

Appendix

Appendix A

A.1 Customization

Understanding Personalization and Customization

To ensure clarity and prevent misunderstandings, it is important to define the terms customization and personalization and how they will be used during this literature. Personalization is described as a concept initiated by the company, whereas customization, conversely, is regarded as a concept initiated by the customer (Allen et al., 2001; Montgomery & Smith, 2009). Additionally, personalization is considered an umbrella term, encompassing customization as a subfield to implement personalization (Fan & Poole, 2006; Sunikka & Bragge, 2008).

Personalization for a company means presenting and using personal-level information in the interactions and transactions with customers to individualize customer experience and enhance marketing effectiveness. This represents a competitive advantage in the today's market where knowledge-driven business is crucial. (e.g., Aguirre et al., 2015).

Personalization emphasizes a distinct marketing focus, which centers on prioritizing the customer in order to deliver "the right content in the right format to the right person at the right time" (Tam & Ho, 2006).

On the other hand, customization is a concept in which a more active involvement is required to the users. Even though the company must set constraint to the customization freedom of the users the more and more advanced manufacturing techniques are promoting the creation of products that are more and more tailored. In the paper by Bleier et al. (2017) "Customer Engagement Through Personalization and Customization", the authors define the maximum level of customer independence in choosing a specific aspect of the devices as "Full customization". Here the customer has almost total control over any feature of the product (Jimenez et al. 2013). This is possible due to new technologies and depending on the target business.

Specifically, one study conducted at the Limbitless Solution Laboratory by Marasa, shows how customization plays an important role in establishing strong attachments between users and their prosthetic devices. Findings revealed that enabling users to customize their prostheses fosters a positive sense of identity, allowing them to perceive the prosthetic as an extension of themselves, leading to enhanced self-esteem and social freedom.

Customization and personalization are business strategies widely applied in many different market sectors from the wearable to the automotive to the online platform. To clarify even more the difference between these two concepts some examples are reported below:

Examples of customization:

On the Ray Ban official website it is possible to match different combinations of frame's colors and lenses' characteristics.

HOW IT'S DONE

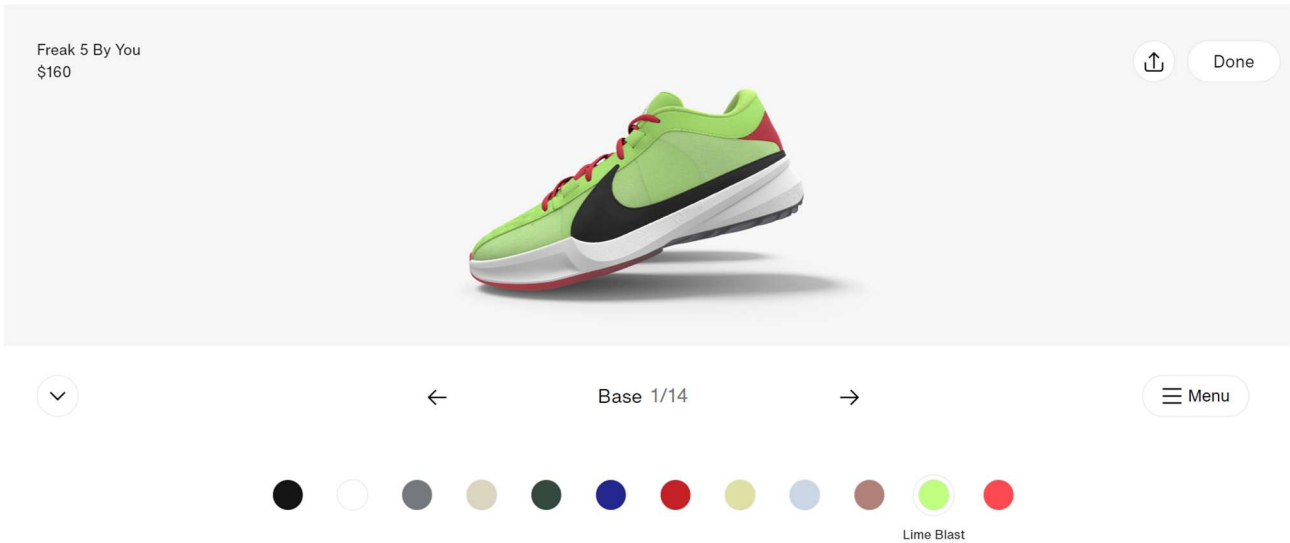
Make it personal in 5 simple steps.



Apple offer a selection of bands for the apple watch. By purchasing different watch bands, the clients are able to change the look of their single clock face.



Nike offer its client the opportunity to choose colors or material regarding all the components of the shoes.



Examples of personalization:

Lay's potato chips ran a campaign allowing customers to personalize their chip bags with their own photos and messages. The "Lay's Summer Days" campaign enabled buyers to personalize their bags for special occasions or personal touches.



Apple offers personalization services for their devices. Customers can engrave messages, names, or symbols on products like iPads, iPods, AirPods, and certain models of iPhones and MacBooks, adding a personal touch to their Apple devices.

Engrave your AirPods, AirTag, Apple Pencil (2nd generation), or iPad with a mix of emoji, names, initials, and numbers. All for free. And only at Apple.



Customization the company play a role in deciding what are the constrain of course otherwise would not be worth it for the company. Depending on the kind of business, the solution that a company can offer to their client can follow different principles and be presented to the clients throughout different platforms. The next paragraphs will illustrate the different approaches.

The Role of Customization on the Users

Humans are expressive as a specie. Foresight factory estimated that by 2025 a third of every consumer will have a customized product. Users tend to be overwhelmed by mass market options and tend to value more what they create themselves by also willing to pay more for those customized product. The users do not want to be consumer anymore, but they want to be co-creators. This is not a surprise if we look at the DIY (Do-It-Yourself) culture which embodies a participatory approach and a distinctive ethos towards technology and materials. (Lealand, 2016). Instead of relying on "complete" products readily available as ready-to-use items, DIY encourages engaging with technology and materials through hands-on involvement and personal customization. The DIY culture fosters a sense of empowerment, creativity, and resourcefulness. It boosts individuals to experiment, learn from mistakes, and share their knowledge with others in a collaborative and supportive community this leads to an increased sense of personal satisfaction.

If we look for example at the psychological implications of customization in luxury brands, it was found that customized luxury offers, positively affected subjective well-being. (Choi et al., 2022) The customization effect was mediated by feelings of self-authenticity, leading to increased well-being behavior. Tailored solutions allow consumers to express and reflect on their identity and values, which enhances their well-being.

On a business strategy and marketing level, customization can be used as a tool by the company to provide and maintain a sense of exclusivity while appealing to the masses (Yoo & Park, 2016).

The reason why the feeling of self-authenticity influence people's well-being can be found in the theory of the "Thirteen fundamental psychological needs" presented by Desmet (2020). This classification can be considered universal, "Although individuals may have different goals and wishes on the surface, deep down we all want the same things. Our fundamental needs are universal: regardless of culture, age, and lifestyle, everyone ultimately has the same set of needs." The effect of personalization and customization would touch many of the needs

presented in Desmet's theory in particular the need for "Autonomy" would be enhanced by giving the users the opportunity to express themselves and their individual preferences.

Self-authenticity is a personal value that motivates one's actions (Erickson, 1995). It foresees that individuals match their inner thoughts and feelings with their external expressions and behaviors (Goor et al., 2020). In contrast, an inauthentic individual violates their identity and values (Glaser and Strauss, 1964, Jung et al., 2021). Expressing self-authenticity is crucial for individuals because it increases their perceived life satisfaction, leading to enhanced subjective well-being (Cable et al., 2013, Erickson, 1995, Painsil and Kim, 2021).

Customization principles and platform

The psychological principles below can better explain how human mind deal with customization. Those principles and platform set up can be used as guidelines and can be selected depending on the target market or on the kind of business pursuit.

1. Customization principles

- "Paradox of Choice": by Barry Schwartz (2004) refers to the feeling of being overwhelmed by too many choices or a blank canvas. The "enough" selection of choices depends on many factors related to the context and the market segment targeted. Determining these choices properly will assure user engagement instead of intimidating the customer.
- Co-creation Strategy: ensure user engagement throughout the customization process. The user what to be supported with guidance from experts. This can be done in various formats and with different approaches. The amount of advice can go from small tips to a full co-creation with the brand.
- The Experience Focus: places a strong emphasis on the entire product journey, offering users the chance to engage with customization not only during the initial purchase but also throughout their ongoing use, maintenance, and end-of-life phases. This principle paves the way for innovative modular design approaches, allowing for minor adjustments while maintaining a core structure. Such solutions offer flexibility and adaptability to meet evolving needs, resulting in reduced production costs and, subsequently, lower prices in the market. Ultimately, this approach leads to greater long-term user satisfaction.
- Sharing Stories: can be a very engaging method for conveying the uniqueness of customized products with family and friends. Proud users can not only enhance their own well-being but also serve as ambassadors of positivity and hope within the amputee community. This approach is not only limited to engaging and increasing the self-identity satisfaction of the direct users but can also help normalize and sensitize society.

2. Type of platforms

- Perfectly pre-set: By offering a pre-set options of colors and more, the users are empowered with creative expression while maintaining a clear business scope.
- P.O.P. Builder: Users actively participate in the co-creation process, assembling their own product from a carefully curated range of preselected components.
- Future Proof Fashion: By offering interchangeable parts it enable the users to select covers that match their style and easily update them whenever they desire.

- Make It Mine: During purchase, users can add unique touches that reflect their individuality. The range of customizable parts is limited and thoughtfully predefined.
- True Fit: Up to three parts are meticulously crafted based on biometric data or body measurements, ensuring a product that fits you perfectly.
- Functionality Flex: Users have the flexibility to choose from a pre-set array of functional components that cater to their specific needs. These choices can be made during the initial assembly or swapped out as the product evolves.
- Unique You: the products are functionally tailored to each user at a deep biometric level, delivering true functional individualization.

Designing for User Engagement and Satisfaction

User satisfaction is often achieved through active user engagement. An active involvement in the design process itself can be the key to fulfill the user satisfaction. Collaborating with the users can provide meaningful insight on their expectations and concerns. The way individuals choose to present themselves is an ever-evolving decision, influenced by factors like fashion, hairstyles, and accessories. For this reason, maintaining constant communication with the user is crucial.

When implementing personalization for a product, service, idea, or system, the central focus revolves around the individual.

Several design tools and methods can be used to investigate the user experience, starting from context mapping to the user journey map. The outcome of those activities when validated by the users can outline crucial aspects related to what the person values and considers important. Those are key pieces of information and become imperative for establishing effective personalization strategies (Li, 2019).

In addition, personalization can enhance users' satisfaction and engagement with their prosthetic devices and contribute to the perception of their self-identity. In a study focused on cosmetic silicone prostheses for partial-hand amputations (Atallah et al., 2023), most patients reported satisfaction with durability and donning, while comfort was a concern. The study also demonstrated how much the fitting, weight, appearance, and comfort of the prosthesis influenced users' self-identity and satisfaction.

In a cross-sectional study researchers examined the clinical practice of engaging patients in prosthetic cosmetic design. (Lee et al., 2022b) Patients who were offered cosmetic design options reported significantly greater satisfaction with their prostheses. Satisfaction with the appearance of the prosthesis was correlated with the perception of empowerment in daily activities. This empowerment is related to the above-mentioned theory of thirteen fundamental needs. People desire to be autonomous in their daily life, wearing a device that can fulfill this need help them having a gratifying self-perception that doesn't make them feel disabled in the eyes of people.

This suggests that customization during the design process can positively influence user engagement and satisfaction.

The active involvement should be not limited to the primary user of the prosthetic device, but it is important to include the main actors of the system. Nilsah Cavdar Aksoy and colleagues, (2021) in their article "A typology of personalization practices in marketing in the digital age", propose a classification framework for personalization where are proposed three forms of personalization, one of which is the social level. All individuals exist within a social environment and are influenced by interactions with others and events occurring in that social context. In the context

of recommendation systems, Arazy et al. (2010) emphasized the crucial role of social networks in crafting personalized recommendations. This proves how active involvement in the design process and participation in the program, peers, family, and society are key elements influencing users' preferences for personalized options.

It is also important to bear in mind that amputee is more prone to emotional instability, stress, and anxiety due to the trauma they have experienced. Involving the user in the process could trigger emotional discomfort for the user. To mitigate this risk, careful preparation is required both in terms of setting up the rights activities and in terms of the language used during the dialogue with the user. For this reason, experts in the field such as psychologists, medical professionals, and CPO often come to the aid.

A.2 Users' quality of life (QoL)

The World Health Organization defines "Quality of life" as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.

In the experience of an amputee there are many factors that influence the overall quality of life of the individual. Those factors can be residual-limb pain, phantom pain, time interval after amputation and number of prosthetic fittings. Another factor that is responsible for the QoL of the individual is the duration of daily prosthesis use. A longer usage time tend to lead to an increase of psychosocial, physical wellness. (Topuz et al., 2022b)

The user wellbeing is very much dependent on the Prosthesis functionality and features. During an interview with a prosthesis user, he stated that even a very small change in the device can make a really big difference on the user experience.

Every day, users of prosthetic limbs encounter a set of daily challenges that significantly impact their overall experience. The following list highlights the most known difficulties:

1. Emotional Impact: Approximately 30% of individuals experience depression, anxiety, or post-traumatic stress disorder (PTSD) after limb loss.
2. Lack of Sensory Feedback: They often miss out on natural sensory feedback, such as touch and temperature perception.
3. Skin Irritation and Pressure Sores: Improperly fitting or long-term use of prosthetic devices can lead to skin irritation and pressure sores.
4. Limited Mobility and Range of Motion: Prosthetic devices may impose restrictions on amputees' activities, affecting their mobility and range of motion.
5. Joint Pain and Arthritis: Prosthetic devices can place additional stress on joints and muscles, resulting in pain and inflammation.
6. Maintenance and Upkeep: Keeping prosthetic devices in good condition requires regular maintenance, which can be time-consuming and physically demanding, causing strain and stress for amputees.
7. Muscle Weakness and Atrophy: Incorrect usage or adjustment of prosthetic devices can lead to muscle weakness and atrophy.
8. Fatigue and Discomfort: Using a prosthetic device can be physically demanding, particularly during the initial adjustment period, leading to fatigue and discomfort.

