are close together, the following evaluation rule is applied: M>O>A>I.

The feature is assigned to the category that has the higher rank in the hierarchy according to the evaluation rule [33]. The basis of the evaluation rule is the assumption that decisions on product development should primarily take into account those features which lead to dissatisfaction in case of non-fulfillment [34]. According to the classification scheme, the frequencies, and the evaluation rule, no application feature is categorized as attractive, five are categorized as one-dimensional, three as must-be, and nine as indifferent (see Table 4).

Table 4. Initial categorization of application features (absolute frequencies)

#	**A**ttrac-tive	**O**ne-dimen-sional	**M**ust-be	**I**ndif-ferent	**R**everse	**Q**ues-tionable	**Rule**	**Category**
#1	8	37	18	19	2	1		O
#2	10	14	14	35	13	0		I
#3	8	26	12	29	11	0	X	O
#4	4	14	36	29	3	0		M
#5	12	20	13	29	12	0		I
#6	8	31	17	24	2	4		O
#7	4	7	4	44	25	2		I
#8	11	22	13	36	3	1		I
#9	9	12	9	42	15	0		I
#10	13	16	18	31	7	1		I
#11	18	19	11	31	7	1		I
#12	10	5	9	52	10	0		I
#13	7	28	17	20	13	1		O
#14	6	11	14	48	6	0		I
#15	7	24	26	20	8	1		M
#16	2	26	44	13	1	1		M
#17	16	24	15	26	5	0	X	O
Note: # = number of application feature; X = evaluation rule was applied								

5.2 Category Strength and Total Strength

Two further measures help to evaluate the assignment of an application feature to a category [35]: category strength (Cat) and total strength (Tot) [32, 36]. The former is used for quantitative analysis of the strength of assignment of an application feature to a category [33]. The formula is defined as the percentage difference of the highest category above the next highest and can be represented as follows: *Cat = most frequent denomination – 2nd most frequent denomination* [*0%; 100%*]. The larger the Cat, the clearer the assignment of an application feature to a specific category. A Cat of at least 6.0 % shows a statistically significant difference between the most frequent and the second most frequent category at a confidence level of 90.0 %. A Cat of less than 6 % requires a new mixed category to be created, meaning that the application feature cannot be statistically assigned to one of the classic Kano categories. At this point, however, the Tot must also be considered [33]. The Tot is defined as the total percentage of attractive, one-dimensional and must-be answers [36]: *Tot = A+O +M* [*0%; 100%*]. The higher the Tot, the higher the percentage of respondents for whom this feature is generally relevant, regardless of categorization. By combining the Tot and the respective category assignment of the features, the order in which the features should be implemented or offered can be determined [33]. If the Cat of an item is less than 6.0% but the Tot is at least 60.0%, the attribute must be assigned to the mixed category [32]. The results of the present study show that two features must be classified in a mixed category (see Table 5).

Table 5. Extended evaluation of the categorized application features

#	Category	Better Index	Worse Index	Category Strength	Total Strength	Fong Test	Importance (SSI)
#1	O	0.55	-0.67	21.2%	74.1%	–	4.15
#2	I	0.33	-0.38	24.4%	44.2%	–	3.55
#3	O	0.45	-0.51	3.5%	53.5%	X	3.44
#4	M	0.22	-0.60	8.1%	62.8%	X	4.07
#5	I	0.43	-0.45	10.5%	52.3%	X	3.81
#6	O	0.49	-0.60	8.1%	65.1%	X	4.19
#7	I	0.19	-0.19	22.1%	17.4%	–	2.56
#8	I	0.40	-0.43	16.3%	53.5%	–	3.59
#9	I	0.29	-0.29	31.0%	34.5%	–	2.69
#10	I	0.37	-0.44	15.1%	54.7%	–	3.64
#11	I	0.47	-0.38	13.8%	55.2%	–	3.32
#12	I	0.20	-0.18	48.8%	27.9%	–	3.15
#13	O	0.49	-0.63	9.3%	60.5%	X	3.75
#14	I	0.22	-0.32	40.0%	36.5%	–	2.93
#15	M(X)	0.40	-0.65	2.3%	66.3%	X	4.07
#16	M	0.33	-0.82	20.7%	82.8%	–	4.47
#17	O(X)	0.49	-0.48	2.3%	64.0%	X	3.83

Note: A = attractive; I = indifferent; M = must-be; O = one-dimensional; Q = questionable; R = reverse; # = number of application feature; (X) = mixed

5.3 Statistical Significance of Categorization

In order to test the statistical significance of categorization, the Fong test is carried out. This test is used in cases where the evaluation according to the frequency shows only minor differences between the two most frequently mentioned categories [33]. The results show that for seven features the Fong test is significant (see Table 5) and therefore there are only minor differences between the two most frequent category assignments. Thus, it is advisable to examine the self-stated importance to make a classification [33].

