A model of Anshin about the information security

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ABSTRACT

Traditional studies on security have been based on the assumption that users would feel the sense of security when provided with objectively secure systems. In this research, we investigate users’ subjective sense of security, which we call Anshin in Japanese. We conducted surveys on Anshin to the users of information security technology without technical knowledge. In order to deduce reasonable factors, questionnaires need to have a large set of question items. Our Previous questionnaires did not reflect any feedback from users without technical knowledge. Therefore, we produced a new questionnaire to reflect feedback from such users, using brainstorming and the KJ method. We conducted a Web survey to 888 subjects with our new questionnaire. As the result of the factor analysis, we found four factors: “Perceived benevolence”, “Perceived competence and integrity”, “User’s intuition” and “Reputation of the company from third party”. In this paper, we report our construction of an Anshin model for users without technical knowledge using those factors.

1. INTRODUCTION

Anshin is a Japanese term that indicates the sense of security. It is composed of two words, viz. An and Shin. “An” is to ease, and “Shin” is mind. Anshin literally means to ease one’s mind. Traditional research on security has been based on the assumption that users would feel Anshin when provided with secure systems. Sometimes the users feel Anshin even with a secure system, and other times they feel Anshin when they are being phished. Rachna et al. [1] reported that 90% of users cannot distinguish between the authentic websites and phishing ones. The users tend to look see the contents of the website and judge whether it is a phishing website or not. Sheng et. al [2] reported that the users tend to judge a website’s legitimacy by its “look and feel”.

The survey from the risk perception has the results that the users are safe but do not feel Anshin. Kasperson et al. [3] reported that experts estimate risk based on objective numbers from past statistics while ordinary users estimate risk based on the subjective think because memorable events or memorable images affect them. Luhmann [4] reported that there is a gap between what experts consider a risk is, and what ordinary users consider a risk is. Risk appraisal shows that attributes of users (e.g., age, sex, educational background, experience) are influential as well. In Japan, security threats such as information leaks and phishing attacks are increasing and fewer people feel Anshin at the use of the information technology compared to other countries [5]. As for security, evaluation is possible quantitatively whereas it is not so with Anshin because it is psychological and subjective [6]. According to these surveys, safety and Anshin are different concepts, and we need to survey on Anshin. When we survey the Anshin, we must define the attribute of the subjects.

We have been trying to derive the factors of Anshin using user surveys with questionnaires and factor analysis [7][8]. Ideally a questionnaire survey covers as many question items as necessary for investigation. In our previous surveys [7] [8], we produced the questionnaire using the results from a preliminary survey using free-style answers from the users with technical knowledge on information security. Accordingly, the questionnaire did not reflect any feedback from users without such technical knowledge. In our previous research [9], we created the questionnaire to reflect the feedback from the users without technical knowledge about information security using brainstorming [10] and the KJ method [11].

In this paper, we report that we extracted Anshin factors and created an Anshin model based on Anshin factors. In Section 2, we present related work. Section 3 reports on the Web survey as well as the Anshin factors. Section 4 reports the Anshin model. Section 5 gives some conclusions.

2. RELATED WORK

Regarding the difference between security and Anshin, Yamagishi et al.[12] suggests a need for...
“trust” between “Anshin” and “security.” They define trust as “to think that the person will not take offensive action towards although social uncertainty is present,” and security as “to feel that such social uncertainty is not present in the first place.” Murakami [6] defines safety as what can be expressed with an objective numerical value in relation to danger, and Anshin as subjective judgment of a user’s danger. While security can be assessed quantitatively, Anshin has strong psychological and subjective aspects, so that it is difficult to assess. One must conduct a survey in the psychological and subjective aspects for the investigation of Anshin.