9. Phantom Limb Sensations: Many people experience "phantom limb" sensations, where they feel as though their missing limb is still present.

A.3 Aesthetic

Effect of Embodiment on User Satisfaction and Ownership

The embodiment plays an important role in the user satisfaction and overall experience when wearing a prosthetic limb.

In the prosthetic literature, the concept of embodiment is frequently discussed as the assimilation of a foreign object into the existing infrastructure that supports perception, action, and self-awareness. This mental model is sometimes referred as "body schema" ("the incorporation of a prosthesis into one's body schema") (Christie et al., 2019) others as "body image" ("prosthetics like rubber hands are incorporated into the body image itself") (Weser & Proffitt, 2019). Another way to express this integration is by considering embodiment as the utilization of the same neural resources that typically support the biological limb ("E [an object] is fully embodied if and only if all its properties are processed in the same way as the properties of one's body").

Embodiment is driven by two abstract mechanisms which are ownership (feeling that the artificial limb is belonging to one's own body) and agency (sense of being in control of the artificial limb). These two control the user's perception, action, and self-awareness of their prosthesis.

The sense of ownership derives from the sensory system which give to the users the perception that parts of their own body belong to themselves. Ownership can be measured in terms of the trust the user place on the prosthesis and in terms of belief the artificial limb is a biological limb more than a foreign object (Zbinden et al., 2022) (Baicchi et al.,2018) (Maimon-Mor & Makin, 2020). Interesting is how a higher sense of ownership is dependent on the appearance of the artificial limb, as demonstrated by Cuttes et al. in the rubber hand experiment Cutts et al., 2019). This integration or incorporation into the body representation, is very much dependent on the aesthetics of the prosthetic device by impacting on the patient feeling of explicit ownership. Explicit ownership measures a patient's conscious feeling regarding the prosthesis being innately perceived as part of their body rather than a foreign extension of their limb. (Bekrater-Bodmann, 2020b)

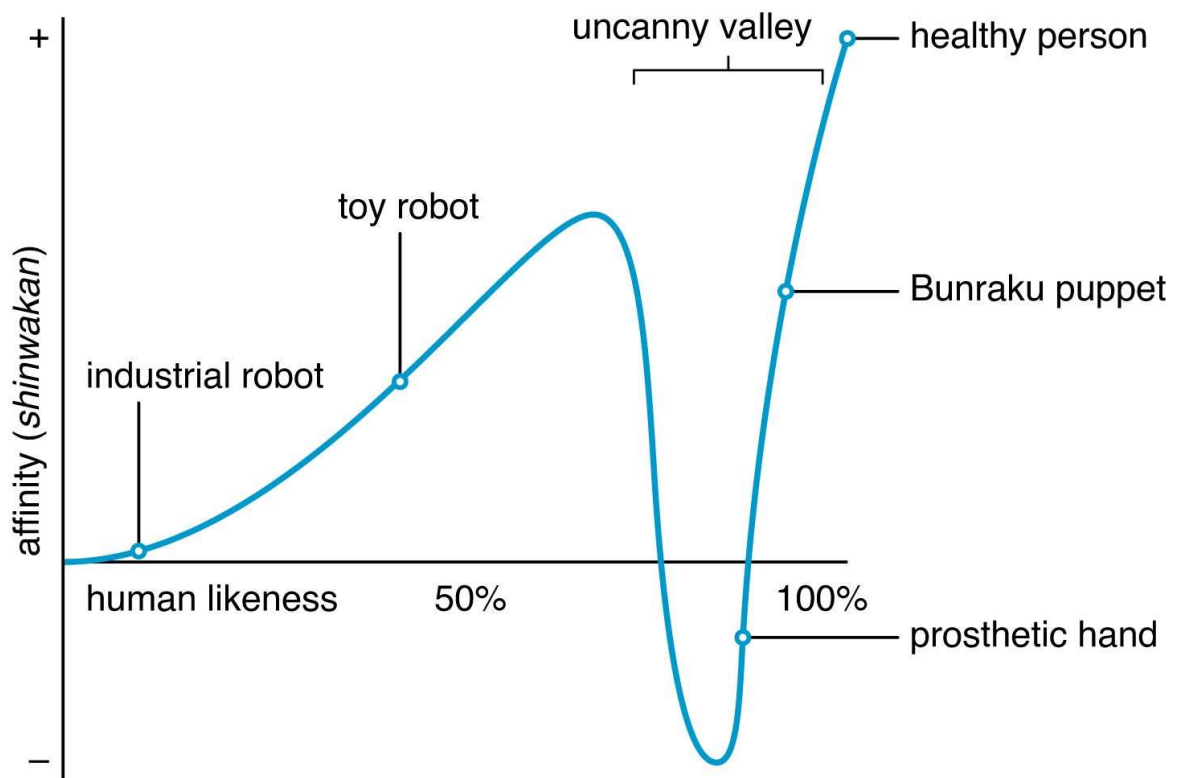
From a neural perspective, embodiment refers to the successful allocation of brain resources originally dedicated to controlling one's own body, enabling the representation and operation of external objects. In the prosthetic field is important to focus on visual embodiment, which entails the effective allocation of visual limb-related neural resources. Visual embodiment is particularly relevant in studying prosthesis representation due to the visually guided nature of prosthesis usage. Additionally, visual internal models of the body have been proposed as crucial mechanisms for processing multisensory integration and achieving a sense of bodily ownership, which is a desired aspect of prosthesis usage (Beckerle P. et al., 2018).

An assumption, although untested, is that amputees reject their prostheses—designed as substitutes for hand function—due to a lack of embodiment, where the prosthesis doesn't feel like a genuine body part (Murray, 2007). It is believed that enhancing embodiment can potentially improve prosthesis usage (Beckerle P. et al., 2018).

The sensory domain is one of the most predominant when it comes to embodiment research. Sensational input such as visual, vibratory, auditory or thermal increase the sense of prosthetic embodiment which create a sense of ownership on the device (Longo et al., 2010)

In terms of postural domain, users who wear the prosthesis more often or for a longer period have less postural sway. This is related to a higher sense of embodiment with the device. (Imaizumi et al., 2016) (Cuberovic et al., 2019)

While the previous two domain are currently more explored, less is known related to the psychosocial field. In specific the current literature shows a gap in the knowledge about the correlation between the lack of embodiment and the higher rates of depression, anxiety and body dysmorphia observed between the amputee community. (Resnik et al., 2021). This gap could be caused by the high subjectivity and extremely intermixed topic with other domains. In this domain the exploration can be categorized into external social interaction of a patient and his internal self-image. The latter one is influenced by the anatomic plausibility of a prosthetic which means how similar the prosthesis looks to the correspondent anatomic. At the same time a prosthesis that tries to replicate the anatomic limb might fail when the sense of ownership and embodiment is felt in a different way compared to the anatomic limb. Causing the opposite effect of what was intended. (Bekrater-Bodmann, 2020c) (Mills, 2012b). This is supported by the uncanny valley phenomenon represented in figure X. This theory was originated by Masahiro Mori in the 1970 which hypothesis that as the degree of human resemblance increases in the design of an object, so does our fondness for that object—up to a certain point. However, as the resemblance approaches near-perfect accuracy, our fondness suddenly declines and is replaced by an unsettling or eerie sensation. This decline is then followed by an increase in affinity when the object achieves a level of human likeness that indicates it's a living person. This abrupt shift from decreased to increased affinity, driven by the sense of uncanniness, forms what is often referred to as the 'uncanny valley' in the spectrum of affinity. (Mori et al., 2012b)



Effect of Personalization and Customization on User Engagement and Satisfaction:

Prostheses are advanced engineering product in which the functionality plays a predominant role. Nevertheless, it is important to consider the aesthetic of the product to fulfill user needs.

The literature review reveals that the aesthetic of the prosthesis can have a impact on the users quality of life and satisfaction. An aesthetically appealing device can improve the confidence of the user, promote a more active participation in the social life, reduce the risk of anxiety, depression and psychological distress and increase the frequency of use of the device. The same is true on the opposite, unappealing device can affect negatively on the amputee experience. For this reason is crucial to take a look at the personalized and customized options and how these can have significant positive effects on user engagement and satisfaction. Through customization and personalization the customers can imbue the product with personal meanings (Lips-Wiersma & Morris, 2009), consequently, they are more mindful and appreciative of the product (Brunneder & Dholakia, 2018).

Appendix B

B.1 Interview guide

Interview guide CPO/OTHER EXPERT (Marketing,bracing,sales,R&D)

Introduction

Nice to meet you and thank you for taking time to have this chat with us/me today.
Before starting, are you comfortable? Would you like to have some coffee, water, or anything else?

About the project:

I am Laura and I am currently doing my master in the Netherlands. I am here to work on my final project and the scope of this is to understand the current ordering process and explore customization opportunities to offer to our clients. I am planning to talk with many users, CPO, and other expert to collect their needs and thoughts to then design a better experience.

This interview will take around -one hour-. I will follow a guide just to keep the interview on track but feel free to share whatever you like. I am curious about you experience and anything you want to share with me will be helpful.

Do you have any questions you want to ask before starting?

About you:

- Can you tell me a bit about yourself and what is your work about?
- For how many years have you been working in this field? What is your background?

Current situation

- Currently there are a few options for foot covers (colors options and split toe options) available in the market for users. Do you know how the selection process happens as to what foot cover is selected for a user?
 - a. do they show anything to users?
 - b. do they ask anything to users?
 - c. Is it on stock or do they order it for each user?
 - d. do they have all options available in the clinic? If not, how do they choose what they have on stock?
 - e. CPOs / How are they ?
- Do you see the current acquiring process of a prosthetic limb as a customized process?
 - a. If yes in which terms?
 - b. When do you think is customization currently happening?
- Are prosthetic users offered with customization options when acquiring or fitting a prosthetic device?
If yes,
 - Do prosthetic users often ask for customization options to their CPO?
 - Could you describe what customization options are typically available?
 - What does the users like about it? What do they don't like?
 - When in the process are these options presented to users, and how is this done?

- What methods or materials are used to showcase these customization options? (e.g., pitches, explanations, visuals, videos, tangible samples)

If not,

- Can you explain why that might be the case? Is it due to cost limitations, disinterest from users, time efficiency or other factors?

- Are prosthetic users asking for covers?

If yes,

- a. Do prosthetic users often ask for covers to their CPO?
- b. Which kind of covers do they ask for?
- c. What does the users like about it? What do they don't like?
- d. What are the users currently looking for? Aesthetic or functionality? (Natural look/protection from dirt, sand/..)

If not,

- e. Can you explain why that might be the case? Is it due to cost limitations, disinterest from users, or other factors?

- What do you know about what competitors in the prosthetic industry are offering in terms of customization options?
 - f. For example, UNIQ, what do you think about it? Do you know if users like it?
 - g. From your perspective, do these customization options seem to be effective, and if so, why? If not, why?
- Can you share any success stories related to customization in the prosthetic industry that you've come across?
- What challenges or barriers do you see when it comes to implementing customization options in prosthetic devices?

Decision making process.

- Can you describe the current decision-making process when it comes to selecting or designing a prosthetic device?
 - What is the role played by the CPO in this process?
 - What is the role played by the prosthetic device users' in making decisions about their device?
- To what extent does the decision-making process depend on the insurance system in place?
- Are there significant differences in decision-making processes based on the country or region where prosthetic care is provided? How do different countries handle this?
- In situations where users have choices, such as selecting colors for foot covers, how are these choices typically handled?
 - Are users actively involved in making these choices?
 - Are a variety of options kept in stock and readily visible for users to choose from?
- Have you observed any differences in how user choices, like colors of foot covers, are handled in different leading countries or regions?

- Is there any input or influence from marketing offices in shaping these choices and user involvement?
- Can you explain how the portal is currently used in the prosthetic industry?
 - Is the portal accessible to both the user and the CPO, or is it typically used exclusively by the CPO?
 - Are the CPO constantly updated on the new Ossur products? Is Ossur taking care of presenting new products to the CPO or do they have to keep themselves updated?
 - What choices or options are typically available on the portal for users or CPOs?
 - Is it possible to filter or personalize the options presented on the portal based on the specific condition or needs of each patient?
- What challenges, if any, are faced in the current decision-making processes for prosthetic devices?

NAVii related questions

1. NAVii will be presented with a standard black cover, and then users will have the option of selecting a second or third cover, from a range of options such as colors and sizes (length).
 - a. Is it desirable:
 - i. Do you think from your experience, users will be excited about having this option?
 - ii. Do you think they will ask for it?
 - iii. What is your impression on what CPOs will think of having this option?
 - b. Presenting this new option to CPOs and Users?
 - i. What do you think is the best way to present these options to the users?
 - ii. CPO role
 - iii. Ossur sales role
 - iv. Web
 - v. User role (if they have seen it and ask for it)
 - vi. Other (portal, app, etc.)
 - c. Will it be important to the users to see it physically or OK to see it online?
 - d. Will it be important to the user to be able to try on different colors/sizes?
 - i. Will they have it on stock? How so? How many would be optimal?
 - e. What are your thoughts on making it available for the user to order by themselves in the future (if it is not a medical device)
 - i. What opinions will CPOs have on this?
 - f. Today there are many covers available like UNYQ, any thoughts on our competition with these companies?
 - g. Do you know if users are particularly happy with a cover company today, that would be considered best practice or the best in class?
2. There are two length options for the cover, the long version will have to be cut to adjust on the different users
 - a. How will the ordering of different sizes happen?
 - i. Will the user play a role?
 - ii. Will the CPO decide on their own?
 - iii. Will they always order the longest and then cut it?
 - b. Regarding this, do you think the length should be adjusted by the CPO or by the user?
 - c. Will it matter?
3. What will be the role of the user in the selection of the cover?