5.4 Self-Stated Importance

The self-stated importance (SSI) is especially helpful if the users' answers are equally distributed over two or more Kano categories [23]. The SSI allows to draw attention to the most important results [22] and to set priorities for product development and improvement measures [28]. The SSI is determined by the weighted average value from 1 (refers to not important at all) to 5 (refers to very important) from the survey data. In the present study, all must-be features can be confirmed to be important (see Table 5). Moreover, the one-dimensional and indifferent categories can each be placed in a priority hierarchy from high SSI to low SSI.

5.5 Better und Worse Indices

As suggested by previous research [22], we calculated the satisfaction coefficients, which indicate whether the satisfaction can be increased by fulfilling a certain

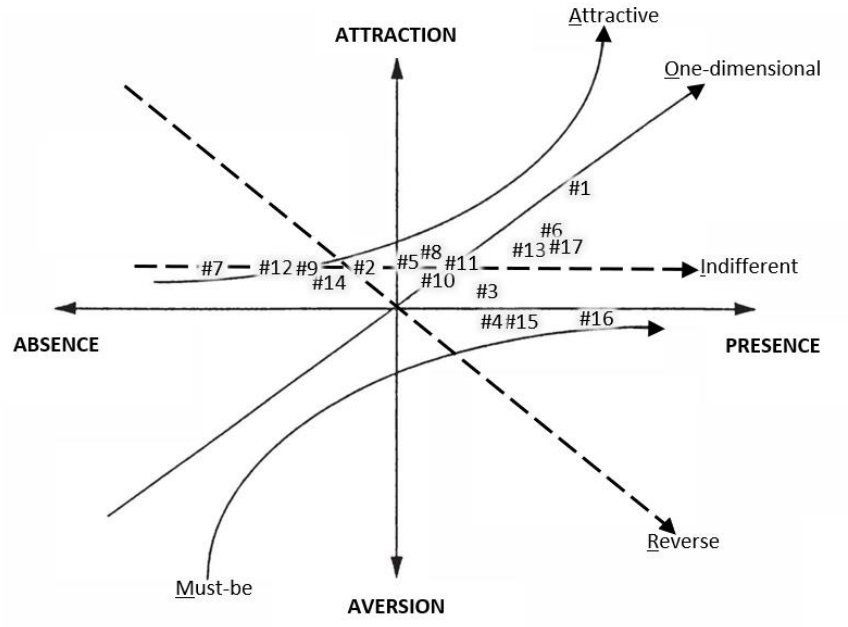
application feature or whether the fulfilment of this feature only prevents the user from being dissatisfied [36]. Thus, the determination of the satisfaction coefficients is suitable for providing additional information in case of ambiguous category allocations [33]. There are two satisfaction coefficients [33]: The better index indicates whether satisfaction increases by fulfilling a specific application feature. The worse index indicates whether user satisfaction decreases if the application feature is not met. The better index ranges from 0 to 1: the closer the value is to 1, the higher the influence on satisfaction. The worse index ranges from 0 to -1. An index of -1 indicates that the influence on the dissatisfaction is particularly strong if the analyzed application feature is not fulfilled [28]. Values from 0.5 for the better index are considered as significant, while values from -0.5 for the worse index are considered as critical. The satisfaction coefficients should always be interpreted in relation to each other [33]. Looking at the results of this study (see Table 5), the emergency service/outpatient call button that makes a direct request for medical assistance proves to be particularly significant, which points to an indispensable implementation of this feature in the application.