In information security technology, it is important to conduct a survey looking at human aspects. Typical examples of survey are social engineering [13]. Social engineering is an attack using non-technical methods that rely on human interaction to break security procedures. In western countries, the similar concept of Anshin is “trust,” and has been studied in the fields of psychology, philosophy, economics, and sociology. Barber [14] divides trust into trust for the ability of the partner and trust for the friendliness of the partner. In the latter case, the integrity correspondence of the partner is related to trust. Xiao [15] defines those two parts of trust in the field of e-commerce; there are trust that originates in a user’s recognition and trust that originates in a user’s emotion. Gambetta [16] defines trust as a level for a user to establish their subjectivity whether another user or group is favorable towards themselves. There is also a notion of trust with psychological, subjective aspects, and Lewis, et al. [17] consider the emotional part of trust a major factor and position as irrational. We define Anshin as the emotional part of trust [18].

Marsh [19] has produced a computational trust model in which trust is quantified in the range of -1 and 1. Solomon et al. [20] define that the range of what to trust is specified by the trustees. Riegelsberger [21] and Falcone et al. [22] argue that the affective reaction is crucial to decide whether to trust a person or not. Riegelsberger[21] describes a basic trust model in which “trustor” is a person to trust and “trustee” is a trusted person. Trustor decides, based on trustee's ability and motivation, whether to trust the trustee or not. In addition, internalized norms and benevolence are included in trustee's motivation. Trustor judges whether to trust trustee or not, using trustee's temporary information, social information and institutional information. These surveys reported on the subjective factors, however the surveys do not make it clear enough about subjective factors and models.

3. SURVEY ON ANSHIN

3.1 Overview

We conducted our first survey with 452 students from Iwate Prefectural University using a questionnaire on Anshin when they used a security system or service on the Internet [7]. Most subjects were computer science students and only 100 were non-computer science students. As the result of the analysis, we had six factors: Security technology, Usability, Experience, Preference, Understanding, and Cognitive Trust. With the later survey [8], we conducted a survey with users without technical knowledge, and had the five factors: Cognitive Trust, Kindness, Understanding, Preference, and Familiarity. With those surveys, we use a questionnaire which was produced based on the preliminary survey with the computer science students.

When we conduct a survey on Anshin about information security for ordinary people, it is important that the questionnaire reflects the ideas of users without technical knowledge. However, the users without technical knowledge may not understand information security. Therefore, to produce a new questionnaire we collected the feedback from the users without technical knowledge. We collected viewpoints from the users by conducting brainstorming with groups of several people. Brainstorming is a technique to discuss with a group and to collect the ideas. We thought that the users could suppose the security knowledge using brainstorming and we collected the ideas. In brainstorming, the subjects can think much feedback by listening to feedback of others.

The collected feedback using brainstorming was subjective. The feedback was sorted out to collect the same kind of feedback items together into one using KJ method. KJ method is a technique that can arrange subjective feedback and show it as a figure [11]. The question items are produced based on the feedback, we need to verify whether those items reflect indeed the original feedback from the users without technical knowledge, or not. However users might not understand the question items if we used technical terms when we verified. In order to solve the problem, we used the graphic figure which showed the collecting process with KJ method so that the users understood the process to lead to a question item easily.

In this way, KJ method can sum up subjective feedback, help creating question items, and verify the question items with users without technical knowledge using graphical figure. For example, the survey from the Kansei engineering, Lokman [23] has classified a full-range of emotional keywords
using KJ method, as a result, a total of 820 words were derived and 43 clusters were generated. Kim [24] has reported that they analyzed user’s cleaning behavior using KJ method and then developed a cleaning robot which reflected analysis contents. Miyata [25] has reported how to make a virtual reality application. When they make application, they say that group work is important. They propose three steps. The first step is to put forward many ideas, the second step is to unify and combine ideas, the final step embodiment of idea. In this survey, they have reported on using KJ method by step two. They made clear the target of the application using the figure from KJ method.

The process to create a general questionnaire has three steps [26]. The first step is to collect the ideas, the second step is to create the questionnaire, and the third step is to correct the questionnaire. As a method to collect candidates for the question items, methods such as the researcher’s own questions, user survey, and related work’s questionnaire are used [27]. In general, when creating a questionnaire, the questionnaire must be simple, comprehensible, and clear. For example, question items should use daily words [28] and questions should be about twenty words or fewer [29]. It is important to avoid question items that include double negation or a double meaning [30]. In the survey about the privacy, there is the possibility of asking a deeply private question about the subject. Therefore, Braunstein [31] reported on the effectiveness of question items that have no effect on privacy in privacy surveys.