- a. Will the user select the color and size from a variety of preset options or will be able to add some customization himself (like painting or adding some details)
 - i. Do you think the users would opt for a finished cover or they would prefer to have some kind of action on it?
 - ii. Which level of freedom should they have in this in order to feel empowered and not overwhelmed by too many options?
4. Which impact do you think customization options like NAVii will have on the user life (emotions, activity level, self-image..)
5. Can this option, having a choice be a decision-making factor for CPOs or users in choosing NAVii over other MPK?
6. What do you think is most important when presenting this new option to
 - a. CPO
 - b. Users
7. Currently there are a few options for covers (colors options and split toe options) available in the market for users. Do you know how the selection process happens as to what foot cover is selected for a user?
 - a. do they show anything to users?
 - b. do they ask anything to users?
 - c. Is it on stock or do they order it for each user?
 - d. Do they have all options available in the clinic? if not, how do they choose what they have on stock?
 - e. CPOs / How are they?
8. Are prosthetic users asking for covers?

if yes,

 - a. Do prosthetic users often ask for covers to their CPO?
 - b. Which kind of covers do they ask?
 - c. What does the users like about it? What do they don't like?
 - d. What are the users currently looking for? Aesthetic or functionality? (Natural look/protection from dirt, sand/..)

if not,

 - e. Can you explain why that might be the case? Is it due to cost limitations, disinterest from users, or other factors?

CTI market

- Can you provide an overview of the CTI market?
 - Who are the main users?
 - Could you describe the methods used for selling these products?
 - Does the methods change depending on the users (age, physical needs,)
 - Do they user try the product on before buying it? Or do they select it after seeing it?
 - Is it on stock or do they have to order it for each user?
 - do they have all options available in the clinic? If not, how do they choose what they have on stock?
 - What role has the CPO or the specialist in the selection of those devices?

- Do you think these methods are working effectively? Why? Why not?
- I have been told that bracing lamination is used for children and that there's a catalog for them to choose in between different look and style.
 - i. How does the catalogue look like?
 - ii. How is it used?
 - iii. What effect has this catalogue have on the children experience?
 - Do they like it?
 - What do they like about it?
 - How does this make them feel?
 - What are the main advantages and challenges of using this catalog?
 - iv. Is something similar used with adult as well?
 - What are the differences between the adults and the children selection?

Opportunities

- In your opinion, what is the future of customization in the prosthetic industry? Are there emerging trends or technologies that might impact this area?
- What do you believe users are most likely to look for when given a choice in protective knee covers? How do you think users typically make decisions?
- What strategies or tools do you think Ossur can use to help users better understand their options for protective knee covers? (e.g., samples, mini samples, sample books, websites, apps, etc.)
- How can Ossur personalize the experience and offerings based on different target groups within the amputee population? (e.g., elderly vs. young, low active vs. high active individuals)
- What challenges or considerations do you see when it comes to personalizing the experience for different user groups within the amputee population?

I am going to present you a scenario and afterwards I will ask you some questions:

I would like you to imagine that one of your clients come to you with the desire to change the look of his prosthesis. He is a TF amputee, and he is wearing a NAVii knee. He is not happy about the aesthetic of his leg, and this makes him very uncomfortable in showing his leg off. He doesn't know exactly how he want the leg to look like and he is asking for your guidance in the selection. You want to propose to him the NAVii cover.

- How would you approach this situation?
- If you can think about "the perfect tool" to help you in making your client satisfied and to have an active role in de decision how would this tool look like?
- What feature this tool should have to make your support efficient?
- What would help the client to make a choice on the selection?
- What do you think the client would like or would not like of it?

Wrap-up:

- Is there anything else you would like to add or any specific insights you believe are important to share regarding customization in prosthetic devices and your experience?

Interview guide USER INTERVIEW

Introduction

Nice to meet you and thank you for taking time to have this chat with us/me today. Before starting, are you comfortable? Would you like to have some coffee, water, or anything else? if you want to stop or change position during the interview, feel free to do it at any time.

About the project:

I am Laura and I am currently doing my master in the Netherlands. I am here to work on my final project and the scope of this is to understand the current ordering process and explore customization opportunities to offer to our clients. I am planning to talk with many users, prosthetist and other expert to collect their insights and thoughts that will feed into our design.

This interview will take around one hour. I will follow a guide just to keep the interview on track but feel free to share whatever you like. There is no right or wrong answer, everything is relevant, and I would be happy to hear from your experience, that is why we are [here](#) and you are the expert in your experiences and perceptions. It is important to me to know that you are comfortable while answering to my questions so if at any point you are not, feel free to let me know. If you want to skip any [question](#) just say so, and we do, no questions asked 😊 We can stop at any time if you need it.

Do you have any questions you want to ask before starting?

About you:

- Can you tell me a bit about you, where you live, your interest, what you do, etc. whatever you want to share with us/me?
- What type of prosthesis do you use?
- For how long have you been using a prosthetic device?

Current situation

- The prosthesis you have today, how did you get it?
 - a. Was it chosen by the CPO?
 - b. Did you ask for it?
 - c. Other?
- Are you able to choose [your a](#) device / component / knee / foot if you wanted to? can you tell me how this happened?
- Did you have some constraints to follow while choosing it? How did this make you feel?
- Have you ever been offered the possibility to choose how your prosthesis looks like?
If yes,
 - What choice was it that you were given? What kind of product was it?
 - Did you ask for it or who did offer it to you?
 - Could you describe it in detail? Do you have a picture?
 - When did it happen?
 - How was it done? (e.g., pitches, explanations, visuals, videos, tangible samples)
 - Were you happy with the choice?
 - a. Why?
 - b. Why not?

- Can you explain why that might be the case? Were you not interested in it? Other factors?
 - Do you think you would be interested in a different situation?
- Have you ever customized or personalized your prosthesis? (might want to give them examples like stickers, or paint or shine stones)
 - Yes: how so?
 - No: why not?
 - The foot cover/shell that you have on now, can you tell me how you got that one?
 - a. Did the CPO choose it for you?
 - b. Did you choose?
 - c. Did you see any options when getting it or you just got it?
 - d. Was it already on the prosthesis when you got it or was it put on in front of you, or how did that go?
 - e. Would you have liked the process to have been different? How so?
 - f. No: how so?

Opportunities

1. COVER

- a. Have you used a prosthetic cover on your prosthesis?
- b. How was it?
 - i. How did you choose it?
 - ii. How did you know about it?
- c. Did you like it?
 - i. What did you like
 - ii. What did you not like
- d. Would you like to use it again?
- e. Did you pay for it out of pocket or was it covered by insurance?
 - i. Do you remember how much it costs?
 - ii. How much would you have paid for it?
- f. what is most important to you when choosing a cover?

2. COLOR

- a. If your prosthesis came with a cover would you like to have options in choosing a different color?
 - i. Why?
 - ii. Why not?
- b. What color do you think you would choose?
 - i. Why?
- c. What if you could then choose a second cover to have to switch out covers, would you like that option?
- d. How ~~would~~ you use it, when would you switch?
- e. what color would the second one be?
 - i. Why?

3. SIZE / LENGTH

- a. What about the size of it, or length? Would you like to be able to choose a size?
 - i. Why?
 - ii. Why not?

4. THE CHOICE:
 - a. How would you like to choose your cover (the color and size)?
 - i. With your CPO
 - ii. On your own?
 - iii. Seeing a prototype
 - iv. Trying it on?
 - v. Online browsing
 - vi. Getting something home with you to try on?
 - vii. Other?
5. Does having a choice matter to you?
 - a. Why?
 - b. Why not?
6. What other choices would you like to have than color and size?
 - a. Prompt if they don't say much:
 - i. What about DIY
 - ii. What about brand names like Luis Vuitton or NIKE
 - iii. What about military style, or outdoor style, or sparkly one or other?

Wrap-up:

Is there anything else you would like to add or any specific insights you believe are important to share regarding your experience?

B.2 Interview notes and insights CTi market

CTi market

- Can you provide an overview of the CTi market?
 - Who are the main users?
 - Could you describe the methods used for selling these products?
 - Does the methods change depending on the users (age, physical needs,)
 - Do they user try the product on before buying it? Or do they select it after seeing it?
 - Is it on stock or do they have to order it for each user?
 - do they have all options available in the clinic? If not, how do they choose what they have on stock?
 - What role has the CPO or the specialist in the selection of those devices?
 - Do you think these methods are working effectively? Why? Why not?
- I have been told that bracing lamination is used for children and that there's a catalog for them to choose in between different look and style.
 - i. How does the catalogue look like?
 - ii. How is it used?
 - iii. What effect has this catalogue have on the children experience?
 - Do they like it?
 - What do they like about it?
 - How does this make them feel?
 - What are the main advantages and challenges of using this catalog?
 - iv. Is something similar used with adult as well?
 - What are the differences between the adults and the children selection?

Bracing distinction

1. 95% Most common bracing product are saving life products, injury solutions. Single use, medical device (neck collars, booths) Have standard size and they are used for a short amount of time (few weeks).
The look of this products as colors etc is not relevant because users are going to put them on only for a certain amount of time
2. 5% are the life style products which are used every day or in special context like when doing sports ecc, they can be made specifically for each patient, totally customized

Order system for the customized

- They have a document to make the order which is filled in by the specialist and the patient together.
- In the document they have some technical aspect and some accessories that the user can choose in between
- It is not something they can order online because the specialist has to take all the measurement
- If they choose a customized pattern, they have to send the guideline to the designers which will then have to design the look of it specifically

Options

For the customized bracing

- More then 12 colors
- The user can decide for matt or shine finishing
- The user can decide for customized patterns

- They are moving away from this level of customization because it is not efficient and they don't earn from it but most of the time they lose money. They want to set more limitations in colors etc to make it affordable for the company

User preferences

- The standards bracing don't have color options
- Customized bracing have more success with children and athletes
- Elderly would choose more plain colors

Product advertisement

The customized solutions are really popular on Instagram and some of the users are famous for being athlete etc and other users take inspirations from them

Costs

The device itself is normally paid by the insurance and the customization is out of pocket for the user

Cost for customization not sure

Cost for the CTi si around 3.000/4.000 euros

B.3 Interview notes and insights User TTI

Interview topics

Flip Flops

- He would like to wear flip flops when he is at the beach or outside in the summer, not necessary for when he is at home where he can walk bare feet
- They are not really comfortable, the split between the toes is okay but the back of the flip flop tend to shift and without the toes is impossible to have grip on the slipper tip to keep it in place

Portability

- Would be nice to have a foot that can do everything without having to change but is also nice to have a more "fancy foot" to go to the office and a more rough one for when you are doing outdoor activities

Cover

- "I don't care how it looks like, it is not a visual thing, I just want my long pants to fall in the right way, when I wear shorts I am fine with showing my prosthesis as it is"
- "When I got amputated, I didn't want people to look at my leg, I didn't want to look like a disabled."
- There are some covers that look like real skin but it is visible that is fake and it is not really appealing. It can be a good way to try to hide it when the user is still not confident on showing the prosthesis.
- When I wear a long sock it doesn't stay in place and it falls down
- Functionality first → He prioritizes the functionality of the cover and he wants it to protect the components from the dirt or from dust etc but he also likes when it looks metallic and minimal
- If the cover is easy to attach to the prosthesis and it doesn't fall off easily then is great!

- See through style is cool and shows a bit of the mechanic of the device with is nice. He would prefer it compared to the total cover
- The prosthesis has some components that stick out and the pants get stuck on them, a cover with a more organic and humanized shape would help in wearing the pants.
- The long cover that goes from the knee to the ankle is better then the short one to make the pants fit better

Cover personalization

- If it looks like real skin it doesn't necessary mean that is nice, better in metallic materials.
- Before showing the covers to him "There is no real visual need for me so I don't think I would need many options "
- After showing the covers to him "It is actually nice to have the possibility to choose between colors even if it only two, people would like to have an option"

Relationship with CPO and customization

- Would you like your CPO to give you the possibility to choose at the beginning or do you prefer if he choose for you?
When you first start to wear a prosthesis you really want the support of the CPO and you put a lot of trust in him. He is confident and he knows what he is doing, while for the user everything is new.
- Would you like to customize it yourself or to ask the CPO to do it for you?
He would prefer the CPO to make changes in the device because he knows how to do a clean and precise job but only if it is possible in a decent amount of time otherwise he would just do it himself if it is just some small adjustment.

Adjustment:

- He changes the angle of his prosthesis depending on the type of shoes he is wearing not a big struggle but he tried the app that is connected to the device and he can easily select the changes on the app and it is much more handy
- Very small changes can make a really big difference on the user quality of life.
- The CPO is a fundamental in support in understanding what the user needs and what are the changes that are necessary to improve the situation. It is important to fix the problem at the core.

B.4 Interview notes and insights User TFI

1. COVER

- a. Have you used a prosthetic cover on your prosthesis?

He is using a prosthetic cover already the old version of the Össur portfolio, the cover goes from the knee to the ankle, before starting to work for the company he was already wearing another cover, a cosmesis one made of foam. He really liked that one and he wouldn't have switched to the new one if he wouldn't work for Össur. The old one was always on the way when he started to do a lot of tests for Össur and was not really functional anymore. He started to use the foam because of his interest not because someone propose it to him

- b. How was it?
i. How did you choose it?

He didn't choose it, was the only option Össur had to offer

1. How did you know about it?

His situation is a bit different because he is working for Össur and he has more contact with the field and he knows more about what the market offers but he thinks that most of the people would not know about the possibility to use the covers if the CPO doesn't tell them

- c. Did you like it?
i. What did you like
ii. What did you not like

About the foam cover he liked the fact that was also covering the space between the knee and the socket which is missing with this new cover, but this cover is better in the sense that is much more functional for easy donning and doffing. He likes the material of the new cover because it is not hard plastic so he can cross his legs without hitting the same leg, the material thought is a bit too rubbery and the pants don't always fall perfectly on it.

