Article

Identifying and Addressing Needs of Heterogeneous User Groups—A Case Study from the Banking Sector

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Abstract: Adopting a need-based approach can help companies to create products and services that are preferred by their customers and improve their well-being, thus providing a competitive advantage. To put need-based designs into practice, it would be interesting to know how innovative product and service ideas can address the needs of a specific target group in a specific business domain. This paper presents an approach for (a) identifying such target group-specific need sets based on an online survey and (b) integrating them into the company's innovation processes as part of a Need-based Creativity Workshop. To illustrate and validate this approach, we present a case study that investigates varying need subsets for two different user groups of future banking products and services in France: adults with and without families. Our study shows that a different set of needs is important for each group and reflects upon the benefits and challenges of a target group-specific, need-based design approach to leverage a company's potential for innovation.

1. Challenges of Implementing Need-Based Design

In times of a rapidly changing economy and growing competition, companies are faced with the challenge to constantly generate new ideas for innovative product and services that differentiate them from their competitors [1]. To this end, it becomes increasingly important to take a human-centered design (HCD) approach that puts the requirements and needs of the target group at the center of product development [2–4]. It is no longer sufficient to simply offer customers products with the required functionality. Rather, the choice and use of a product is more and more influenced by the unforgettable experience it offers [1]. A positive user experience (UX) before, during, and after product use can positively influence aspects such as product bonding, brand loyalty, error tolerance, and motivation to keep using the product [5,6]. When creating innovative product and services, it is hence important to ensure that they positively influence the user's wellbeing by stimulating positive emotions and experiences. Approaches such as Design Thinking and experience-driven design have been proposed to facilitate HCD and UX in companies.

In the research field of user experience (UX), it has been argued that a positive UX is connected to fundamental, psychological human needs [5,7]. Products and services that are designed to fulfil certain user needs will create a positive UX, while the frustration of user needs will have negative effects on the UX [6]. Several taxonomies of user needs can be used in product design e.g., [6,8,9]. Each taxonomy proposes a different set of needs, although there are some overlaps. The needs that are most relevant across different taxonomies are autonomy, relatedness, and competence.

Most products and services are designed to address several needs, whereas the fulfillment of one need might impede the fulfilment of another. For example, an intelligent

banking application that invests money for you without your own effort might fulfil the need for comfort and money-luxury, but maybe also cause a feeling of lack of knowledge and loss of control, thus frustrating the needs for competence and autonomy.

While it can be concluded that needs can be a valuable source of inspiration for product and service innovation, the complexity of existing need taxonomies and interrelationships make it difficult for companies to integrate the need-based design approach into their innovation processes. In comparison, it is certainly interesting to use needs as a general inspiration to come up with new product and service ideas (as proposed by [6]), companies would benefit from a more practical approach to identifying the most relevant user needs for their product or service domain, and directly incorporating them in their product or service design. Even more so, it needs to be considered that products and services are hardly ever designed for one specific target group. As it can be assumed that different target groups have different stampings of needs, companies have to find a way to fulfil the diverging needs of the different target groups, while at the same time avoiding potential conflicts between their needs.

To summarize these challenges, companies are faced with the following questions when trying to apply a user-centered, need-based design process to innovative product and service design:

- Which subsets of needs are relevant for specific user groups of my specific field of business?
- How can these subsets be used to design different product variants or product series that address the diverging needs of the user groups?

The present paper addresses these questions. Based on the example of future banking products and services for heterogeneous user groups in France, we show how we can augment the human-centered design process to identify target group-specific user needs and use them for product and service innovation (Figure 1). To this end, we:

1. present a practice for identifying user need subsets for different target groups in a specific business field,
2. describe the "need sets" (i.e., combination of needs and related needs statements that are especially relevant for a certain target group in the specific business field), and
3. provide an overview of the "Need-based Creativity Workshop" that can communicate the need sets to the design team to fuel user-centered design decisions.
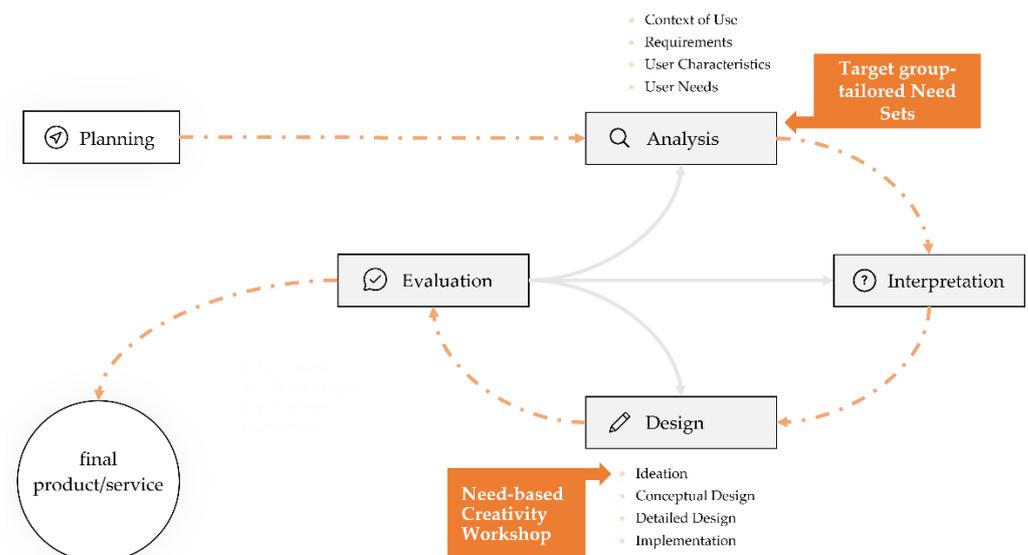

Figure 1. Our approach augments the human-centered design process: in the Analysis phase, target group-tailored need sets are derived. In the Design phase, the Need-based Creativity Workshop can be conducted to communicate the needs to the design team and use them as a basis for product and service innovation.

2. Methods and Tools for Need-Based Design

The goal of the present work is to provide methods and tools that support the assessment and integration of target group-specific user needs in human-centered product and service design for a specific context or business field. In the following sections, we present methods and tools that have been developed to support the definition, identification, and communication of relevant user needs and discuss their strengths and weaknesses.