Creating the new questionnaire using brainstorming and the KJ method required several steps. Firstly, we conducted brainstorming and collected feedback from users without the technical knowledge. Secondly, we integrated similar ideas by grouping, and produced new question items. Thirdly, we incorporated the question items from the previous questionnaire based on the computer science students. Fourthly, we came up with a new questionnaire that reflected the users both with and without technical knowledge. When one conducts a user survey on unknown factors like ours, one needs to have a questionnaire which reflects all the users, not just specific ones [27]. We conducted the preliminary survey with the new questionnaire. We examined whether we had problems or not using statistical analyses and improved the question items. Finally, we created a new questionnaire consisting of 34 question items.

3.2 Create a questionnaire

We collected feedback from the subjects without technical knowledge on information security as the first step. The subjects were supposed to have a credit card and an experience of online shopping. We asked the subjects what makes them feel Anshin when they use a credit card for on-line shopping.

We conducted the experiment twice with different groups of subjects. The first group survey was conducted with five subjects on the 25th of November, 2008. The second group survey was conducted on five subjects on the 24th of January, 2009. The first group’s subjects were students and those in the second group were university office secretaries. We asked for their feedback from Anshin when using online-shopping.

We described the rules of the brainstorming to subjects. The subjects verbally discussed ideas and wrote ideas on Post-it notes. The subjects grasped the ideas of others by listening to the ideas from others and reading the ideas on Post-it notes. The researcher expedited the proceeding, but did not participate in the discussion. Each experiment took two hours in total. As a result of the brainstorming, we had 71 ideas altogether; 31 ideas from the first group and 39 ideas from the second group. Within those ideas, some were similar. Therefore, we arranged the 71 ideas by Card-making using the KJ method as the second stage.

Firstly we revised the ideas that were difficult to understand and wrote them on 10cm x 15cm cards. Secondly, we arranged the same cards semantically by grouping and naming following the KJ method. For example, subjects said "I feel Anshin when using my PC’s windows update" and "I feel Anshin when using a PC on which an antivirus is installed". These ideas mean when the subjects take security measures, the subjects feel Anshin. Therefore, we arranged the ideas "Proper security measures are implemented on your own computer which you are using". As a result, we ended up with 46 items.

We extracted the new question items, which were not included in the previous questionnaire as the third stage. The previous questionnaire had 28 question items. We compared them once again with the 46 new items. We came up with twenty four 24 new items which were not in the previous questionnaire. We produced a new questionnaire at the fourth stage, consisting of 52 items. We had 28 previous question items and 24 new question items. However, if a questionnaire had too many question items, the subjects would be tired of answering and might not answer carefully. Therefore, we reduced question items to 36 items by further grouping and naming: 24 previous question items and 12 new items. In the new questionnaire, we used a 7-point Likert scale, ranging from strongly agree 1 to strongly disagree 7.
3.3 Preliminary survey

We conducted a pretest using the new questionnaire on the web to fix the question items. In the web survey, subjects without technical knowledge about information security were required to have a credit card and have experience with online shopping. Subjects for the pretest were selected based on their answers to 8 questions about security risk and security measures from a survey by Information-technology Promotion Agency, Japan [32] and Nomura Research Institute Secure Technologies [33]. We eliminated subjects who answered the questions correctly because they were considered to be users with technical knowledge about information security.

The survey was conducted on the 22nd and 23rd of July, 2010, with the remaining 103 subjects, who used credit cards for on-line shopping but were presumed not to have information security knowledge. Thirty nine out of 103 subjects were male, and 64 were female. We conducted item analysis of the results from the survey and we conducted factor analysis with the maximum-likelihood method and promax rotation over the survey results. As a result, five factors were derived. Those five factors include 36 items in total. They were explained by 60.82% (Cumulative) as a total. In order to confirm reliability of measurement, Cronbach’s coefficient alpha for each subscale is as follows: Factor 1 was 0.922, Factor 2 was 0.793, Factor 3 was 0.856, Factor 4 was 0.927, and Factor 5 was 0.800. Cronbach’s alpha is the most commonly used measure of reliability. It indicates the extent to which a set of items can be treated as measuring a group on the basis of the correlation coefficient between items.