The look under the pants is the primary reason he is wearing the cover. There are some functional aspect of it like if he fall they it might protect a bit the engine of the knee

- d. Would you like to use it again?
e. Did you pay for it out of pocket or was it covered by insurance?
i. Do you remember how much it costs?
ii. How much would you have paid for it?

He didn't have to pay for it since he is working with Össur but normally other users have to pay for the cover which is not considered medical device and it is not covered by the insurance. He said that they cost a lot like 400/500 €, some of them even more. They are not affordable and may people can not have even on so imagine buying a few of them.

He would pay around 100/150 €, he thinks this is a reasonable price for it

- f. what is most important to you when choosing a cover?
The texture and the feeling of it, it should be soft,
The shape and the fit under the pants
The length, he prefer the long one
g. What do you think about the offers from other companies (such as UNIQ)
He doesn't like those covers because they are made of hard plastic and it doesn't feel very comfortable, he is also doubting the durability of those covers due to the kind of, material used but this not found on experience, is just a feeling

2. COLOR

- a. If your prosthesis came with a cover would you like to have options in choosing a different color?
 - i. Why?
 - ii. Why not?

He doesn't care too much about the color in general so he wouldn't do it only for the color, but he would like to have more cover and switch between them.

- b. What color do you think you would choose?
 - i. Why?

He would go for the blue, grey and black, if is one of the options he might go for the color skin one.

He thinks that would be a good idea to have a standard light one and the user can ask the CPO to spray paint it with a color that is really similar to his skin tone

- c. What if you could then chose a second cover to have to switch out covers, would you like that option?
- d. How woud you use it, when would you switch?
- e. what color would the second one be?

2. Why?

3. SIZE / LENGTH

- a. What about the size of it, or length? Would you like to be able to chose a size?
 - i. Why?
 - ii. Why not?
 - iii. What size would you get?

He would always opt for the long one, couldn't imagine a situation in which he would prefer the short one.

About the possibility to cut it himself he thinks that most of the users would go to the CPO because he has the tools for cutting it easily, anyway it could take some time and some users are really confident on treating their prosthetics, so it is best to give the possibility to the user to cut it on their own.

Self-cut would save time both for the users and for the CPO

4. THE CHOICE:

- a. How would you like to choose your cover (the color and size)?
 - i. With your CPO
 - ii. On your own?
 - iii. Seeing a prototype
 - iv. Trying it on?
 - v. Online browsing
 - vi. Getting something home with you to try on?
 - vii. Other?

Online:

- If you are an expert user with already some of the cover and you want to reorder the same one, you already know the feeling of the material and how the color would look like
- Get a fist idea of what would be the offer and start to think about it. Have a pre-selection individual phase and then go to the CPO to get the cover
- This would save time with for the CPO

In person:

- Would like to see how it looks like on a leg and not only the picture of the cover without the reference of the leg
- It is good to feel the textures and the composition of the material.
- Would be a good idea to try it on as you would do with a pair of shoes

A samples with the different feelings on it would be enough to get an idea of the final look

5. Does having a choice matter to you?
 - a. Why?
 - b. Why not?
6. What other choices would you like to have than color and size?
 - a. Prompt if they don't say much:
 - i. What about DIY
People would like to add a personal touch to the cover, many people would go to the CPO because he has the right colors and the room to spray them but if there was a kit with the proper paint then people would use them if they had some artistic skills
 - ii. What about brand names like Luis Vuitton or NIKE
Some users would really like this, he doesn't care too much about the brands and he doesn't show the leg anyway, but he can see how people would like to have some brand if they are fun of it
 - iii. What about military style, or outdoor style, or sparkly one or other?

Wrap-up:

Is there anything else you would like to add or any specific insights you believe are important to share regarding your experience?

About the material he thinks this material can work, it doesn't have to look too rigid and hard because it is less in harmony with the rest of the body

If he could also change the foot cover depending on the NAVii cover he would do it, it would give more continuity to the leg and would be more appealing to the eye.

General considerations:

- he does not want to show his leg, never in public he walks with shorts or shows some part of his leg → annoyed by people that treat him differently like a disabled or someone that need extra help
- He is already using the previous version of the prosthesis cover → main reason is the natural look with the pants, no functionality related to the cover for him.

Interview topics

Covers

- How would you like your prosthetic leg to look like? → It should look thinner than the sane leg, (not sure about the motivation of this but he knows that is a common desire) but it should have the same kind of shape.
- The color should be not too dark to allow the user and the CPO to customize it afterwards.
- The material should not be too rubbery to avoid the part to get stuck on it by making the fitting of the pants harder.

- He always uses long socks because he doesn't want people to see his ankle.
- It shouldn't look totally anatomical for some reason.
- If he had to choose between a cover that goes from the knee to the ankle and one that goes from the socket to the knee, he would definitely choose the one that goes from the socket to the knee
→ much easier for the others to notice that there is something wrong with your leg

Customization experience

- Would be nice to sit with the CPO and see some samples of the covers so that the user can see how the final color will look like

Other factors

- Knee noise is very relevant to him. If the prosthesis is making some noise he wouldn't wear it

Relationship with the CPO

- He is was working as a CPO himself

B.5 Interview notes and insights- USA clinic on NAVii cover

Quotes

"This (the cover) is just the cherry on the cake and the cake is the prosthesis that is inside the cover"

AESTHETIC

- Showing the prosthesis is the biggest concern.
- In Malta most of the people want a cosmesis that looks like a normal leg
- The pull over skin is very rarely used.
- Normally the patients bring the t-shirt and we laminate it
- Sport related pattern on the socket is the most chosen one
- Water transfer color technology is often used "One user asked for the wooden pattern, it was actually pretty cool."
- Many goes for the very bright colors very rarely people go for cosmesis, at the beginning they tend to cover it and afterwards they start to show it more as it is without covering it.
- We discourage pigmentation because the clients come back not satisfied most of the time because they were expecting something different.

NAVii COVER

- Many people want something that fake the leg
 - The clip in works well for some group of user
 - The CPO said "I love to do the final finishing on a leg."
 - Most of the time they want to cover and make it look like a real leg until at some point "they discover that society doesn't treat them differently."
 - The amount of the limb lost is not proportional to the level of shame they feel, sometimes they just lost the pinky toe, and they are struggling to deal with it more than the some patients that lost the entire leg.
 - Sometimes when they lost more then one limb they normalize it faster "they get so use to adapting to their limb loss"
 - Some burned patients might lost some finger and the ears but their biggest concern is about their ear and not the fingers
 - Do they always overcome it?
"The grieving process is very subjective some do it really quickly, others never do".
 - "I discourage the cover because they interfere"
 - In the case of the long cover "We (the CPO) can cut the length of the cover"
-
- On of the CPO doesn't believe in the potential of the cover and this is what he says to his patients "Focus on having a pure gait, if you walk normally people look at you in the eye, if you walk well, they won't even notice you are wearing a prosthesis."
 - The same COP about the cover "This is just the cherry on the cake and the cake is the prosthesis that is inside the cover" "First comes functionality of course!"

Price and competitors

- "it shouldn't cost more than 100 bucks otherwise people would not invest in it"
- It is a very competitive market
- UNIQ → very expensive and the customers have to pay out of pocket

- Otto Bock is selling only few options and sometimes is offering some extra options for a limited amount of time

Decision making and sales process

- How should they choose the cover? → “Go to the APP and pick the one they prefer”
- It takes a lot of time for them to decide, and it is a “waste of money and time for the CPO”
- If they have too many options to choose in between they will never make a decision.
- Selling directly to the consumer would save time to the CPO
- They could pre decide what they want
- What do you think they would choose?
“They would mostly pick the grey, white and black one”

USER OPINION

- “I would probably go for the black one as first choice and then the blue one as a second option” “I think the blue one is manly.”
- “I don’t miss the ankle shape that much” what he misses more is the portion between the residual limb and the knee compared to the ankle.

B.6 Interview notes and insights- USA clinic on User journey

Quotes

"We let the patient know they are part of the decision process."

"They just want to know that there is somebody out there for them."

TRAVELLING

- There is a card that is available online and they can show to the airport, some people ask for it but the majority asks on the online communities
- Anxiety pull off their willingness to travel, the main reasons are:
 - o How to manage their prosthesis during the travel
 - o The space on the flight because it is very tight

The specialists suggest not to take the leg off during the flight but instead to stand up and walk a bit because otherwise "If you take it off you don't put it back again." Because the residual limb get too swallow and the socket is too tight.

INSURANCE

- Insurance causes a lot of stress also for VA
- You have to go through a long process
- How do you choose the right product for your patient?
"Experience, you got to know the general set of rules from the insurance."
- "I have a patient; she got the potential to be a K3 but we have to prove it"
- The prescription of the device has so many variables
- "We coach them through the system"
- Insurance and the overcome of the trauma are sometimes related → welfare and economical reason for this. Some of them they what to get around the insurance system and they pretend to don't get better; they never recover because they want to get the insurance to cover the costs

- "Psychological tricks to keep them motivated" it is a team process, they spend time with the patient, they get to know them it is not only a brief meeting to establish their level of activity but they get to know their patients
- "We let the patient know they are part of the decision process"
- The intelligence of their patients is fundamental "the smartest your patient are the most you can push them" They must have the ability to understand that if they don't come back regularly it is going to affect their recovery process
- The military:
"People just try to be curious in general and they get annoyed by it"

UNSPOKEN TOPIC & UNMET NEEDS

Substance abuse

- Heavy drugs and most of them abuse of opiates
- The specialist which prescribes the medicine get notification on how many time the patient is going to the pharmacy and can tell the pharmacy to stop selling medicine to that person

- The CPO easily identify the people that are abusing
- Under drugs the patient can get irritated, and the specialist has to deal with it "this session is not going well, is best if you just go home and we reschedule."

Intimacy with partner

Physiological needs

- Get the liner soaked in the pee.
- Some patients were involuntarily peed on the charging port of the knee → The insurance is going to cover the costs to repair it 1/2 times but not more than that. In this case the patient is embarrassed or is in a denied mindset, the specialist has a very delicate position because they know what is going on and they want to help the patient without hurting "It is very difficult to have to say to someone that would be better to wear a diaper"

Sweat

- The sweat causes a lot of anxiety and it get worse and worse when it happen.
- The Black sockets are not very indicated for this because they make the stump very hot and the situation get worse and worse
- Some use spray to block the sweating but these substance can damage the skin a lot and it can also tear or get irritated
- The cosmesis don't help with this and they sometimes make the sweat situation even worse

RELATIONSHIP WITH THE SPECIALIST

- They don't talk to you about certain topic if you don't build a good relationship.
- They spend thousand of hours with their patients way more than a psychologist would spend with them "If you care about your patients, you become more than a doctor"
- Practitioners burn out → Very thought for the specialist as well, some are not well trained for it, they might have to leave the practice or keep moving through
- They get pretty good in identifying if the patient has the potential to improve their physical condition "You got to figure out the personality type of your patient."
- In the Baltimore clinic they have a service model in which the prosthesis and the therapist are in the same place. Why do they have the Physical therapist there and another clinic don't? → "We have to pay for it" but they do it because it is the best option to have them in the same place because the patient can have two meeting in the same day without having to go back multiple time.
- A study demonstrates that the number one reason for the patients to go back to the same clinic is because of the "CONNECTIVITY" they build up their relationship with the specialists.
- It can be experienced as a divorce for some of the patient changing the clinic or the CPO.
-

COMMUNICATION WITH THE PATIENTS

- Standard text, calls and sometimes even videocall.
- "It can happen in the middle of the night because they are at the sea, and they are nervous about it and they want to talk with the CPO"
- Most of the time they call because they are insecure and "They just want to know that there is somebody out there for them"

THE DEAM PROSTHESIS

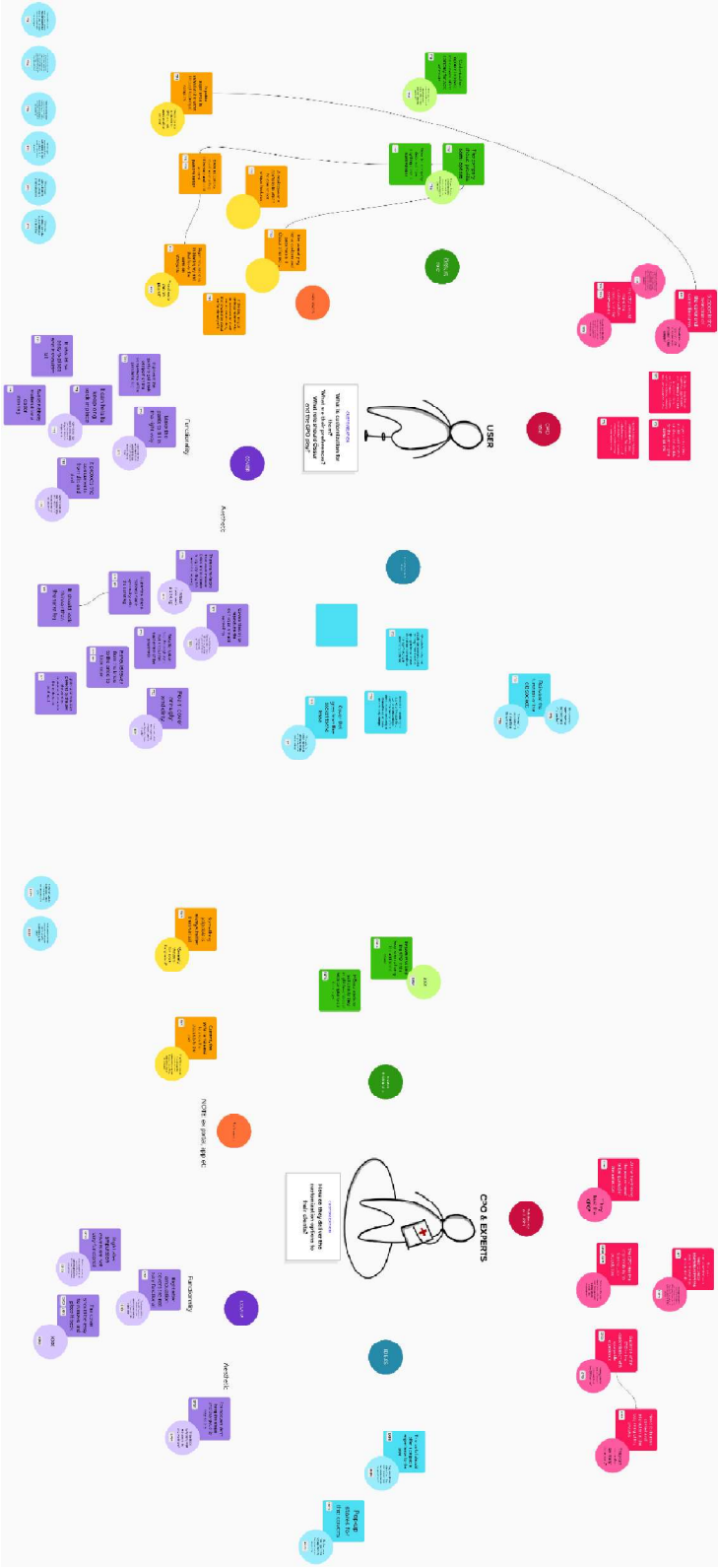
Would be the one that make the use forget that is wearing it "They just want to enjoy their family, they want normal day challenges, they want to complain about the price of the potatoes and not having to take care to all the step they are doing. They would like to be able to walk and watch at their phone at the

same time without having to stop to do it, they would like to walk without having to look the path ahead. They just would like not to think about their prosthesis.”