2.1. User Need Taxonomies

User needs have been proposed as important concepts for designing a positive UX. UX is defined as a "momentary, primarily evaluative feeling (good–bad) while interacting with a product or service. [. . .] Good UX is the consequence of fulfilling the human needs for autonomy, competence, stimulation (self-oriented), relatedness, and popularity (others-oriented) through interacting with the product or service (i.e., hedonic quality)." [7]. Adopting a need-based design approach therefore means to identify the users' needs and find design solution for fulfilling them. If the important needs of the target group are not fulfilled or even frustrated, the UX will not be positive. Besides the set of needs mentioned by Hassenzahl [7] in the scope of UX design, a variety of typologies have been proposed, each consisting of a broad range of different needs [5–11]. They all focus on creating positive experiences and wellbeing, while varying the number of needs featured in each set. The needs mentioned by Hassenzahl [7] are based on the ten psychological needs by Sheldon and colleagues [9]. Another topology is defined by Reiss [11], focusing on the aspect of desires that lead to motivation for an interaction. The two aforementioned models have also inspired the creation of other need taxonomies e.g., [5]. Since so many different approaches exist, Desmet and Fokkinga [6] reviewed the current literature and composed a new taxonomy of 13 needs with the goal to combine the most relevant needs and structure them on two levels: 13 fundamental needs and 52 sub-needs illustrating them in more facets.

All of the approaches above propose a broad understanding of generic psychological needs which are relevant for all people, rather than focusing on specific needs that are relevant in a certain context, e.g., banking applications or on a certain target group, e.g., families, children, or older adults.

2.2. Identifying User Needs

User needs can be derived using qualitative methods (e.g., interviews, focus groups or contextual inquiries) or quantitative methods (e.g., questionnaires). Qualitative methods offer very rich insights into the potential needs of the target group but are time-consuming. Thus, they are usually conducted with smaller samples, which limits their representativity. To assess the UX and related user needs on a large scale, it is therefore common to use questionnaires.

The MeCue [12] measures the perceptions and emotions when using a product. Similar constructs are assessed by the AttrakDiff [13] that puts special emphasis on the hedonic quality of a product. Thus, both questionnaires are well suited for product evaluation. The UEQ-S questionnaire [14] measures product quality based on various criteria such as attractiveness or transparency and is built on underlying needs. However, it is not suitable for identifying the needs that users may have in a particular situation. The VisAWI questionnaire [15] only addresses facets of aesthetics and therefore does not allow any statements about needs and values.

The mentioned questionnaires were all designed to be employed during the evaluation phase of the human-centered design process, as they focus on the assessment of the UX of an existing product. There are only a few known questionnaires that can be employed to assess the qualitative aspects of UX in early project phases and to identify context- and user group-specific needs. Up to now, no method is available to assess user needs in a quantitative manner, especially not within a certain context and for a specific target group. To our knowledge, there is only one domain-specific questionnaire that has been used in

order to gain knowledge specifically for the particular context of the safety-critical domain of acute care [16].

2.3. Communicating User Needs in the Design Process

Since needs are rather abstract concepts, different tools to communicate them within a design team or user groups were developed. This step is very important, as it forms the basis for integrating the insights about user needs in the process of product or service innovation. Some approaches proposed card-based tools to support the need-based design process [7,17]. Each card contains information that makes the need more graspable for the design team such as an image, short description, examples, related emotions, or quotes. Desmet and Fokkinga [6] present a more visual approach: They created posters displaying all of the fundamental needs by the example of a chair design. In addition, they provide an explanatory overview of each fundamental need and the according sub-needs that elucidate different dimensions of a fundamental need. The overview includes a description of each need complemented with an image. Peters and colleagues [17] created video clips for the three needs autonomy, competence, and relatedness as a part of their toolkit for wellbeing supportive design workshop [18]. Each video features user quotes, design examples for supporting and impeding the need, and guiding questions to examine whether a need is addressed. The videos are used as a basis to inspire reflection about design decision that support and frustrate the respective need as well as ideas for redesign.

In addition to creating textual descriptions, images or videos of the needs, another approach is to make the needs tangible through interactive workshop activities, as proposed by the Needs Profile method [19]. In the Needs Profile workshop, participants explore different aspects of a need by acting them out as a gesture, building models using the Lego® Serious Play® method and creating personifications of needs using the persona technique and Empathy Map [20]. The results of the Needs Profile workshop can be used to fuel need-based design decision and the creation of prototypes [21].

3. Case Study: Differing Bank-Related Need Subsets of Adults with and without Families in France

With financial services going digital and increasingly fierce competition, banks have to become more customer-oriented, in order to survive on the market. This is all the more critical given that the banking sector suffered from a noticeable drop in customer confidence since the finance crisis after 2007 [22–25], which is still ongoing [26]. To cope with this, banks must focus on customer satisfaction and a positive customer experience.

Thus, a better knowledge of their customers becomes more and more essential for banks. This, however, cannot be limited to knowing their financial behavior and personal data. It is already widely known and researched how trust is especially important, yet it is an under-addressed factor when it comes to customer–bank relationships [23]. According to the 2014 Ernst & Young study [26], mistrust in banks is especially strong in Europe. To be able to regain people's trust, banks have to dive deeper and identify customers' goals, fears, motivations, and expectations with regard to new financial products and services. This in-depth knowledge of their customers can then fulfill several objectives for banks, in order to improve customer bonding and attract new target groups:

- Identifying products and offers (credit or savings) that are likely to interest a customer according to their age group, profession, family situation, etc.
- Proposing high-quality products and services that are adapted to the individual customer
- Targeting marketing campaigns and customer communication to the individual customer
- Anticipating the needs of prospective target groups in order to create matching attractive offers
- Personalizing all interactions with customers
- Improving the customer relationship journey

We demonstrate our approach for identifying the needs of different target groups based on a case study. The case study was conducted as a cooperation between the Fraunhofer-Institute of Industrial Engineering IAO (located in Germany) and the Orange Research Team (located in France) who is responsible for creating customer-centered, innovative services for Orange Bank. In the case study, we show how bank-related needs might differ between two predefined target groups: single adults (group "Adulthood") and adults with children (group "Family"). We present our two-step approach to identifying and quantifying the needs of the two groups. In a qualitative pre-study, we first identified 12 relevant needs for the banking sector. We then conducted a quantitative online survey that investigated how important these needs are to the participants. The results were analyzed for the two target groups separately to determine the three most important needs a bank should take into account when addressing the respective target group.