The item analysis shows that some question items have problems. When there is Ceiling effect, Floor effect, the absolute value of high skewness, or the absolute value of high kurtosis, the question items are a problem due to a bias in response. The responses from the subjects may not be measured accurately.

In the case of the question item which is higher value than the median, most people did not feel Anshin because the value is over 4 that subjects do not feel Anshin.

Cronbach’s alpha is a measure of the internal consistency of answers. The values would decrease when we decreased the number of question items and the values would increase when we increased the number of question items. However, when the values would increase when we decreased the number of question items. This shows this item does not correlate with the sum of the remaining items. In this case, it is necessary to correct this item.

The value with communality is the sum of the squared factor loadings for all the factors for a variable is called the communality. It has the range of values between 0 and 1; it is the percentage of variance in that the variable that is explained by those factors together. When there is a value with low communality, this is a low effect of factors extraction by factor analysis. The communality does not have clear standards. However, it typically requires more than 0.3. This survey is intended to correct the question items. Therefore, we set a high standard with 0.4.

As a result of the analysis, we found that three question items had problems due to their floor effect. We had two items whose kurtosis values were over 2 and found high. We had one item whose average was high (over 4) and five items whose Cronbach’s alpha coefficient of all items increased when we decreased the item (over 0.935). We had six question items whose communality was low (under 0.4).

We found some problems with seventeen question items by item analysis as well as factor analysis. Therefore, these items needed to be studied further. Five out of twelve newly introduced question items were included in those with problems.

We had produced a questionnaire that, we thought, reflected feedback from subjects without technical knowledge about information security. This could be because the subjects did not generate the sentences of question items so that the feedback from them might not have been truly reflected.

We interviewed three of the subjects who had participated in brainstorming for approximately two hours per person. The verification method was to explain the backdrop of the question items produced and to confirm the gap between the question items produced and the aims of the feedback from the users without knowledge of information security. As a result of the verification, there were some question items that differed from the aims of the subjects.

For instance, “You do not directly transact with the company providing the service, but a professional intermediate agent serves as a go-between” was perceived as that Anshin originates towards the act of providing a mediator. However, the subjects perceived that Anshin originates not towards the company that is specialized in intermediation. Therefore, we decided to change the question item into “there is a mediator company specialized in intermediation put in between”. There were two question items that did not differ from the aim of the subjects but had a possibility of being misinterpreted.

For instance, the question item “not only the good points but also the bad points of the products are
introduced without being concealed” had the aim that it brings about a feeling of Anshin towards the company that minutely indicates the details of product information. However, the subjects replied about its downside that they felt like it clarified that “it is outside the scope of the support contract.” Therefore, we changed it to “it presents the details of various kinds of products so that customers would understand the details of products.”

There was one question item that the subjects did not feel Anshin. This question item is “it is a company that has a thriving stock price of which does not take a plunge?” which is a question item produced based on the opinions gained from the subjects who were knowledgeable about stocks. However, the subjects who do not understand much about stocks cannot make sound judgment. Therefore, we decided to erase this question item. Representation problems were pointed out with regard to the remaining question items, which we made modifications. We changed the wording of other question items, because it was pointed out a problem of the wording. We produced the questionnaire consisting of 35 question items.

We conducted a pretest again. The survey was conducted with 103 subjects on the same conditions as the last survey, on the 20th and 21st of January, 2011. Forty out of 103 subjects were male, and sixty three were female. From a result of analysis in the same manner as the previous analysis, we had one problem question item. Problem The problem question item says, “Although the corporation providing the service is foreign, they are good at using Japanese language”. Its intention is that the customers may well feel Anshin at the time of troubles when the company deals with them in their native language, Japanese, not in the other languages. We failed to convey the intention of the users to feel Anshin when the response to troubles is their native language. It is thought that the users imagined the intention of the users to feel Anshin when a web site is in their native language notation. Therefore, we decided to delete this question item. Finally, we produced the questionnaire consisting of 34 question items.