“You are not defied by our amputation, you are defined by you.”

Appendix C

<https://app.mural.co/t/ossur1512/m/ossur1512/1695030177643/83ce79d90efdb6c66158a06f04752b23b9f9efcc?sender=u5605326eb752e2427c6d4538>



Appendix D

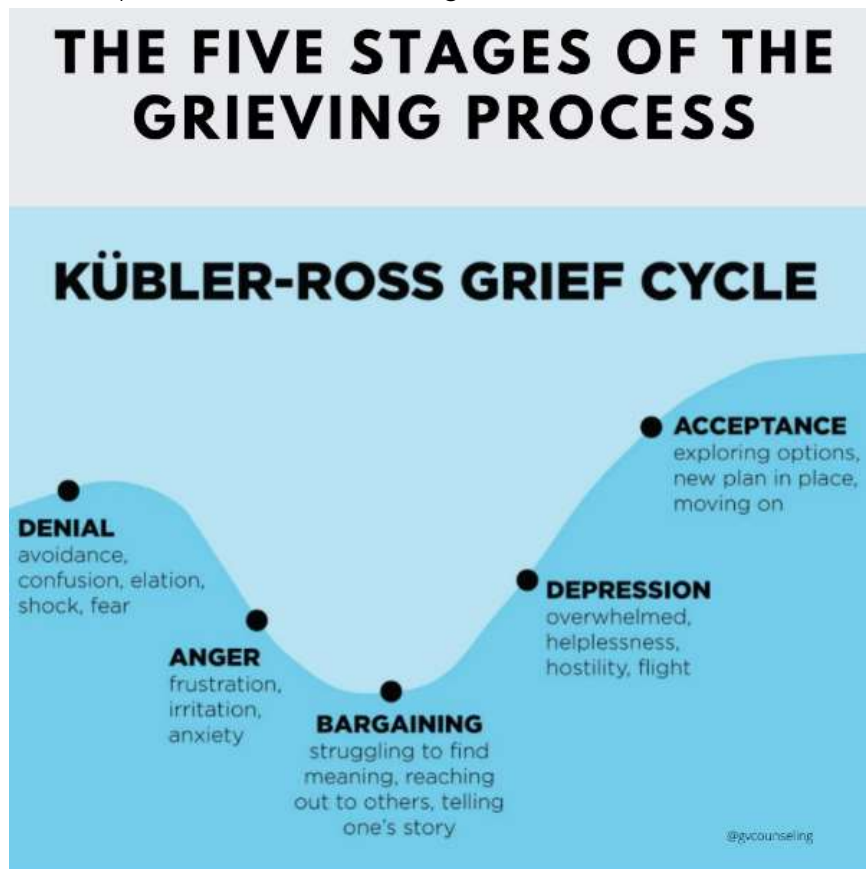
D.1 The acceptance process

Undergoing an amputation can evoke feelings and emotions similar to those experienced when losing a loved one. The grief cycle, as proposed by psychiatrist Kubler-Ross, delineates various stages that individuals experience when facing a traumatic event such as the loss of a loved one or, in this context, limb amputation. These distinct phases guide individuals from the occurrence of the event towards acceptance of their new condition. ((Jo et al., 2021)

Currently, there is no literature that establishes a correlation between the grief cycle and the evolving needs of users in various stages.

It is highly likely that the needs of users will indeed fluctuate significantly as they progress through the process. Would be interesting to explore in what manner these needs change, and if it is possible to identify recurring patterns within the amputee community that could serve as standard.

Investigating more these area can lead to design opportunities that could offer tailored solutions for each phases targeted on the individual needs depending on the process of acceptance while remaining valid and valuable for the entire amputee population.

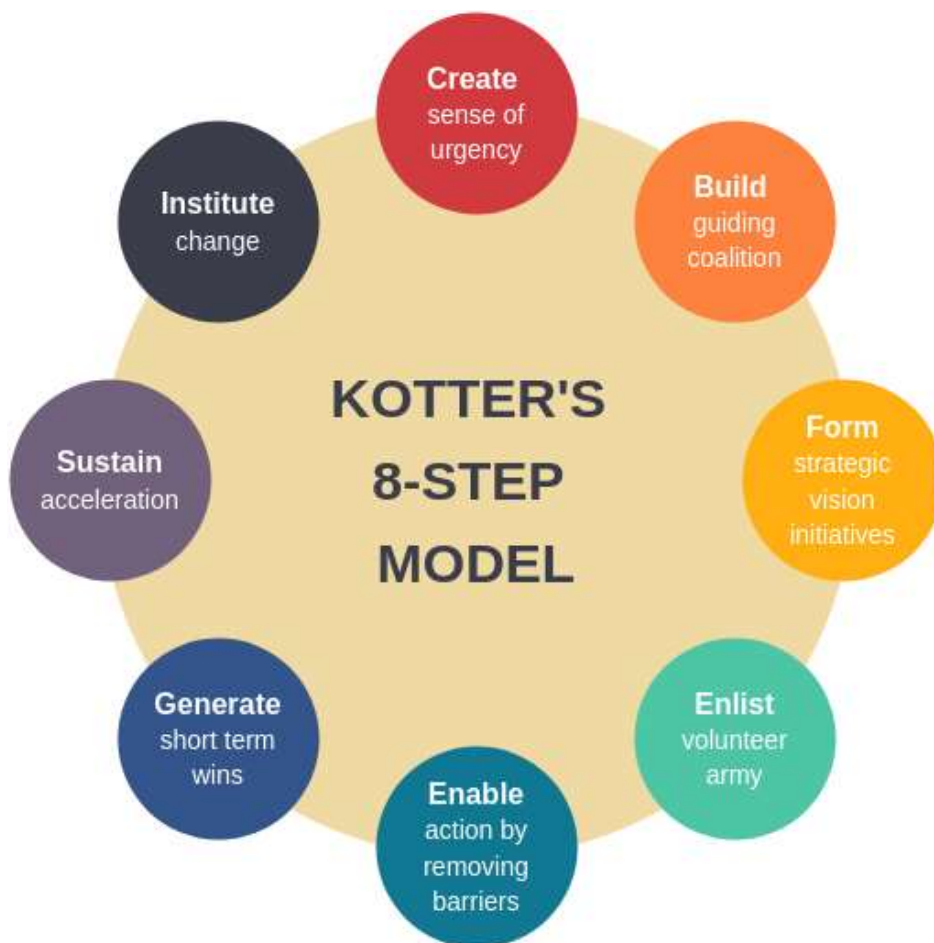


D.2 Emotions

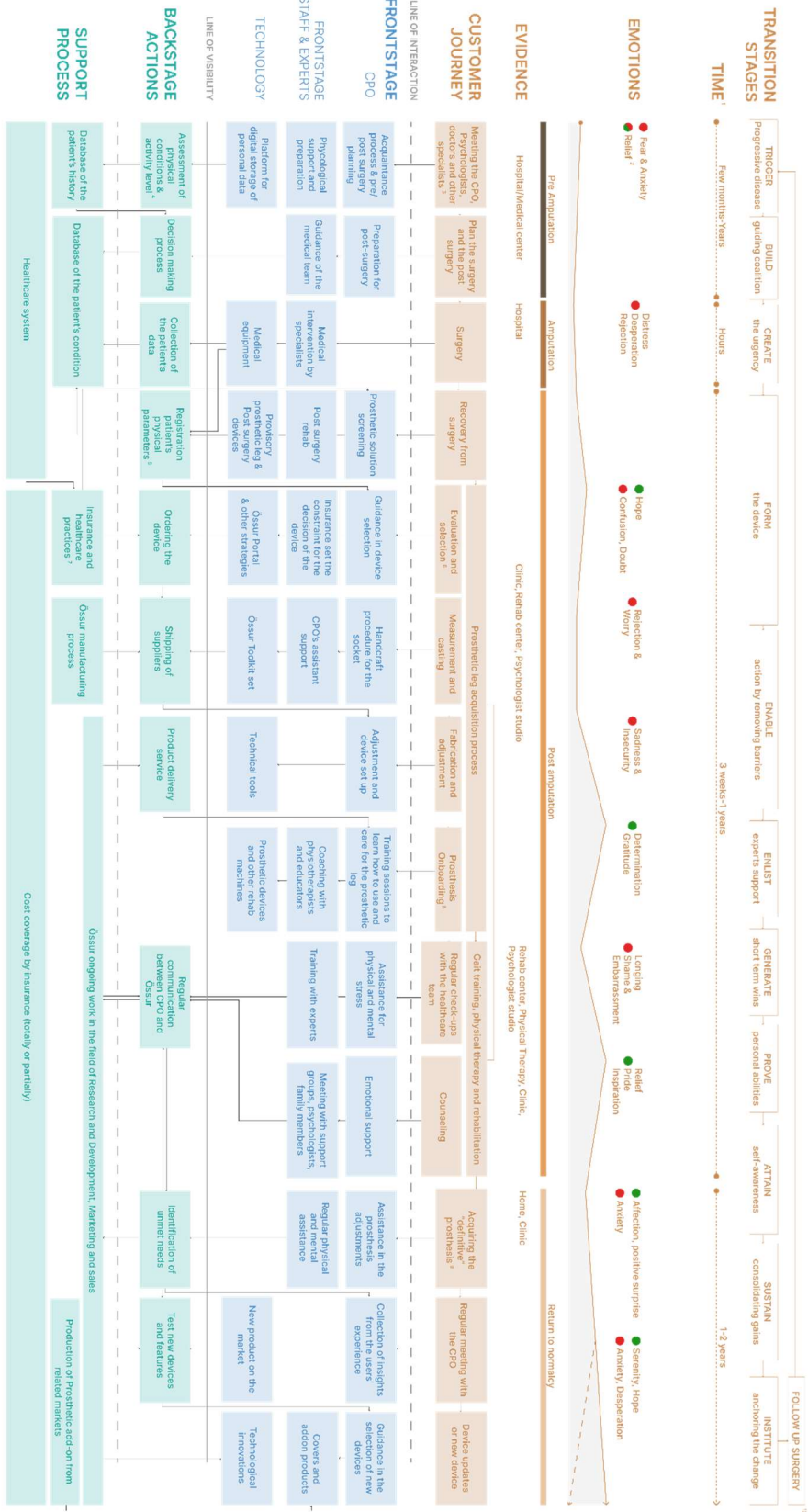
The analysis of the emotion through which a person with an amputation undergoes during the process from the surgery to the selection of a prosthesis varies a lot depending on the personal situation. As showed in the user journey and the service blue print there is a difference between the patients with an amputation due to a traumatic event and the patients which had a chronic disease. The study of the emotions for of the users journey has been researched with experts and not directly with users. The reason behind this is because expert can have a bigger picture or many cases and can provide with a overview of the trends in the Prosthetic users experiences. The emotions used are referring to the Emotion Typology, (2016) elaborated from TU delft.