5.6 Summary of Results

With the help of the Kano analysis, this paper shows how each application feature affects satisfaction and dissatisfaction with teleconsulting applications. The application features can be classified into four categories: must-be, one-dimensional, indifferent, and mixed. The results show that two features, i.e. information possibility about data protection and practical/clear menu navigation are classified as must-be, which means that teleconsulting applications should offer these features, as they are a decisive competitive factor [34]. If they are not fulfilled, the user will have no interest in the teleconsulting application. Four attributes are categorized as one-dimensional: Emergency service/outpatient call button that makes a direct request for medical assistance; reminder messages regarding the times for taking medication; transmission of messages/information to the own family physician; and possibility of sending image/video material to simplify the diagnosis for the physician. The higher the degree of fulfilment of these application features, the higher the user satisfaction and vice versa. Features that have been assigned as one-dimensional are explicitly requested by the user [37]. Moreover, nine attributes are classified as indifferent, which means that they have no influence on the satisfaction with the application: (Push) notifications of further individual information/recommendations on the diagnosed disease; adding data on health status and medication; exchange of experiences with other patients who have a similar health status; information on health care facilities and pharmacies in the surrounding area; ordering directly from online pharmacies; reminder messages about required examinations/post-treatments; issuing (online) prescriptions; time graphs with progress and objectives for the patient; evaluation of the physician/physician contact. In addition, two features, i.e. summary display of the examination results; and choice of diagnostic paths in the form of a chat, telephone call or video call, were assigned to the mixed category in the course of the evaluation method [22, 32, 33].

Figure 2 shows a summarized graphical representation of the results in the coordinate system.

Figure 2. The Kano model of satisfaction supplemented with our results



6 Discussion

We aim to provide an understanding on the attributes that form user satisfaction of teleconsulting applications of baby boomers generation. Based on the theory of attractive qualities (TAQ) [13] we develop a general understanding of elderly peoples' expectations of teleconsulting applications regarding application features. For this purpose, 17 application features were identified by literature search, review of teleconsulting applications available in the application store, and expert interviews. These were then evaluated and categorized with the help of a Kano questionnaire from participants belonging to the baby boomer generation.

6.1 Research Contributions

Research in the stream of telemedicine has revealed the effectiveness, e.g. the diagnostic accuracy, of teleconsulting as comparable to personal physician visits in a wide range of applications and environments [16]. Building on these promising results, we examine how these effective applications achieve user satisfaction that – together with other factors, e.g. social or cultural factors [38] – in turn leads to users' intention to use the technology and the exploitation of its potential. Focusing on technological aspects, we identify 17 application features of teleconsulting applications, which sheds the light on possible ways how to design the applications.

Thereupon, following similar approaches in IS research studying product features [26, 27], we introduce the Kano analysis [13] as an appropriate methodological approach to evaluate the relevance of these application features for the elderly peoples' satisfaction with teleconsulting applications. The results reveal that the application features can be classified into different categories, namely must-be, one-dimensional, indifferent, and mixed category. We contribute that the application features do not necessarily have a proportional relationship with user satisfaction, i.e. for the features categorized as must-be. The presence of the application features information possibility for data protection and practical/clear menu navigation prevent elderly people from being dissatisfied with the application, but they take these features for granted, meaning that their presence does not result in satisfaction with the application. Moreover, not all application features are relevant for the elderly peoples' user satisfaction as they do not influence the satisfaction, i.e. the indifferent application features. Thus, we highlight that the application features can be placed in a hierarchical order depending on their relevance for creating user satisfaction, namely by considering their assigned category as well as the better and worse indices [39]. For some application features, user satisfaction increases significantly with only a small improvement in the application performance, while for some other features it increases only slightly, even though the application performance has been greatly improved.

Further, we focus on elderly people, i.e. the baby boomer generation, which is an important user group of teleconsulting applications as they already represent a large part of the population [11] and their health provision will be a major challenge for health systems in the future due to the demographic change and age-related health problems [12]. Research highlighted the importance of age-sensitive design of technologies as an important aspect of information systems research [20]. Thus, we contribute by revealing elderly peoples' needs and expectations towards application features of teleconsulting applications and derive age-sensitive recommendations for the design of these applications. Moreover, elderly people are more likely to maintain their status quo [19], i.e. person-to-person visits of physicians, and evade new innovations. Features that are categorized to the attractive category lead to attraction to a specific product [13] such as teleconsulting applications and thereby lead to an abandonment of the status quo. Our result did not reveal an identified application feature to be attractive. Thus, we highlight that there is a need to design further application features and study the factors leading an application feature to be attractive in the view of the elderly people.