3.1. Method

An approach combining qualitative and quantitative methods was chosen for gathering insights into customer needs with regard to banking offers. The Orange Research Team uses six different target groups as a means of segmenting and clustering their customers in specific and similar groups. The present study focusses on comparing the needs between the two groups "Adulthood" (people older than 30, living on their own, and providing for themselves) and "Family" (adults living with and providing for at least one child). Other target groups were also included in the study but are beyond the scope of the present paper.

Figure 2 shows the different steps and main results of our methodological approach as well as the outcomes of each step in the presented case study.
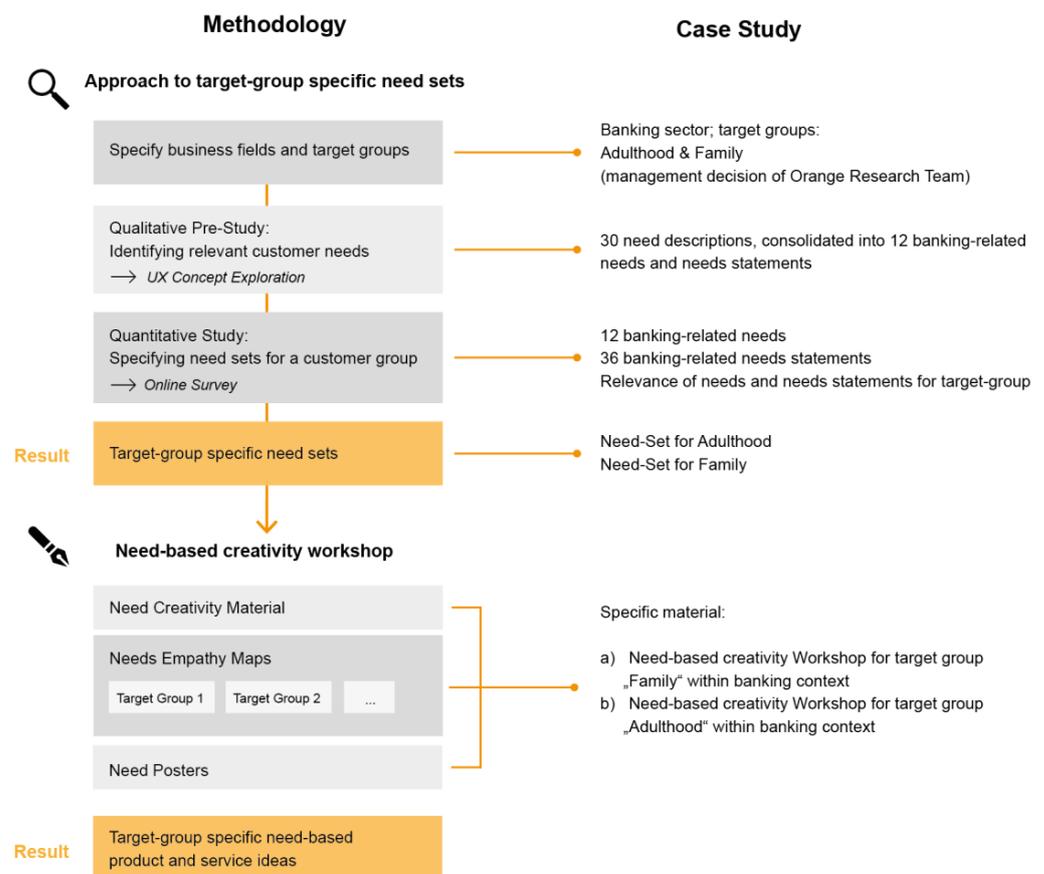

Figure 2. Overview of the methodological approach (**left**) and related outcomes of the case study (**right**): our approach consists of different steps in order to gather knowledge about the needs of a specific target group in a specific business context. These results will then fuel a creativity workshop to generate new product and service ideas.

3.1.1. Qualitative Pre-Study: Identifying Relevant Customer Needs for a Specific Field of Business

We first took a qualitative approach to gathering relevant user needs. We conducted a UX concept exploration [5,21,27] study so we could find out in detail which needs are especially important for a certain person in the context of banking, as well as the underlying motivation and reasons. A total of 24 participants in France and Germany took part in the one-week study and reflected on their values, needs, and bank-related behavior. To do so, they received templates and materials and completed a task each day for a week. Similar to experience probes [28], they were closely monitored and repeatedly asked to elaborate on certain aspects and give their creative reflection. In-depth interviews took place at the end of the study to deepen relevant topics and gain a more detailed understanding of the individual needs. Results from this qualitative approach have been condensed to user boards, which visualized the needs, relevant statements, and thoughts of each participant. From the UX concept exploration study we deduced 30 concepts that referred to user needs in the context of banking. Considering the need taxonomies mentioned above (Section 2), those concepts were clustered and summarized under 12 needs. Those needs were the ones that turned out to be the most important bank-related needs during the user study.

Table 1 shows an overview of the 12 needs and their association with the needs from different need taxonomies. For two of the needs ("safety" and "societal impact") two references were combined, and for three other needs ("data security", "family", and "innovation") existing definitions were altered slightly, in order to create a definition that matches the results from the pre-study more accurately. For the need of "trustfulness", no existing definition could be found, as this need is usually addressed as part of needs evolving around connecting with other people such as "relatedness", "benevolence", or "positive relations with others". However, the results of our pre-study as well as literature research strongly indicated that this need is important in the context of banking and financial services and was therefore considered as a separate need for our case study.

Revisiting the results of the user board for these 12 needs and the result of the qualitative approach, we found different statements that are characteristic expressions for this need.