D.3 Kotter's model

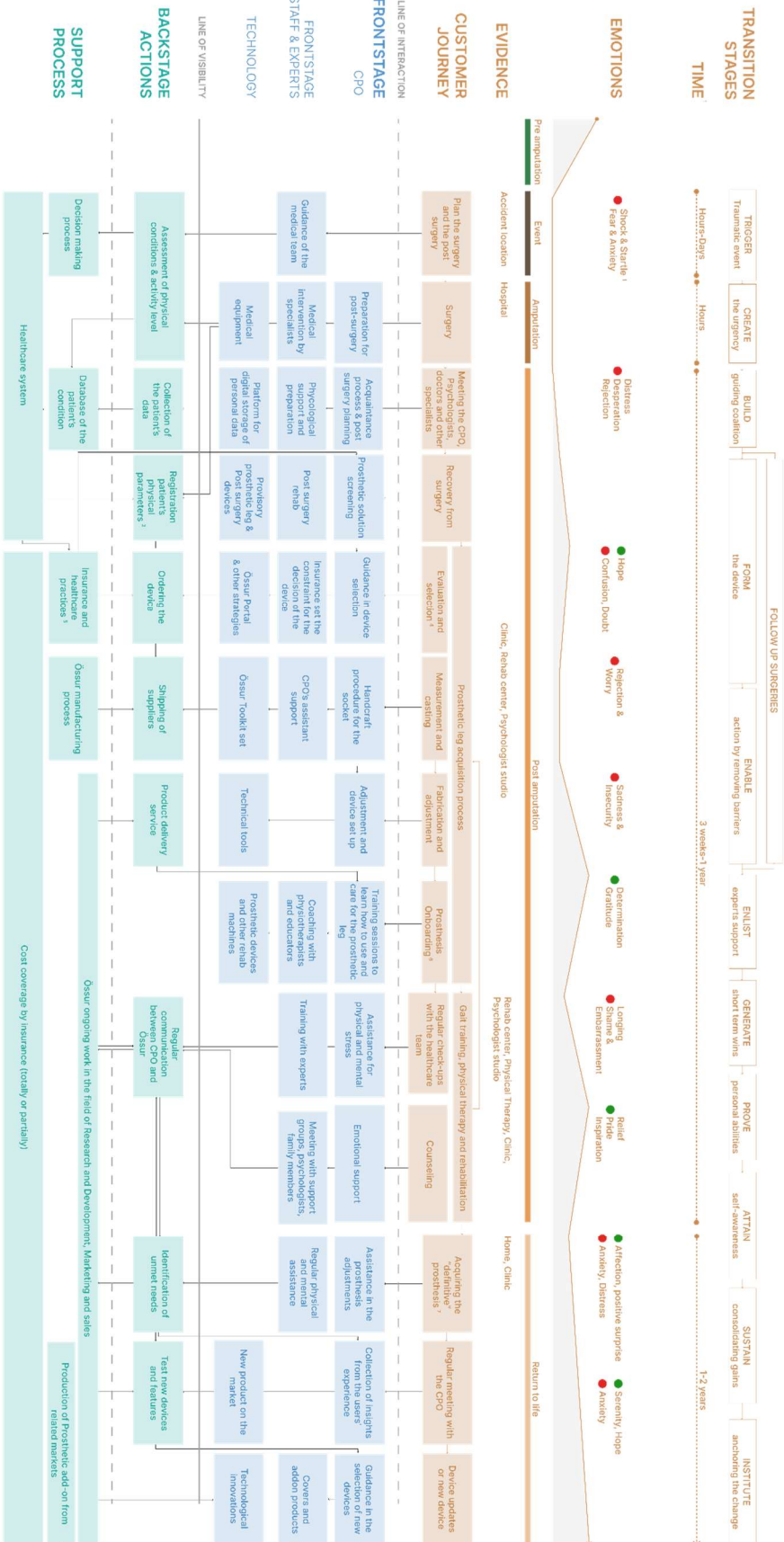
In the service Blue print the first layer has been mapped by referring the transitional phases through which a company has to go through while changing their business model drastically. These stages even if they are applied to a totally different context they align and have some similarities with the stages through which an amputee has to go through during the whole journey. (Kotter's 8 Step Model of Change, n.d.)



D.4 Journey map and Service Blue Print (amputation due to a chronic disease)



D.5 Journey map and Service Blue Print (amputation due to a traumatic event)

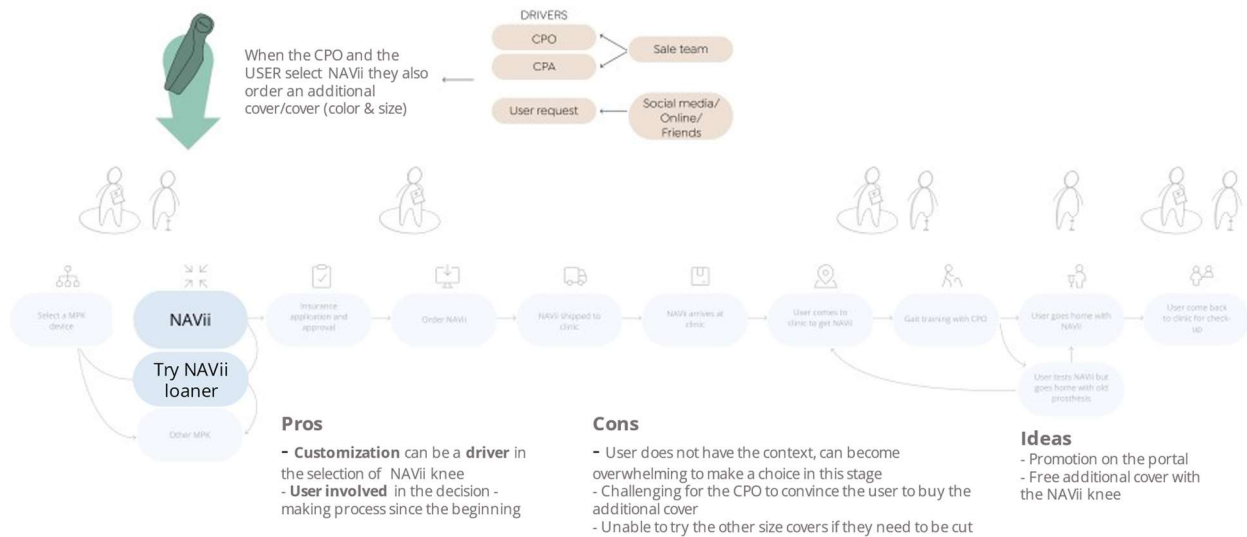


Appendix E

E.1 Summary of the discussion points

D230602 | NAVII ADDITIONAL COVER ROADMAP

CASE 1

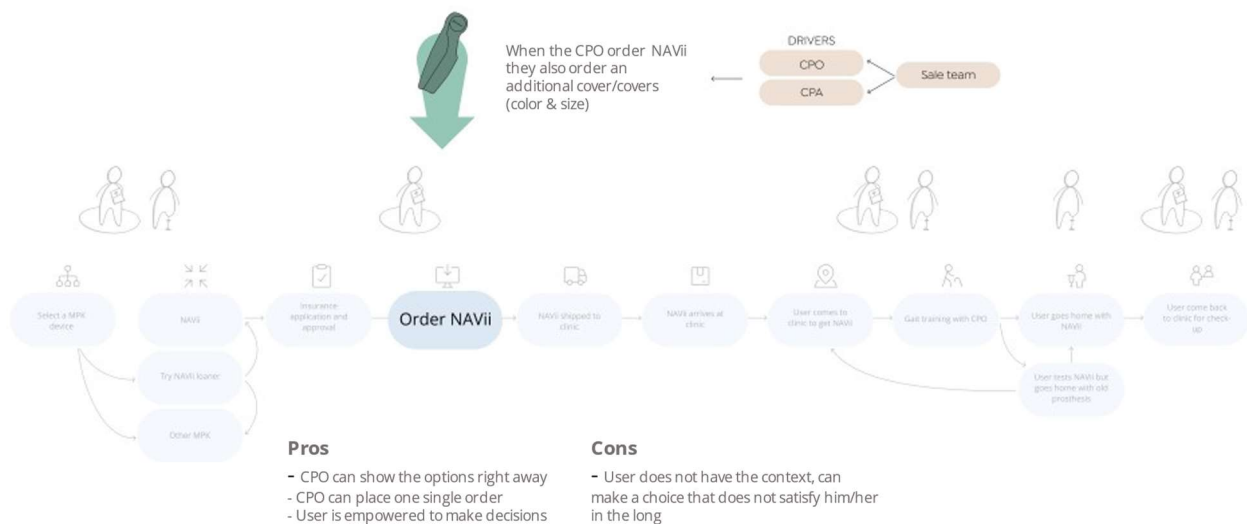


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D230602 | NAVII ADDITIONAL COVER ROADMAP

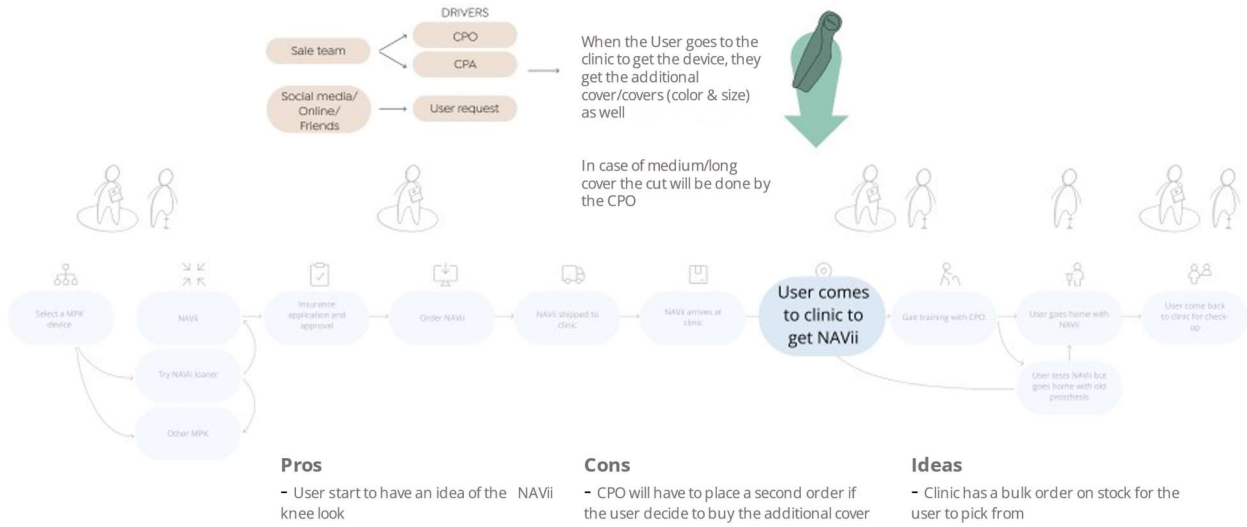
CASE 2



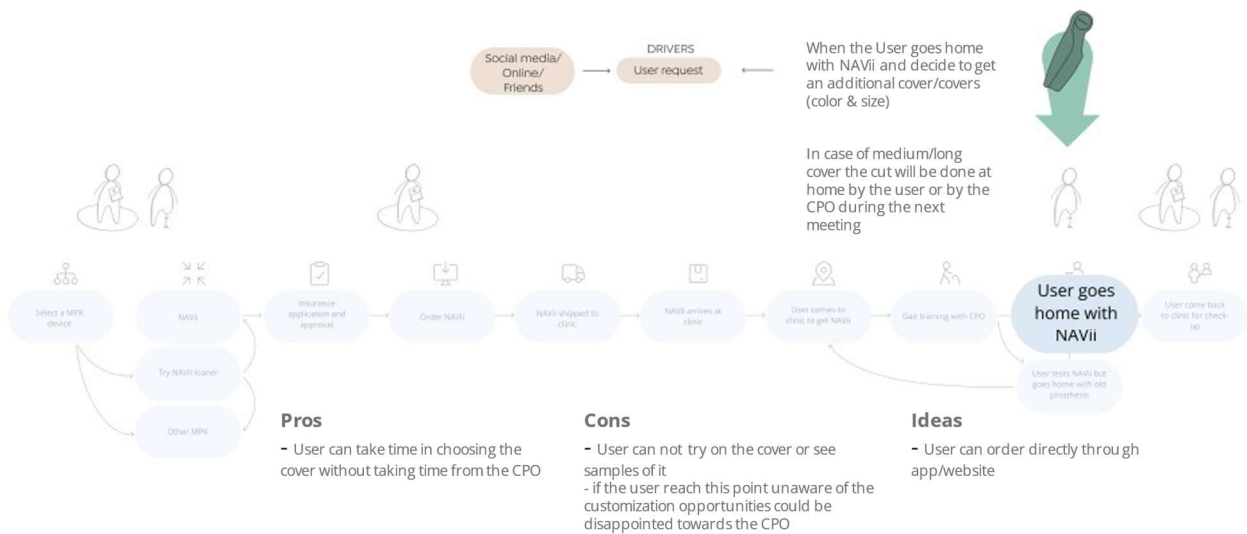
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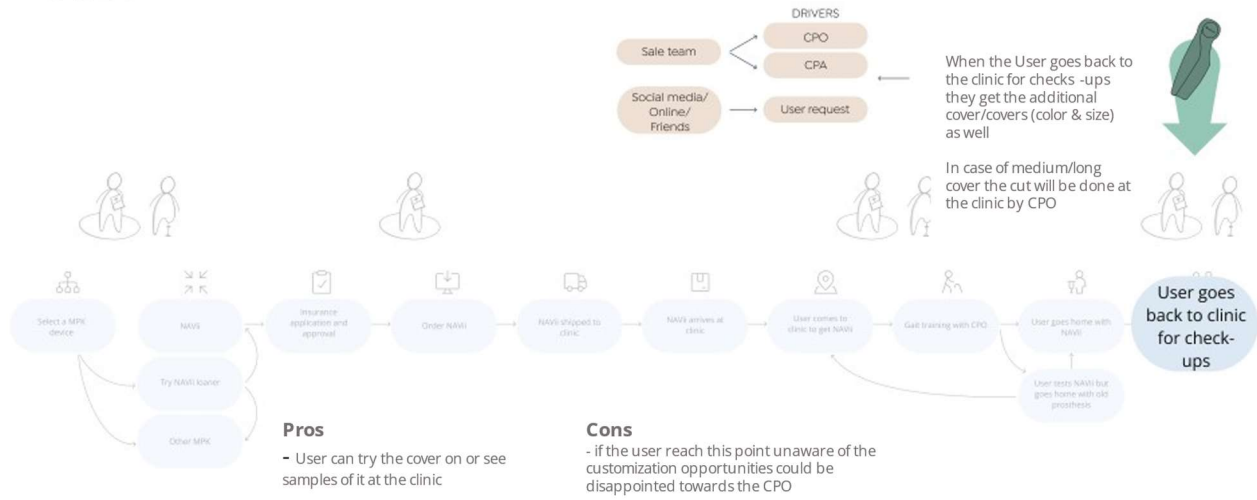
CASE 3