4. FACTOR ANALYSIS

We conducted a user survey using the new questionnaire through a web survey. The survey was conducted on 888 subjects, on the 22nd and 24th of February, 2011. We asked for their ideas about Anshin when using online shopping. We show the average and the standard deviation which we calculated from a result of Web survey in Table 1. We had three question items exhibiting a floor effect. Therefore, we conducted a factor analysis with thirty-one items except three items. Furthermore, we except seven question items where had low commonality less than 0.3. Finally, we conducted factor analysis with twenty four items.

Factor analysis with the maximum-likelihood method and the promax rotation found that four factors are derived. The three factors were explained by 63.734% (Cumulative) as a total. To confirm reliability of measurement, Cronbach’s coefficient alpha of each subscale Factor one was 0.905, Factor two was 0.899, Factor three was 0.834 and Factor four was 0.798. We show factor loadings in Table 2. We identified the following factors:

**Factor one** is Perceived benevolence. This is a factor users feel Anshin when a company responds with benevolence in “the trouble that occurred from the user’s mistake” or “the user’s question”.

**Factor two** is Perceived competence and integrity. This is a factor the users feel Anshin when the company possesses competence not to let personal information leak out and the company performs personal information management integrity.

**Factor three** is User’s intuition. This is a factor when users assess Anshin from “instinct” and “experience”.

**Factor four** is Reputation of the company from a third party. This is a factor the user assesses Anshin based on information from a third party. (for example, TV newspaper)

We surveyed Anshin factors in which the feedback from subjects was included. As a result, feedback was included in factor one and factor four. Factor one had five items from subjects, Factor four had three items from subjects. We found that the users without technical knowledge tended to feel benevolence of the company or the information from the third party as Anshin factors. Especially, factor four was composed mainly of feedback. We presume that factor four was an Anshin factor of users without information knowledge.

Understanding and preference factors in the previous survey were not found in the results of the main survey. Understanding factors are deeply related to the possession or lack of knowledge about information security. The subjects of the survey in the previous survey were employees of local governments who were a group of persons who have everyday opportunities to operate information technology equipment. Therefore, no person with a complete lack of knowledge was included. However, it is considered that in the main survey there were more users lacking knowledge compared with the previous survey because its subjects were not a specific group. It has not become clear why
preference factor was not extracted from the main survey and a further consideration is necessary. The factor analysis that we conducted in the previous section was an exploratory factor analysis. Therefore, in order to verify the four factors, we conducted a confirmatory factor analysis (CFA)[34] using Structural Equation Modeling (SEM). SEM is a statistical technique for theoretical models, which are called causal models [35]. It is a hybrid technique that encompasses aspects of confirmatory factor analysis, path analysis, and regression, which can be seen as special cases of SEM.

We assumed observation variables to be three items of high factor loading in each of the four factors and the covariance between the four factors. As a result, we found that the overall fit of the models were acceptable with GFI (0.965), CFI (0.978), RMSEA (0.057). The models have a close fit by the criteria indicated: RMSEA below 0.08[36], CFI and GFI above 0.9 [37]. Therefore, it verified the validity of the four Anshin factors. We show result of confirmatory factor analysis in Figure 1.