To make the needs measurable and quantifiable in the follow-up online survey, we created four representative statements for each of the 12 needs. Each statement described a specific characteristic of a person with a high stamping on the specific need. The statements were phrased based on the results of the pre-study. Two researchers revisited the materials and comments produced by the participants of the pre-study and noted down all of the aspect that were associated with a specific need. After that, these collections of several statements were reviewed and rated by four members of the research team to determine the four statements that best describe each need. In this process of selecting representative statements for each need, it became obvious that needs are multifaceted constructs, as, e.g., also shown by Desmet et al. who presented 52 sub-needs detailing the 13 fundamental needs [6]. Each need combines different aspects that concern people or, positively speaking, create positive experiences for them when interacting with a bank. Therefore, the goal of the selection process was to represent the most important aspects of each need rather than finding different verbal expressions for the same aspect. The four statements selected for each need were used to create a questionnaire to assess the bank-related user needs of the different life cycle groups. Table 2 provides an example, showing the four statements chosen to represent the need "autonomy".

Table 1. Overview of the 12 needs identified as important in the banking context, their definition and, reference to related need taxonomies.

| Need	Definition	Reference
Safety	Needing structure, the absence of danger, and the independence of outer circumstances, especially with regard to saving.	Combined aspects of Fronemann and Peissner, 2014 [5] and Reiss, 2004 [11] (need "ownership")
Data Security	Feeling that your personal data is kept safe from harm and threats.	Adapted from the definition of "security" by Desmet and Fokkinga, 2020 [6] with a focus on personal data
Autonomy	Being the cause of your actions and feeling that you can do things your own way, rather than feeling as though external conditions and other people determine your actions.	Desmet and Fokkinga, 2020 [6]
Competence	Feeling that you are very capable and effective in your actions rather than feeling incompetent or ineffective.	Sheldon et al., 2001 [9]
Idealism	Feeling that the world is a moral place and being able to act in line with your personal values, rather than feeling that the world is immoral and your actions conflict with your values.	Desmet and Fokkinga, 2020 [6] (need "morality")
Family	Desire to raise own children and make your decisions in their best interest.	Adapted from Reiss, 2004 [11]
Bonding	Having warm, trusting interpersonal relations, characterized by empathy and affection.	Ryff, 1989 [29] (need "positive relations with others")
Comfort	Having an easy, simple, relaxing life, rather than experiencing strain, difficulty, or overstimulation.	Desmet and Fokkinga, 2020 [6]
Trustfulness	Feeling that you can completely trust a person's actions and advice, rather than having to monitor them.	Own definition
Money	Feeling that you have plenty of money to buy most of what you want rather than feeling like a poor person who has no nice possessions.	Partala and Kalllinen, 2012 [30] (need "money-luxury")
Innovation	Being stimulated by and finding pleasure in novel, varied products and services.	Adapted from Desmet and Fokkinga [6] (need "stimulation")
Societal Impact	Being a reliable and trustworthy member of society with a desire to improve society (including altruism, justice).	Schwarz, 1994 [31] Reiss, 2004 [11] (need "idealism")

Table 2. Statements used for need "autonomy".

No	Statement
1	I manage my finances myself and do not need any help.
2	A main bank that obliges me to have my salary account with it is unacceptable for me.
3	I am responsible for making the right financial decisions for myself, not my bank.
4	I feel best when I make my financial decisions independently

3.1.2. Online Survey: Specifying Need Sets for a Customer Group

The study procedure for the online questionnaire was as follows (also compare Figure 3): at the beginning, participants were asked to fill in a screening questionnaire. The answers to this questionnaire were used to assign every participant to the matching target group. This was carried out by providing seven short descriptions of living situations. The participants had to indicate which of them described their own current living situation best. Four of the descriptive texts matched the four customer groups defined by the Orange research team. The other three did not match any of them, but described other living situations (e.g., retirement). Participants who chose one of these three descriptions were excluded from the study. For the two groups that are investigated in the present study, the following descriptions were used:

- Adulthood: I am living alone without a partner. I might be divorced. I have a solid job with regular income and can provide for myself. I am over 30 years old.
- Family: I have at least one child that is financially dependent on me.
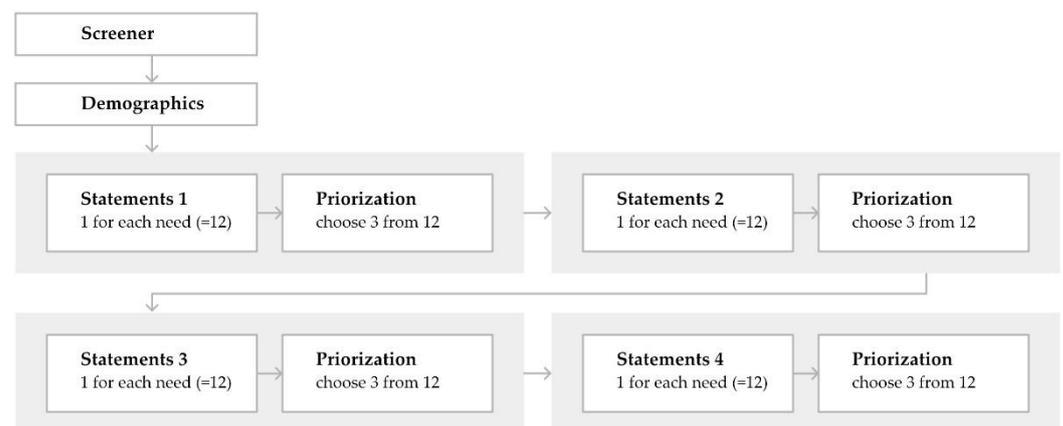
Figure 3. Overview of the different phases of the online survey.

Participants who fit into one of the groups were directed to a demographic questionnaire inquiring about the age, gender, relationship status and number of children, level of education, employment status, and income. These data were used to further characterize the different groups of participants.

After that, the main part of the questionnaire began which focused on the evaluation of the 12 needs. For each of the 12 needs, the four characteristic statements were included in the questionnaire (in total: 48 statements). For each statement, participants indicated their approval on a 5-point Likert scale, ranging from 0 = strongly disagree to 4 = strongly agree. Agreeing with a statement implies that the corresponding need is important for the participant.