CASE 4

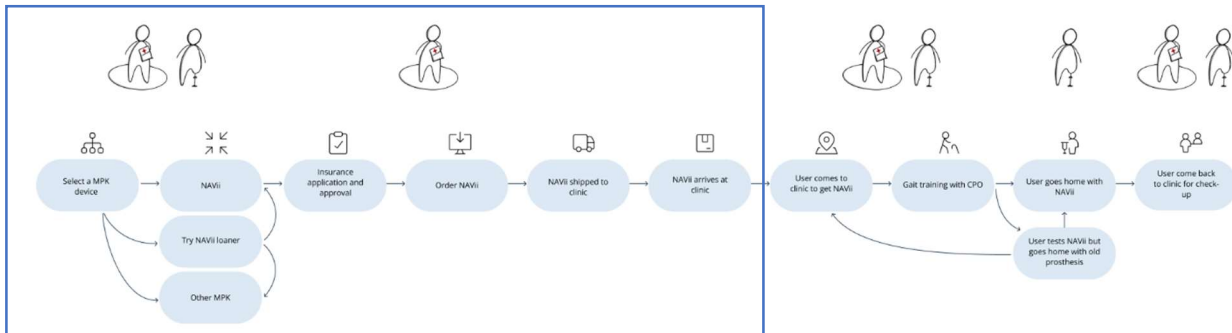


CASE 5

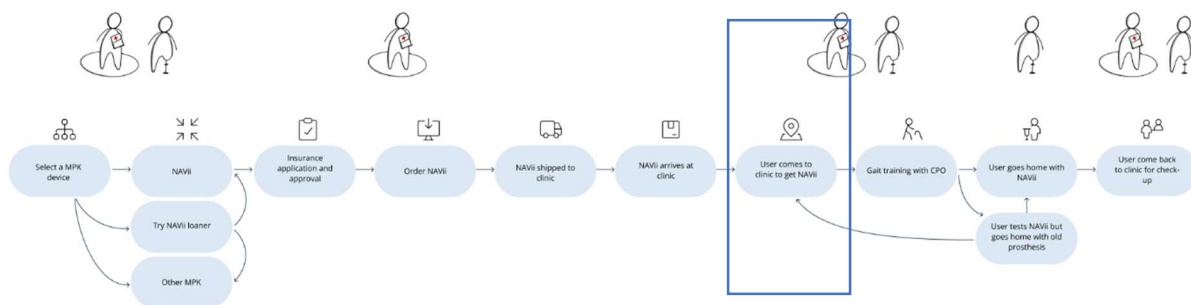


E.2 Interview notes and insights- On NAVii acquisition process Expert 3

Difference between people that are using NAVii knee as the first prosthesis and those that already used another prosthesis before



In the first phase (blue square) the users that never used a prosthesis before is looking for human contact and CPO guidance. Presenting the additional cover here might not be beneficial for the user and for the CPO. They don't have idea of how the prosthesis will look like and they are very new to everything



This phase “user comes to the clinic to get NAVii” should be the main touch point. In case of users that are using NAVii as the first device they might be introduced to the additional cover here and then select the next time they go back to the clinic.

In case of user that have experience with prosthesis already they might be able to choose the cover here already.

Selling strategies

If we sell through the CPO

- they will for sure markup the price (3 or 4 times the price)

If we sell directly to the user

- we have to consider that if the users are not satisfied with what they select they will complain to Össur. If this would be the case, we have to be prepared and plan how to handle it.

Insurance and price:

- If the cost of the additional cover is covered by the insurance the users will be less critical, if they have to pay, they will be very critical on the look.
- The cost should be affordable by most of the users, most of them are not rich people and they already have to manage many other costs. But this doesn't mean that they do not deserve the additional cover.

Global tools

- It has to be presented in the appropriate way, it should look fancy and refined.
- there must be **alignment in the prices** if we decide to sell both directly to user or through the CPO (the user cannot see one price on the website and a totally different one in the clinic)
- Clinic stock can be hard to have for most of the clinic. Clinics are messy and full of stuff around. Something more compact like a brochure would be easier for most of the clinic.
- To promote the NAVii cover on the market we could think about Össur pop-up stores with a stock of covers as temporary showrooms.
- Something that they can show to family or kids and not see the selection as an individual activity in which the user is looking at a brochure lonely

Portal

- the CPO never shows the portal to the user. It is not necessary and can be overwhelming.

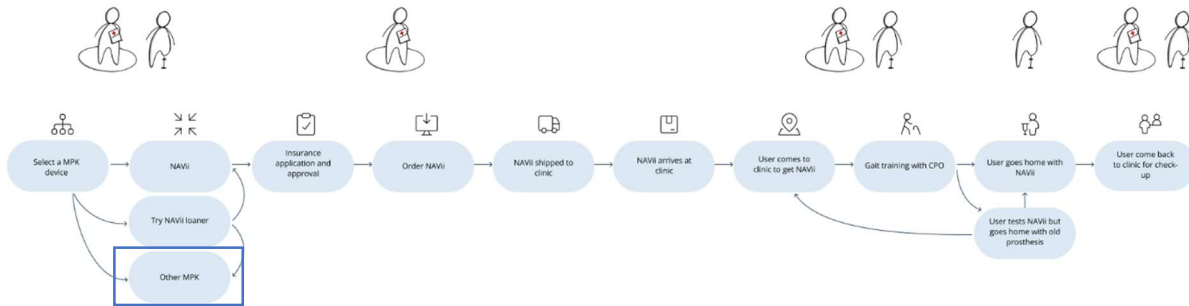
UNIQ and others

- the users go to the CPO to order them because they need to take measurements.

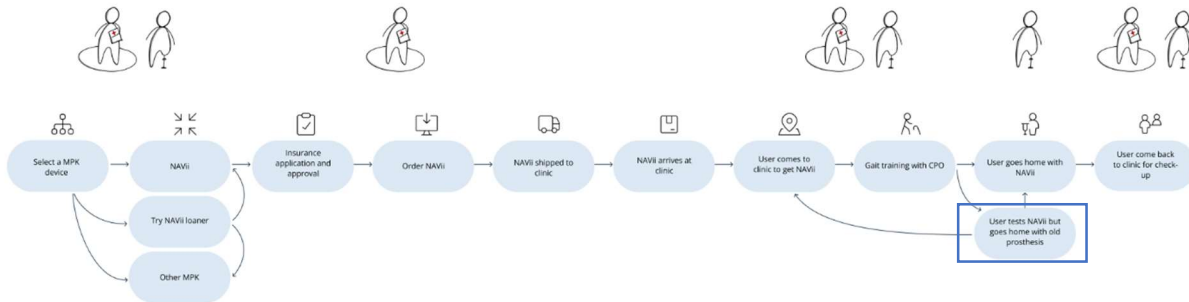
Size

- if we want to let the user cut it, it should be easy to cut with scissors no specific tool or something that would put them in possible danger.
- If they can try on a long one even if is not perfectly fitting because it need a cut or it is too short it would be already good enough for them to imagine the final look

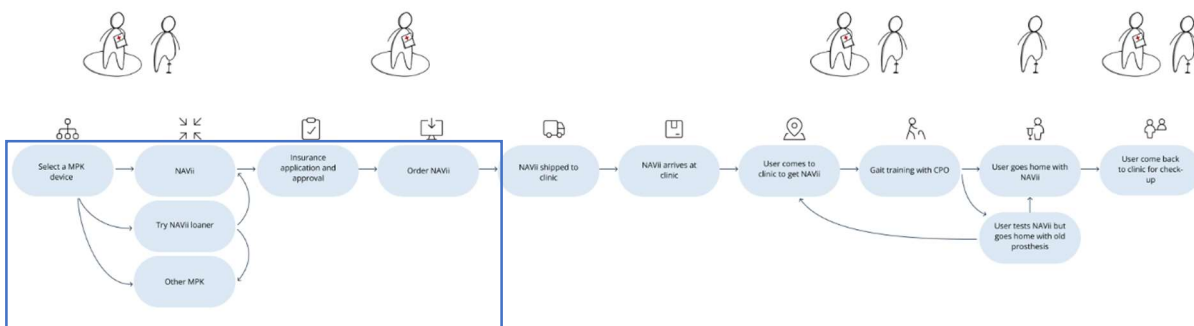
E.3 Interview notes and insights- On NAVii acquisition process Expert 4



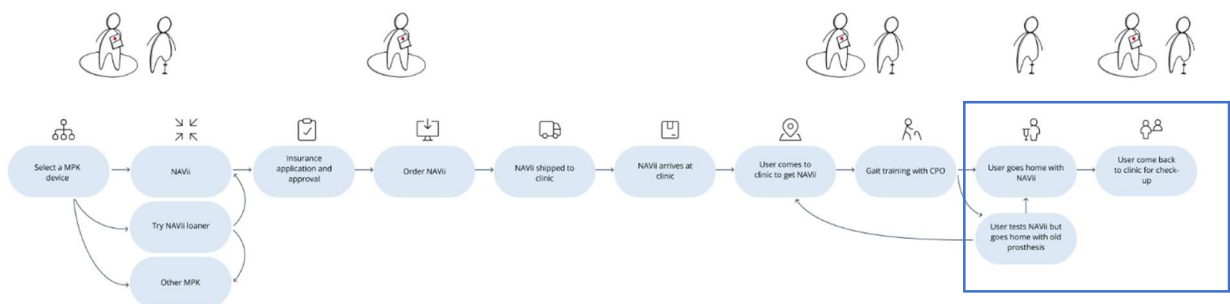
This is not crucial, and it is a bit distracting maybe we can keep it out



Move this to the left or in between the gait training and the user going home with the NAVii and delete the arrow that goes from "user tests..." to "user goes home..."



- Customization as a driver in the initial phase (blue square). In this phase the CPO could communicate to the user the opportunity to add the additional cover without having to make the order yet. For example the CPO could say "I want you to know that NAVii has the opportunity to select additional covers, I could show you some samples now or we can look at them in the future,..."
- The assets to make a selection and the order should be there already in the case of expert and confident users but no need to make a choice in this stage. introduce the possibility is important tho



Here is too late, the first exposure should not be here, they need to know before reaching this stage. Even though they might decide to order here

Selling strategies:

- **Emphasize the ease with which it is put on and take off!!** This can be a huge driver in the selection. Many user when they think about the cover they picture it as something that they cannot don and doff by themselves but they need the CPO help. This because most of the covers on the market work like this. If the user see how easy it is to change between one cover to the other they will like it.
- he thinks that it is best to sell through the CPO for reasons:
 - o if you sell to the user there is a loss of control, not sure about how the warranty would work and if something breaks or need to be fixed on the cover it the user buys it directly the CPO will be less willing to help and fix it. The lack of interest depends on the fact that the CPO does not earn any money from the direct purchase of the cover by the user so why should he spend time to fix it?
 - o They can show samples both for colors and sizes

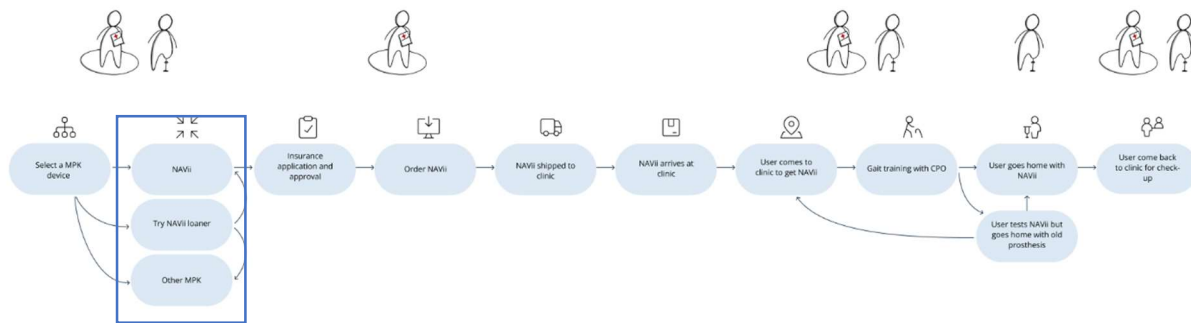
Global Tools

- System should be simple and effective
- Clinic stock is not really feasible, no space too much to ask to the CPO
- It is enough to have maybe the standard size to show the features
- Brochure can be a good way to use inside of the clinic

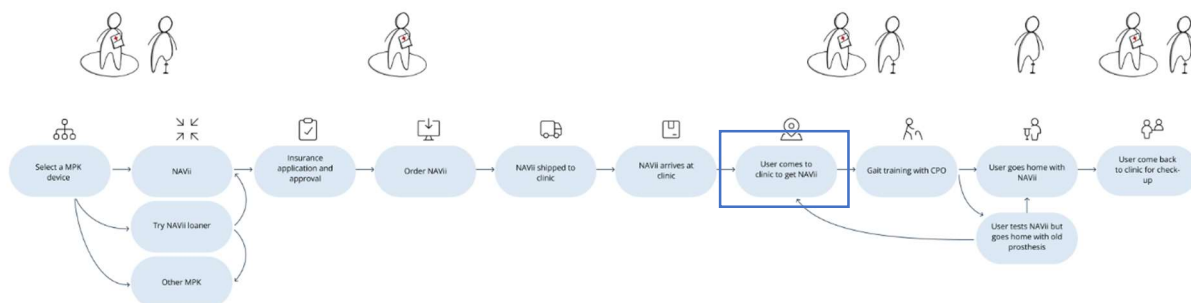
- Small samples he liked them a lot also because could be used in the clinic but also we could think about letting the user to go home with them and take some time with family or friends
- Combination of digital webpage and brochure maybe a QR code that connect the two tools. The CPO can show through the brochure and the user can keep selecting it at home with more time

Future scenario → having a personal NAVii app for each user on their phone and propose cover there