**Table 1: Amount of statistics from main survey**

<table>
<thead>
<tr>
<th>Question No</th>
<th>Question</th>
<th>Average</th>
<th>Standard-deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The service-provider company has social credibility.</td>
<td>2.04</td>
<td>1.130</td>
</tr>
<tr>
<td>2</td>
<td>The service-provider company is a major enterprise.</td>
<td>2.41</td>
<td>1.212</td>
</tr>
<tr>
<td>3</td>
<td>The service-provider company has reliable capability and achievements.</td>
<td>2.37</td>
<td>1.155</td>
</tr>
<tr>
<td>4</td>
<td>The service-provider company has not caused major trouble in the past.</td>
<td>2.26</td>
<td>1.144</td>
</tr>
<tr>
<td>5</td>
<td>The service-provider company is dealing in well-known merchandise presented on TV and in newspapers.</td>
<td>3.34</td>
<td>1.400</td>
</tr>
<tr>
<td>6</td>
<td>The service-provider company is presented on TV and in newspapers.</td>
<td>3.38</td>
<td>1.386</td>
</tr>
<tr>
<td>7</td>
<td>It is felt that the service-provider company is implementing measures to manage private information in an appropriate way.</td>
<td>2.30</td>
<td>1.179</td>
</tr>
<tr>
<td>8</td>
<td>It is felt that the service-provider company will not leak private information.</td>
<td>2.31</td>
<td>1.211</td>
</tr>
<tr>
<td>9</td>
<td>The service-provider company stipulates clearly the handling of private information.</td>
<td>2.25</td>
<td>1.180</td>
</tr>
<tr>
<td>10</td>
<td>The service-provider company clearly states a positive guarantee even if trouble should occur.</td>
<td>2.33</td>
<td>1.220</td>
</tr>
<tr>
<td>11</td>
<td>The service-provider company has not only an on-line shop but also an actual store.</td>
<td>3.31</td>
<td>1.418</td>
</tr>
<tr>
<td>12</td>
<td>It is felt that a mistake you make in operation or procedure will be treated leniently such as by cancellation of contract or willingness to refund money.</td>
<td>2.52</td>
<td>1.196</td>
</tr>
<tr>
<td>13</td>
<td>It is felt that a way to solve a mistake you make in operation or procedure is ready to help you.</td>
<td>2.46</td>
<td>1.192</td>
</tr>
<tr>
<td>14</td>
<td>In case of money trouble, the credit-card company offers security.</td>
<td>2.35</td>
<td>1.228</td>
</tr>
<tr>
<td>15</td>
<td>You feel the security is assured for the system used for the service.</td>
<td>2.16</td>
<td>1.131</td>
</tr>
<tr>
<td>16</td>
<td>You do not feel the system used for the service will leak the input card number outside.</td>
<td>2.09</td>
<td>1.165</td>
</tr>
<tr>
<td>17</td>
<td>You trust the technologies such as encryption used in the system for the service.</td>
<td>2.21</td>
<td>1.142</td>
</tr>
<tr>
<td>18</td>
<td>You comprehend some degree of the technologies used for the service.</td>
<td>2.79</td>
<td>1.211</td>
</tr>
<tr>
<td>19</td>
<td>The system used for the service is easy to operate.</td>
<td>2.63</td>
<td>1.197</td>
</tr>
<tr>
<td>20</td>
<td>You can receive kind support for my questions regarding the operational methods of the system used for the service.</td>
<td>2.50</td>
<td>1.180</td>
</tr>
<tr>
<td>21</td>
<td>A lot of information is provided with pictures and texts regarding the details of commodities.</td>
<td>2.32</td>
<td>1.170</td>
</tr>
<tr>
<td>22</td>
<td>When I ask a question using the question form, I receive a prompt reply with content regarding my question not only a canned response issued by the automatic reply system.</td>
<td>2.42</td>
<td>1.166</td>
</tr>
<tr>
<td>23</td>
<td>When you make an inquiry to the call center, you can receive support from a communicable operator not only by the automated voice system.</td>
<td>2.58</td>
<td>1.258</td>
</tr>
<tr>
<td>24</td>
<td>You do not directly transact with the company providing the service, but a professional intermediate agent serves as go-between.</td>
<td>3.37</td>
<td>1.242</td>
</tr>
</tbody>
</table>
25. You can choose a payment method not limited to credit payment but others such as cash on delivery.

26. The information necessary for you is indicated in an easily understood manner.

27. The overall design of the homepage is in tune with your taste.

28. You family members, friends, colleagues and other acquaintances using this shopping mall give high evaluation such as good words of mouth.