After showing approval for 12 statements, the participant marked the three most important statements to them. This was carried out after every set of 12 statements, i.e., 4 times in total.

3.1.3. Participants

Participants were recruited via a professional recruitment agency and received monetary compensation for their participation. Four hundred and eighty-nine participants from France took part in the online questionnaire. One hundred and forty-eight participants were excluded from further analysis due to their response time (<4 min) or patterned answers. Thus, 341 datasets were entered into the data analysis. These datasets were divided into different target groups. This paper focusses on the target groups *Adulthood* and *Family*. The demographics of these two groups are displayed in Table 3.

Table 3. Demographical characteristics of the participants of the two target groups.

Target Group	Sample Size	Mean Age	Mean No. of Kids	Female	Male
Adulthood	50	22.4	0	25	25
Family	173	42.1	1.9	82	91

3.2. Results

We analyzed the data with regard to two questions:

Q1: Which needs are most important for the participant group?

Q2: Which aspects of the needs are particularly important for the participant group?

To answer Q1, we analyzed participants indications of their three most important need statements. Two indicating numbers were determined as meaningful to identify the most important needs for the target group:

- The *total number of prioritization votes* represents the sum of the votes of all participants assigned to the statements related to a particular need in the four prioritization rounds of the questionnaire (compare Figure 2). The needs that receive the highest number of prioritization votes can be regarded as the *need that is most pronounced* within the sample. The total number of prioritization votes can range from 0 to *n**4 (sample size multiplied by four).

- The *prioritization score* represents the percentage of the target groups that considers a need to be important. To calculate the prioritization score of a particular need, we counted the number of participants who selected at least one of the four need statements during the prioritization rounds. We then calculated the percentage value of this count in relation to the sample size. The prioritization score can thus be a percentage between 0% (no participant selected any statement for this need) to 100% (all participants selected at least one statement for this need). The prioritization score can hence be used to determine *which need is important for most people* in the target group.

To answer Q2 we analyzed the ratings for each individual need statement by calculating the mean rating for the statement for each participant group. A statement was labeled as particularly important if it received a mean rating of 2.5 or higher. We also looked at the distribution of answers (strongly disagree–strongly agree) and only considered statements with a small standard deviation (SD): either all statements with a SD below or equal to 1. If there were no statements with a SD below or equal to 1, then the two statements with the lowest SD were considered.

3.2.1. Resulting Need Set User Group "Family"

For the group "Family" (*n* = 173) the following needs were identified as most important:

- Autonomy
- Safety
- Bonding
- Competence
- Societal Impact

Statements related to Autonomy, Safety, Bonding, Competence and Societal Impact received a total of 226, 221, 219, 205, and 201 prioritization votes, respectively. The prioritization scores were calculated to be 33% for Autonomy, 32% for Safety, 32% for Bonding, 30% for Competence, and 29% for Societal Impact (Table 4).

Table 4. Prioritization Results for the Target Group "Family".

Need	No. of Prioritization Votes	Prioritization Score
Autonomy	226	33%
Safety	221	32%
Bonding	219	32%
Competence	205	30%
Societal Impact	201	29%

In order to answer Q2, we revisited the results of the questionnaire and assessed the approval for each individual statement for these five most important needs. The need statements that surpassed the threshold are presented in Table 5.

Table 5. Need Statements for the Target Group "Family".

Need	Statement	Statement Rating (Mean)	Statement Rating (SD)
Autonomy	I manage my own finances and do not need help.	2.73	1.00
Autonomy	It is up to me, not my bank, to make the right financial decisions for myself.	2.69	0.86
Autonomy	I feel better when I make my financial decisions independently.	2.76	0.91
Safety	I think a bank is safer if it has branches and is not just an online bank.	2.70	1.20
Safety	Saving is the best strategy to make my money grow.	2.54	1.09
Bonding	I need a stable/long-term personal contact with my bank advisor.	2.54	1.19
Bonding	Once I have found a bank where I feel safe and cared for, I stay there and manage all my banking transactions without considering other banks.	2.92	0.98
Competence	I fully understand all the banking products I have purchased so far.	2.82	0.96
Competence	It is important for me to be the expert myself in all my banking transactions.	2.63	0.91
Societal Impact	A good bank should pay special attention to people with financial problems, supporting and guiding them.	2.90	0.91
Societal Impact	My bank should act as a "guardian angel" and protect me from debt.	2.83	0.94
Societal Impact	I expect my bank to take social responsibility and ensure, for example, that despite digitalization, older people also have reliable access to banking transactions.	2.86	1.00
Societal Impact	A bank has a responsibility to accompany young adults and help them shape their future.	2.76	0.89

3.2.2. Resulting Need Set for User Group "Adulthood"

For the group "*Adulthood*" ($n = 50$) the following needs were identified as most important:

- Societal Impact
- Safety
- Idealism
- Data Security
- Bonding

Statements related to Societal Impact, Safety, Idealism, Data Security and Bonding received 65, 67, 56, 53, and 59 prioritization votes, respectively. The prioritization scores were calculated to be 42% for Societal Impact, 32% for Safety, 30% for Idealism, 26% for Data Security, and 25% for Bonding (Table 6).

Table 6. Prioritization Results for the Target Group "Adulthood".

Need	No. of Prioritization Votes	Prioritization Score
Societal Impact	65	42%
Safety	67	32%
Idealism	56	30%
Data Security	53	26%
Bonding	59	25%

In order to answer Q2, we revisited the results of the questionnaire and assessed the approval for each individual statement. For each need, we found two statements that surpassed the threshold (Table 7).

Table 7. Need Statements for the Target Group "Adulthood".