6.2 Recommendations for Future Teleconsulting Application Development

The results of the paper at hand have implications for the design and development of teleconsulting applications as they allow the derivation of recommendations for how user satisfaction with these applications can be increased. Identifying and categorizing the critical features for user satisfaction by the Kano analysis helps to focus on the important features for increasing satisfaction [36], namely where users notice their impact the most [22]. If developers know to what extent an application feature

influences the user satisfaction and are aware of the relative importance of this feature, a satisfaction portfolio can be created and appropriate measures be taken.

Fulfilment of must-be features and competitiveness in one-dimensional features. A general recommendation in line with the TAQ [13] for application development is to strive to meet all must-be features and to be competitive with the market leaders in the one-dimensional features. The improvement of a must-be feature that has already reached a satisfactory level is not productive compared to the improvement of a one-dimensional or attractive one. Accordingly, application developers in the field of teleconsulting applications should ensure that the must-be features, i.e. practical/clear menu navigation, information possibilities for data protection, and a summary display of examination results, are implemented. They should then focus on the one-dimensional categories, with special attention to the respective satisfaction coefficients and SSIs. Factors that have both low satisfaction and low importance are of low priority. Top priority is given to application features that the user considers important and those that have disadvantages compared to competitors' products [37]. A similar approach is recommended for the application features with an indifferent classification, although these generally have the lowest priority.

Research and implementation of new features of the attractive category. For application developers, it may not be enough to satisfy users under the current highly competitive conditions by simply meeting the essential features. Thus, we recommend application developers to implement new and innovative features perceived as attractive that meet user needs and differentiate from the competitors, because none of the identified features in our study is an attractive feature for elderly people. To come up with new features, the potential users that are selected to present a variety of different user needs should be involved in an early stage of the product development process. New features to gain attractiveness should especially address the utility of the application, because elderly people are mainly driven by utilitarian factors rather than hedonic ones to adopt and use technology [8]. According to the TAQ [13], the same feature may change category over time, i.e. attractive features can become one-dimensional and ultimately must-be, because the user needs towards the application features are dynamic rather than static [39]. In other words, products that were perceived as innovative and attractive are no longer considered so, and user satisfaction may no longer be achieved. The timely development and introduction of a teleconsulting application with innovative features is therefore important [39].

6.3 Limitations

The present study is not free of limitations. The majority of participants has not used a teleconsulting application yet. Future research could investigate whether the evaluation of application features changes when users have gained experience with these applications or how individual differences shape the evaluation of a technology [40, 41].

Moreover, we focus on possible patients, i.e. the elderly people, as users of teleconsulting applications. Further users of the applications are the physicians. The physicians might evaluate the distinct application features differently, implicating that

there are differences between patients and physicians in which application features lead to satisfaction and dissatisfaction.

We base our study on the TAQ and the KANO analysis to prioritize teleconsulting application features. However, there exist further approaches for prioritization such as analytic hierarchy process or quality function development, which may supplement the results of our study.

Furthermore, we did not distinguish between less and more severe diseases, although user might evaluate the features differently depending on the severity of the disease, e.g. might value specific features only in the case of severe or chronic diseases. This is relevant for studying baby boomers, because within the generation there might be great variety in the severity of the diseases, with some potential users having chronic or multiple comorbid diseases.

Finally, we evaluate the application features in terms of their relevance for creating user satisfaction, while not accounting for their relevance for medical effectiveness, although those two might be related. Future research could account for both evaluation criteria, i.e. user satisfaction and medical effectiveness, and specify to which degree recommendations resulting from the user satisfaction perceptive overlap or do not overlap with recommendations resulting from a medical effectiveness perspective.

7 Conclusion

In this paper, we conducted an empirical research to investigate the application features of teleconsulting applications that influence the satisfaction of the baby boomer generation. We identified 17 application features in existent literature, by reviewing existing teleconsulting applications and by interviewing experts. Subsequently, 87 persons of the baby boomer generation were surveyed to evaluate the previously identified application features according to the Kano analysis. The present research shows that the application features can be categorized into four categories, which has implications for application developers in their endeavor to ensure user satisfaction.

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