29. You are accustomed to using a similar system.

30. You feel no problem with the system on the basis of your experience of using a similar system.

31. You generally feel safe about it without any concrete reason.

32. You like it without any concrete reason.

33. Proper security measures are implemented on your own computer which you are using.

34. You have knowledge to the risks and menaces accompanying with Internet trading.

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Table 2: Factor pattern matrix from main survey

<table>
<thead>
<tr>
<th>Question No</th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>It is felt that a way to solve a mistake you make in operation or procedure is ready to help you.</td>
<td>.893</td>
<td>.006</td>
<td>-.097</td>
<td>-.062</td>
</tr>
<tr>
<td>12</td>
<td>It is felt that a mistake you make in operation or procedure will be treated leniently such as by cancellation of contract or willingness to refund money</td>
<td>.819</td>
<td>.028</td>
<td>-.075</td>
<td>-.046</td>
</tr>
<tr>
<td>14</td>
<td>In case of money trouble, the credit-card company offers security.</td>
<td>.809</td>
<td>-.010</td>
<td>-.103</td>
<td>-.061</td>
</tr>
<tr>
<td>20</td>
<td>You can receive kind support for my questions regarding the operational methods of the system used for the service</td>
<td>.658</td>
<td>.127</td>
<td>.073</td>
<td>.021</td>
</tr>
<tr>
<td>23</td>
<td>When you make an inquiry to the call center, you can receive support from a communicable operator not only by the automated voice system</td>
<td>.648</td>
<td>-.166</td>
<td>.002</td>
<td>.158</td>
</tr>
<tr>
<td>22</td>
<td>When I ask a question using the question form, I receive a prompt reply with content regarding my question not only a canned response issued by the automatic reply system.</td>
<td>.643</td>
<td>-.075</td>
<td>.078</td>
<td>.083</td>
</tr>
<tr>
<td>19</td>
<td>The system used for the service is easy to operate.</td>
<td>.617</td>
<td>.034</td>
<td>.143</td>
<td>.053</td>
</tr>
<tr>
<td>18</td>
<td>You comprehend some degree of the technologies used for the service.</td>
<td>.499</td>
<td>.142</td>
<td>.039</td>
<td>.039</td>
</tr>
<tr>
<td>17</td>
<td>You trust the technologies such as encipherment used in the system for the service.</td>
<td>.398</td>
<td>.389</td>
<td>.040</td>
<td>-.114</td>
</tr>
<tr>
<td>26</td>
<td>The information necessary for you is indicated in an easily understood manner.</td>
<td>-.102</td>
<td>1.005</td>
<td>.045</td>
<td>-.054</td>
</tr>
<tr>
<td>8</td>
<td>It is felt that the service-provider company will not leak private information.</td>
<td>-.111</td>
<td>.951</td>
<td>.026</td>
<td>.012</td>
</tr>
<tr>
<td>7</td>
<td>It is felt that the service-provider company is implementing measures to manage private information in an appropriate way.</td>
<td>.050</td>
<td>.774</td>
<td>-.038</td>
<td>-.007</td>
</tr>
<tr>
<td>9</td>
<td>The service-provider company stipulates clearly the handling of private information.</td>
<td>.337</td>
<td>.537</td>
<td>-.069</td>
<td>-.036</td>
</tr>
<tr>
<td>10</td>
<td>The service-provider company clearly states a positive guarantee even if trouble should occur.</td>
<td>.162</td>
<td>.498</td>
<td>-.083</td>
<td>.148</td>
</tr>
<tr>
<td>3</td>
<td>The service-provider company has not caused major trouble in the past.</td>
<td>.052</td>
<td>.471</td>
<td>-.068</td>
<td>.299</td>
</tr>
<tr>
<td>31</td>
<td>You generally feel safe about it without any concrete reason.</td>
<td>-.156</td>
<td>.035</td>
<td>.938</td>
<td>-.008</td>
</tr>
<tr>
<td>32</td>
<td>You like it without any concrete reason</td>
<td>-.098</td>
<td>-.018</td>
<td>.917</td>
<td>.008</td>
</tr>
<tr>
<td>30</td>
<td>You feel no problem with the system on the basis of your experience of using a similar system.</td>
<td>.174</td>
<td>-.012</td>
<td>.567</td>
<td>.026</td>
</tr>
<tr>
<td>29</td>
<td>You are accustomed to using a similar system.</td>
<td>.277</td>
<td>-.103</td>
<td>.482</td>
<td>.043</td>
</tr>
<tr>
<td>33</td>
<td>Proper security measures are implemented on your own computer which you are using</td>
<td>.322</td>
<td>.177</td>
<td>.332</td>
<td>-.065</td>
</tr>
<tr>
<td>6</td>
<td>The service-provider company is presented on TV and in newspapers.</td>
<td>-.039</td>
<td>-.002</td>
<td>.027</td>
<td>.887</td>
</tr>
<tr>
<td>5</td>
<td>The service-provider company is dealing in well-known merchandise presented on TV and in newspapers.</td>
<td>.034</td>
<td>-.029</td>
<td>.035</td>
<td>.864</td>
</tr>
<tr>
<td>2</td>
<td>The service-provider company is a major enterprise.</td>
<td>.027</td>
<td>.292</td>
<td>-.055</td>
<td>.431</td>
</tr>
</tbody>
</table>
5. ANSHIN MODEL
We clarified four Anshin factors with the users without technical knowledge. In this section, we report our trial on the construction of an Anshin model based on these four factors. The extracted factor one and factor two show cognitive trust. The cognitive trust is the trustor's rational assessment on trustee's competence, benevolence and integrity [15]. We define factors one and two as the cognitive trust into the Anshin model. In addition, it is reported that user knowledge [38] and experience [39][40] affect trust. We defined Anshin as the emotional part of trust [18]. We introduce the concepts of the user knowledge and experience into the Anshin model. However, it is not clear which factors affect user's knowledge and experience. Therefore, we temporarily define that the user knowledge and experience are related to all factors.