Need	Statement	Statement Rating (Mean)	Statement Rating (SD)
Societal Impact	A good bank should pay special attention to people with financial problems, supporting and guiding them.	2.9	0.91
Societal Impact	A bank has a responsibility to accompany young adults and help them shape their future.	2.92	0.97
Safety	My biggest concern is losing money through my bank.	2.7	1.18
Safety	I think a bank is safer if it has branches and is not just an online bank.	2.6	1.26
Idealism	When I choose my bank, it is crucial to me that it supports environmentally and ethically sound projects.	2.64	1.17
Idealism	I will invest mainly in environmentally friendly and ethically correct projects—even if this means making less of a profit.	2.64	1.01
Data Security	I feel uncomfortable when my bank collects personal information from me, and I cannot quite track what it is being used for.	2.62	1.18
Data Security	The thought of my bank account being hacked scares me to death.	2.86	1.26
Bonding	Once I find a bank that makes me feel comfortable and cared for, I stay there and do all my banking without considering other banks.	2.98	0.89
Bonding	I feel I am in good hands with my bank when it has branches near me.	2.84	0.89

4. Tools for Target Group-Tailored, Need-Based Design

The identified need sets in themselves yield valuable information about aspects that should be addressed when offering banking products and services to the two target groups. Still, in order to fully benefit from a target group-tailored, need-based design approach, companies also require guidance on how exactly they can use the need sets in their everyday development and innovation processes. Therefore, we developed a tool, the "Need-based Creativity Workshop", that enhances the human-centered development process at Orange Innovation using materials that help to immerse into the needs and mindset of the specific target group and we use this to generate new product and service ideas. The tool can be applied in the design phase of the development process (Figure 1) and is described in detail in the next section.

4.1. Need-Based Creativity Workshop

The Need-based Creativity Workshop is aimed at developing innovative product and service ideas for a specific user group. To do so, the need set of a specific target group is used as a starting point. As described above, a need set features the five most prominent needs of the specific target group. The workshop is located in the early design stage of the project. It builds upon the methodology of the "UX Innovation Workshop" that we described in earlier work [19,32]. The "UX Innovation Workshop" integrates aspects of Design Thinking for self-exploration and sensitizing of needs, empathizing, and brainstorming. We extended it by adding a focus on target group-specific need sets with "Need Posters" and an adapted

"Needs Empathy Map". Table 8 shows the overview of the different workshop phases, their goals, and materials.

Table 8. Phases of the Need-based Creativity Workshop.

Time Frame	Phase	Goal	Tasks and Materials
15 min	0: Introduction and Warm-Up	Telling participants about the goal of the workshop Getting to know the participants Getting into a creative mindset and acquainted with the concept of needs	Self-exploration of needs; "Need Creativity Material" for exploring the needs
30 min	I: Sensitize	Exploring what the relevant needs mean for the target group Activating participants' bodies and brains	"Need Poster" for each of the five needs
30 min	II: Empathize	Taking the perspective of the target group Making the needs tangible Creating need combinations and a concrete anchor point for ideation	"Target group-specific Needs Empathy Map"
30 min	III: Ideate	Developing innovative product / service ideas for the target group based on needs	Post-its, Pens
45 min	IV: Prototype (optional)	Visualizing the most promising concepts	Prototyping material

4.1.1. Phase 0: Introduction and Warm-Up

When conducting the workshop in a corporate context, it cannot be assumed that the workshop participants are already familiar with the specific characteristics of their target groups or with the concept of needs. Therefore, the workshop starts with two tasks that allow the participants to get acquainted with the concept of needs by exploring their own needs. First, each participant receives one of the five needs of the target group-specific need set and is asked to spontaneously act out a gesture that expresses what this need means to him/her. For the second task, cards representing the five needs are placed on the floor and participants are asked to position themselves among these cards to indicate how important the needs are for themselves. The two tasks are followed by a brief discussion about the five needs and how they relate to the workshop participants.

4.1.2. Phase I: Sensitize

To make it graspable for all of the workshop participants as to what the five needs mean to the target group, the tool "Need Posters" was developed. Each "Need Poster" represents one need and contains a small definition of the need as well as the need statements that were shown to be relevant. Posters also contain one or more representative quote (taken from the qualitative pre-study) and some room for notes. The "Need Posters" are presented to the participants as a poster exhibition. Participants walk around the room, can immerge themselves in the different posters, and take notes to document aspects that might be important to the target group in respect to addressing each particular need. Thus, the "Need Posters" are collaboratively extended and refined by the workshop participants.

Figure 4 shows an example of the "Need Poster" for the need "Autonomy".

4.1.3. Phase II: Empathize

In this phase, participants are encouraged to take the perspective of the user group and their need combinations, in order to find a concrete anchor point for innovative product and service ideas. To do so, a target group-specific "Needs Empathy Map" is used (Figure 5). The Needs Empathy Map was proposed by Krüger et al. [19,33] and modified by us. To focus on the target group-specific needs set and to facilitate the development of a persona that represents the target group, we changed the bottom part of the "Needs Empathy Map" from general needs to the target group-specific needs set (Figure 6). To ensure that the needs are at the center of their attention, our modified "Needs Empathy Map" features a separate area for each need as proposed by [33] (colored columns in Figure 6). These

areas contain a short definition of the need and the need statements most important to the selected user group. Thus, it is ensured that the participants always have the relevant needs present when working with the persona template (filling in the persona's profile, behavior, quotes, thoughts, and feelings). The created persona forms the basis for the next workshop phase.

Figure 4. Need Poster employed to help workshop participants to understand and reflect on the need "Autonomy".

Figure 5. Working with a Needs Empathy Map (Phase II: Empathize).

Family France

DO, SAY		THINK, FEEL
	PROFILE Age, Education, Profession, Private Life, Hobbies	

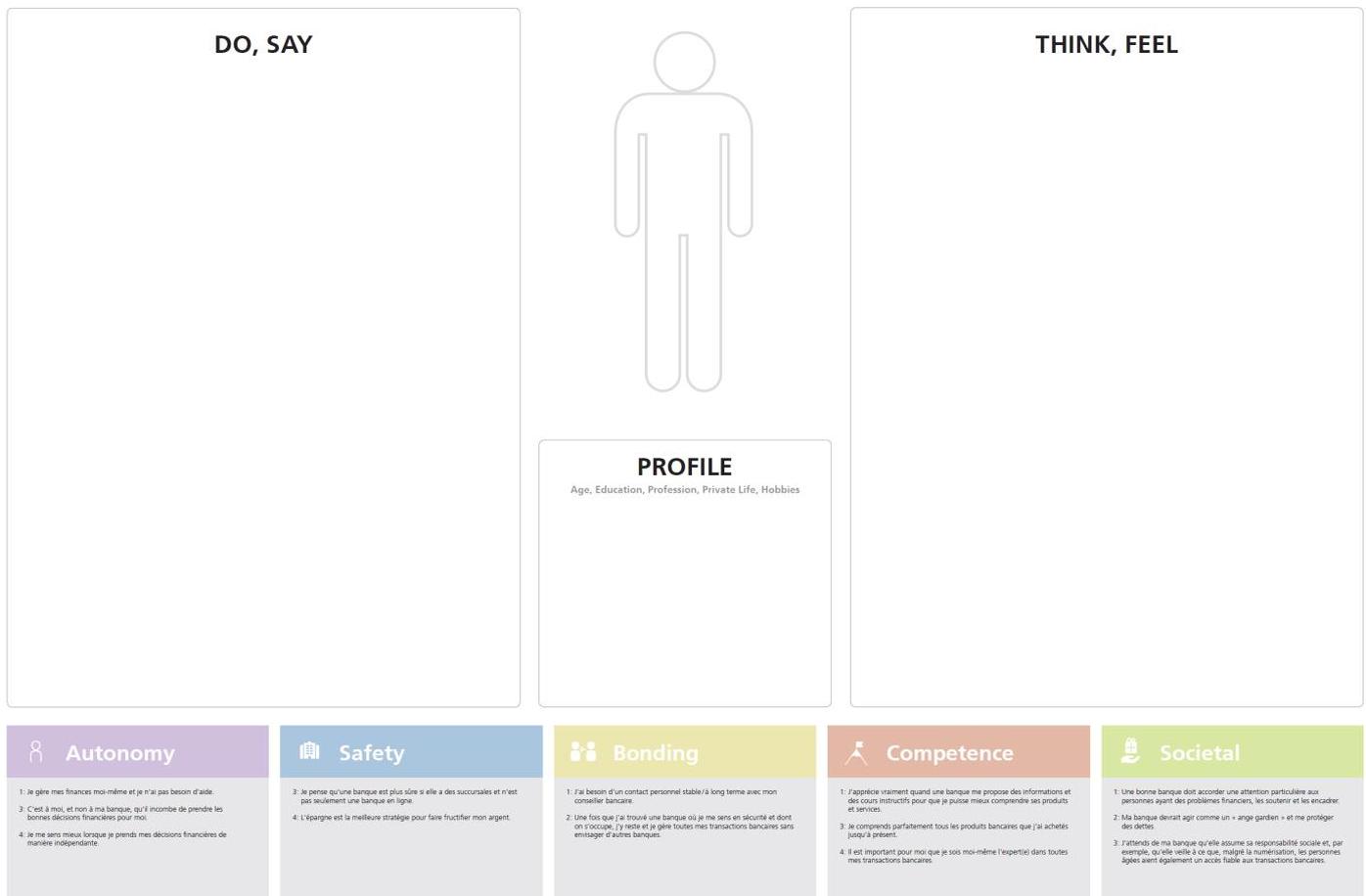| Autonomy	Safety	Bonding	Competence	Societal
1: Je gère mes finances moi-même et je n'ai pas besoin d'aide. 3: C'est à moi, et non à ma banque, qu'il incombe de prendre les bonnes décisions financières pour moi. 4: Je me sens mieux lorsque je prends mes décisions financières de manière indépendante.	3: Je pense qu'une banque est plus sûre si elle a des succursales et n'est pas seulement une banque en ligne. 4: L'épargne est la meilleure stratégie pour faire fructifier mon argent.	1: J'ai besoin d'un contact personnel stable/à long terme avec mon conseiller bancaire. 2: Une fois que j'ai trouvé une banque où je me sens en sécurité et dont on s'occupe, j'y reste et je gère toutes mes transactions bancaires sans envisager d'autres banques.	1: J'apprécie vraiment quand une banque me propose des informations et des cours instructifs pour que je puisse mieux comprendre ses produits et services. 3: Je comprends parfaitement tous les produits bancaires que j'ai achetés jusqu'à présent. 4: Il est important pour moi que je sois moi-même l'expert(e) dans toutes mes transactions bancaires.	1: Une bonne banque doit accorder une attention particulière aux personnes ayant des problèmes financiers, les soutenir et les encadrer. 2: Ma banque devrait agir comme un « ange gardien » et me protéger des dettes. 3: J'attends de ma banque qu'elle assume sa responsabilité sociale et, par exemple, qu'elle veille à ce que, malgré la numérisation, les personnes âgées aient également un accès fiable aux transactions bancaires.

Figure 6. Needs Empathy Map (Phase II: Empathize).

4.1.4. Phase III: Ideate

Based on the Needs Empathy Map, an ideation session is conducted, consisting of silent brainstorming, clustering, and evaluation of ideas. During silent brainstorming, each participant develops ideas for her-/himself in order to answer the question: which new banking product or service could you create to perfectly match the needs of your persona? The ideas are then presented to the whole group, clustered, discussed, and evaluated to choose the most promising ideas.

4.1.5. Phase IV: Prototype

To make the ideas developed during the ideation phase more tangible and convincing, a prototyping session can be included in the workshop. Participants work together as a group, concentrate on one or two ideas and elaborate on them through collaborative prototyping activities. Prototypes should be of low fidelity, for example storyboards, pen and paper prototypes, or roles plays.

4.2. Benefits of the Tools for Target Group-Tailored, Need-Based Design

This need-based method, detailed above, is a framework that is used by the research team at Orange to support their daily work. It has been tested in the scope of their innovation processes, which suggests that it can be valuable for companies who want to make their technical developments more customer-centric and leverage the advantages of user-driven innovation. The target group-tailored need sets guides design choices in a rational and objective way to avoid the pitfalls too often observed in the design

of innovative services, namely technology-push ideas and personal preconceived ideas ("personal idea push"), sometimes on the initiative of a single person.