In order to verify the model, we conducted Structural Equation Modeling (SEM). We constructed a high-order factor model using AMOS 18. We surveyed which factors affect user's knowledge and experience. As the result of SEM, the user knowledge was related with factors three and four. The user experience was related with factor four. We show an Anshin model in Figure 2. However, we found that the overall fit of this model is not acceptable with GFI (0.839), CFI (0.870), RMSEA (0.112).

Therefore, we needed to improve the Anshin model. We used modification index for the improvement of the Anshin model. The modification index is an index to determine whether we add a new path. We added four paths. The first is a path from question item 19 to 20. The second is a path from question item 22 to 23. The third is a path from Anshin factor to question item 19. The fourth is a path from Anshin factor to question item 22. The overall fit of this model turns out to be acceptable with GFI (0.957), CFI (0.971), RMSEA (0.054). The improved Anshin model is shown in Figure 3.

6. DISCUSSION
With our Anshin model with the four Anshin factors, we found that the four question items were related to Anshin. This result shows the possibility of a new factor. These question items represent usability. This factor represents not only usability from the viewpoint of information technology but also in terms of online shopping as a whole. Two question items show operability of online shopping systems. The other two question items show how the company responds to the users' queries.

We discussed the relationship between user's knowledge and the Anshin factor. The user knowledge was related to factors three and four. This result shows the possibility that factors three and four are Anshin factors for the users without information knowledge.
This result indicates that the user experience might affect factor three.

However, the relationship between user’s knowledge, user’s experience and Anshin is not yet clear. Therefore, we will survey the difference in tendency to attach a high value to Anshin factor by the difference of user’s knowledge level and experience level using Multivariate analysis of variance and multiple comparisons. These are techniques to determine whether there would be a difference between specific groups.

7. CONCLUSION

We produced a questionnaire about Anshin that reflected feedback from users without technical knowledge of information security. After a survey conducted on 888 subjects with the newly created questionnaire, our factor analysis extracted four factors for Anshin. We reported the construction of an Anshin model using four factors and user knowledge and experience. As a result, we found that the overall fit of the models are acceptable. We found that the four questions are related to factor one as well as Anshin. We thought that this shows the possibility of usability factor. We found the user knowledge and experience related to factor four. In this case, it is similar to the elaboration likelihood model.

In the future works, we will survey the relationship between usability and Anshin. Also, we will survey the relationship between Factor four and user knowledge using Multivariate analysis of variance.

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Reference