Knowing the specific needs of particular user groups feeds the reflections for the design and innovation of new products and services. In this perspective, this method allows the real expectations and pain points of banking customers to be met to target their financial well-being. Thus, financial services can be adapted to the prioritized needs of each customer by ensuring that the features offered are consistent with individual preferences.

4.2.1. Benefits on In-Depth Customer Knowledge

Based on the need-based design approach, the research team knows why customers will choose a particular bank or financial product and what they expect from their bank. This is a differentiating advantage to in-depth customer knowledge, which is crucial in the field of highly competitive banking between traditional banks on the one hand and online banks on the other hand. It is also a source of an indication of how the target group and their needs will evolve as they age.

4.2.2. Benefits for the Development of New Methodological Approaches

In this case study, the target group-tailored, need-based design approach with its proposed methods was used in the context of financial services. However, the methodology is generic and can also be used for other application areas and fields of everyday life in which there is a voluntary action of the customers to buy or consume a product and service. Moreover, it is not only applicable to customers, but can also be used with other specific target populations, e.g., professionals.

Another advantage of this method is that it involves different actors from the company who are not used to taking part in the ideation process. The tools and guidelines for the Need-based Creativity Workshop make it feasible to include different stakeholders in an efficient and effective way and found the basis for a common vision among the stakeholders of a project during its entire lifecycle.

This proposed methodology makes it possible to extend established, well-known methods such as personas, by adding more depth to them based on real customer data. As a result, the needs and expectations of the developed personas are more specific and thus provide an explanation of the motivations of potential customers. The needs of the user group become tangible. It is thus easier to embody such a persona of a particular group to imagine the corresponding banking services which alleviate its problems

4.2.3. Comparison of our Approach with Other UX Approaches

UX approaches often build upon a highly strategy-driven process. For example, Levy [34] mentions business strategy and value innovation as two tenets, as well as Killer UX Design. Therefore, validated user research is only one of four pillars which seem to be equally ranked in terms of timing and importance. Our approach builds on the assumption, that needs are fulfilled or frustrated in every experience with a product and service and they therefore determine their success. Our approach additionally suggests a chronological order: it focuses on in-depth user research before being able to formulate strategies and value innovations. Our approach as well as other need-based UX approaches as suggested by [6,10,30,35] usually see the user's needs as a source for inspiration, that help with identifying new business strategies and value innovations.

It is often stated that the needs a person might have when using a product or service can differ depending on the individual situation and the specific context of use [2,36–38]. This is, however, often not acknowledged by existing need taxonomies and need-based user research approaches which focus on characterizing the whole number of needs relevant for UX design. Our approach extends the existing body of research by offering a methodology for selecting the needs that are potentially evoked by a specific context (products and services in a specific business area) and for determining those needs that are of special importance for different customer groups.

5. Conclusions and Future Work

This paper presents an approach for identifying target group-specific user needs for a specific business domain. The goal of the approach is to support companies in integrating a need-based design approach in their innovation processes. This enables them to offer tailored product and service solutions to their customers, and, in the long run, to improve the customer–bank relationship and the customers' well-being. Our approach contains a methodology for identifying user need subsets for a specific business field based on an online survey and the Need-based Creativity Workshop for communicating the resulting need sets to the design team and incorporating them into the future product and service design.

To illustrate and validate our approach, we presented a case study that investigated varying need subsets for two different user groups of future banking products and services: adults with and without families. The study results show that different needs need to be addressed when developing banking offers for the two groups.

The presented approach and resulting need sets have been used by Orange Innovation Labs to enrich the development of ideas for innovative banking products and services. They frequently work with the need subsets and the Need-based Creativity Workshop to convey the concept of need to other groups of expertise within the company. Of course, the need sets for the two target groups can only be regarded as a first step towards target group-tailored products and services. Based on our approach, we are currently finalizing our research on the needs for other key customer groups of banking applications in France, e.g., teenagers or young couples, as well as in other countries of business interest, e.g., Spain. It will be particularly interesting to compare the need sets for the same target group in different countries and thereby gain insight into cultural differences of need stampings.

Besides a broad range of need sets, companies would also benefit from an extension of the approach that enables them to evaluate to what extent existing products and services already address the needs of the target group. The need-based approach could then be used to compare banks with each other on objective criteria, evaluate them according to the described needs, and identify suggestions for improving or altering them for the specific target groups.

The approach presented in this paper is not limited to the banking sector. It provides a general methodology that can be used to determine relevant needs for other business areas and their target groups. The application in another business area or market would require the same steps as presented in Figure 2, starting with a careful analysis for a specific market that would then produce context-specific need statements. However, the application of the method might be more time consuming in certain application areas as compared to others. Our approach relies on people being able to articulate their needs within a short period of time. While the chosen method "UX concept exploration" grants some days (in our case, 5 days), to reflect on the topic, this might not be enough time when applying the method to new, emerging markets. Some people might not be able to articulate their needs without practicing and learning more about the topic, so a more creative approach and a more in-depth UX concept exploration phase would be appropriate.

While our case study and daily experience show the benefits of the described approach, the methodology also has some shortcomings that should be considered when applying it. Needs are still very individual and can strongly diverge, even for people who —by definition—belong to the same user group. Our approach requires the prior definition of user groups based on certain characteristics, such as, in our case study, age and living situations. Of course, each person assigned to a specific group also has other characteristics that might bring out a particular need. The reliability of the target group-specific need set therefore strongly depends on the definition of the target group. The need subsets can only be regarded as an approximation of those needs that might be of special importance for members of the target group. A guaranteed fit of user needs and product design could only be realized by assessing the relevant user needs and characteristics for each individual user and by creating products that are adaptable and customizable so that they can easily be

tailored to the individual user. While this is certainly a desirable perspective, it requires substantial work and brings up additional challenges revolving around data security. Still, even if the accuracy of the approach is limited, working with need subsets can still improve the awareness of user needs within the design team and support the development of products and services that address the user needs of the target group in an explicit way. This can be regarded as a huge benefit, especially for companies that, until now, have not taken user needs into account in their innovation processes.

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