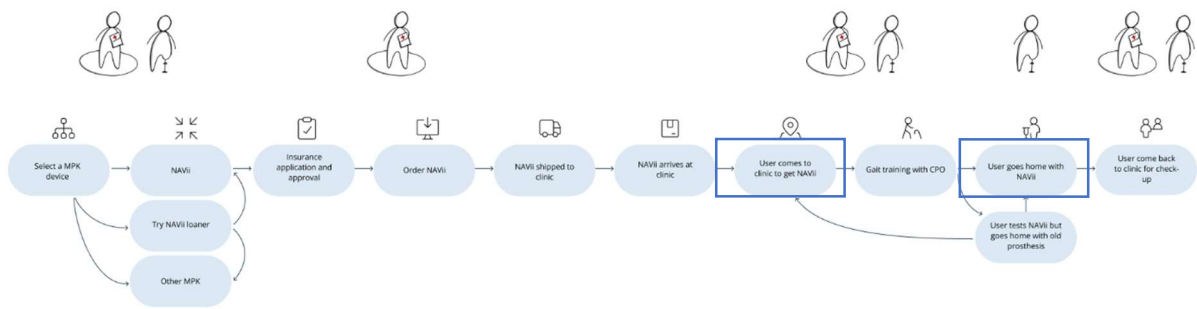
E.4 Interview notes and insights- On NAVii acquisition process Expert 5



- In this phase the customization options can definitely be a driver for the NAVii. So it is important to mention here that they can get an additional cover afterwards but it is probably too early to make them decide



- This is the right to show the different colors and give the options etc. it is not too early and not too late.
- Having to place two orders might be a pro and not a cons because the first one will probably all covered by the insurance, the second one which will be the additional cover will be paid out of pocket



For new amputee these two phases will be in two different times while for the amputee with more experience they might be at the same time or not two far from each other

Selling strategies:

- Use customization as a driver for the selection of NAVii
- The selling directly to the user is not very appealing
- The selling through a website is a lot of work and it is not really worth it in terms of money

Global Tools:

- Website really cool not for selling directly because it is a mess but it is good to show all the options. Put videos, images of a reference on how it will look like on people
- The ring with small samples is really cool for selecting a color
- We are making samples that can show the textures but actually they will already have the black cover on them so probably not really needed or at least depend on which context
- The brochure can be a bit hard to keep updated
- Combination website and small samples with the QR code that send to the website this is a good way to remove papers and brochure while having the same information

Appendix F

Qualities	Interaction vision	Design properties
Empowering	When a group of friends comes together to plan a road trip, everyone has a say in deciding the route, destinations, activities, and accommodations. Empowerment in this context comes from being part of the decision-making process and having a role in shaping the adventure.	The design is promoting the user in making decision regarding his/her own body
Communicative	Effective communication is vital during the planning process to ensure that everyone's preferences, expectations, and concerns are expressed and understood. Clear communication helps prevent misunderstandings and ensures that all participants are on the same page regarding the trip's details.	The design should promote clear and honest communication between the doctor and the patient. This would facilitate and support the decision-making process by promoting the buildup of a strong relationship between them two
Engaging	Planning a road trip is an engaging process, as it involves discussions about exciting destinations, potential activities, and the overall adventure. Friends can actively participate in brainstorming ideas, making decisions, and getting excited about the trip.	The design should involve in first place the user, the CPO and the main stakeholders (like family and friends)
Flexible	Road trips often involve changes in plans due to unexpected circumstances or new opportunities that arise. Flexibility is essential to adapt to these changes, modify the itinerary, and make the most of the journey while accommodating everyone's interests and preferences.	Each CPO has their own method of operation. At the same time, the CPO's approach also varies depending on the type of patient they are dealing with. Each patient has different needs and journeys, and for this reason, it is necessary for the design to be capable of adapting to the various circumstances that may arise.
Playful	Planning a road trip most of the time is a whole adventures per se. It is a fun activity which build up the vibes and the excitement for the trip itself.	The design aims to foster creativity, reduce the user stress and boost his/her positivity towards their situation

Appendix G

G.1 Display Booklet Prototype process



Make it unique in 4 steps

1. LENGTH
2. SIZE
3. COLOR
4. WHAT ELSE

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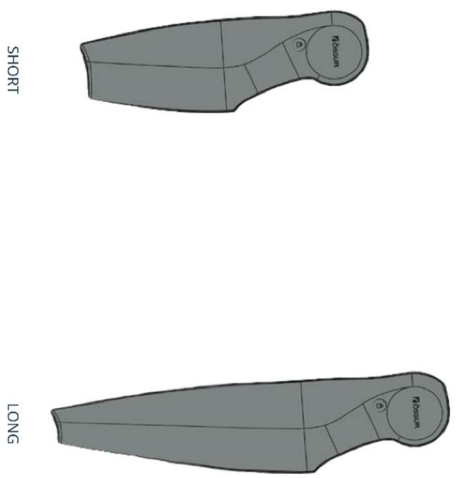
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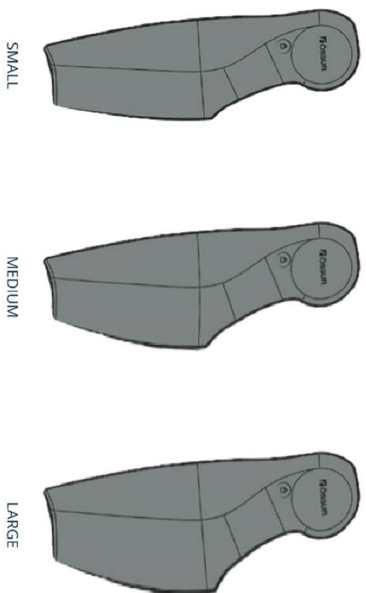
START

**Hössur**[®]
LIFE WITHOUT LIMITATIONS

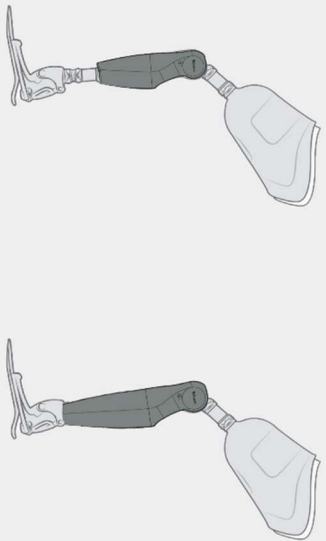
Select the length



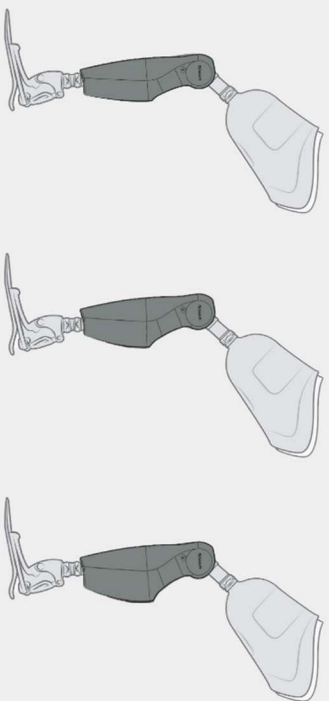
Select the size





1. LENGTH



2. SIZE



Select the color

-  **ANTHRACITE**
BLACK
-  **LUNARIS**
GREY
-  **MIDNIGHT**
BLUE
-  **GALAPAGOS**
GREEN
-  **TERRACOTTA**
RED



4. WHAT ELSE







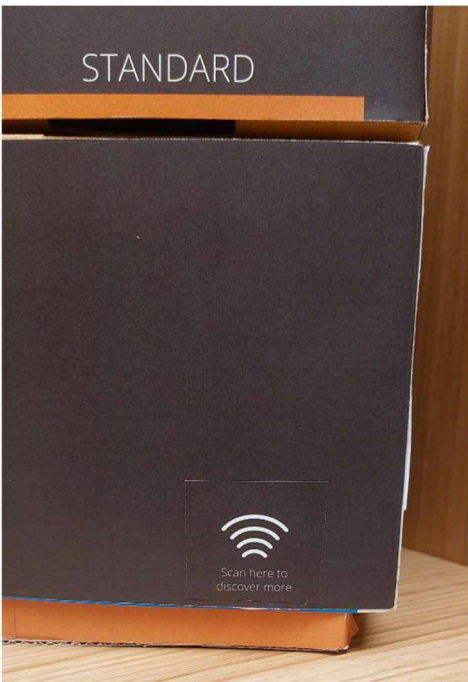


G.2 Toolbox Prototype process









G.3 Testing prototypes plan

The insights obtained from the research led to the selection of a design goal which is:
Design a system of tools that can be used as global assets to:

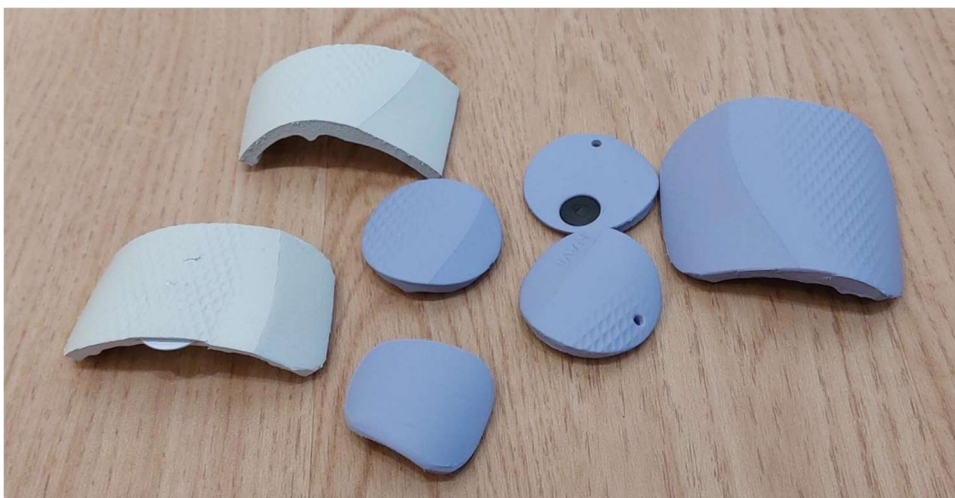
1. Guide the user in making a choice regarding the selection of an additional protective cover for NAVii
2. Support the CPO in presenting the customization option to their clients
3. Overall facilitate the interactions between User-CPO-Össur

This design direction led to the development of different low-fi prototype. All the prototypes aim to achieve the design goal by using different strategies and implying different kind of interactions from the users.

1. Display Booklet



2. Product Samples



3. Toolbox



The plan is to conduct at least 4 tests with Users (Lower limb, above the knee, NAVii users) and CPOs but also with other experts in different fields such as packaging design and marketing.

The testing sessions will be structured in two main parts. The first one dedicated to the Product Samples and the second one to the Display booklet and the Toolbox. The aim of this testing is to identify the strengths and the limitation of the different features present in the prototypes to then shape a final design that archive the wanted interaction.

In order to do so a pilot test will be conducted to better prepare the settings and the procedure of the whole testing session.

Pilot test

The plan is to conduct at least 3 pilot test before the real test with users and the experts. The pilot test will follow the same structure and interview guide of the real testing, which is presented in the next pages of this document.

Goal of the pilot:

1. Prepare in the best way the setting and the procedure of the testing session and practice it once before the real testing
2. Test out the Discussion Guide
3. Test out the equipment, meeting room, etc.
4. Get a first round of feedback regarding the interaction with the different tools
5. Evaluate if it is necessary to make some adjustment on the prototypes or on the session plan before starting with the real testing.

Tools:

1. Samples with different shape
2. Covers with different size (Standard, Medium, Long) with different colors (black, grey, blue, red and green)
3. Display Booklet (with the samples, video and Web page)
4. Toolbox (with samples, video and Web page)
5. Discussion Guide

Intro

- Say thanks for joining and offer a drink before starting.

First of all, thank you for taking part to this test session. Before starting, would you like to have something to drink, coffee, water, if you are ready to start, we can begin.

- Explain about the new NAVii knee and how it comes with different cover options.

As you may be aware, the NAVii knee that is currently in development will be accompanied by a protective cover, Making customization of the knee an option for our users. This marks the first time the company will empower users to choose different sizes and colors of their knee cover.

- Mention there's a basic black cover included and the chance to pick more in different colors and sizes.

The NAVii knee will arrive to the CPO including a black standard cover. There will then be an option to choose a second or third cover in different color and size.

- Talk about making tools to help choose these covers and wanting to try them out together.

Our focus has been on identifying potential methods and resources to present this choice to prosthetic users. Over the past few weeks, I've dedicated my efforts to designing tools that can streamline the interaction between users and CPOs during the NAVii additional cover selection process. Today, I'd like to conduct tests using different tools with you to gain insights based on how you perceive and interact with these tools.

- Make sure everything's clear and ask for questions.

- Say the test will take about an hour, and there's a plan to follow.

- Ask to share thoughts openly during the test, no right or wrong answers.

Is it everything clear? If you have any questions, please don't hesitate to ask. The testing session will run for no more than 1 hour, I will be following a guideline to ensure we don't get off-track. I would like to ask you to express your thoughts aloud and share with me anything that comes to mind during the testing. I am really interested in your thought process and immediate reactions.

- Mention that the tools are early versions and might not work perfectly.

I'd like to emphasize that the materials and tools I'll be providing for your use are prototypes. This means that not all functionalities are fully operational, and some elements may not work as intended at this stage.

Feel free to ask anything or share what comes to mind and remember that there are no right or wrong answers here, every bit helps.

- Say that recording is just for personal notes, and it's anonymous.

Also, I would like to record our session, this will be for my own note taking and will not be shared with anyone, only so that I can go back to our discussion later if I need to as I will be focused on our conversation now and not able to take notes at the same time. All output from this will be anonymous so your name will not appear anywhere.

1. Product Samples

Material:

- Samples with different shapes and with different characteristics

Goal:

- Understand which shape and characteristics make the user perceive the sample in the same way as the cover itself.

Settings and procedure:

1. Provide a finished cover to the participant. The cover can be any color or size. What we are focusing now on is the feeling of the cover (Material characteristics, material behavior, texture,)
2. Let the participant play around with the cover for a bit.

Questions on the covers:

- **what are these, what do you think?**
 - what do you think about having these options available to patients
 - how would you go about showing your patients the different options they have?
3. Now place the samples in front of the participant,
 4. Let the participant play around with the different samples.

Questions to ask after the interaction:

- What are these?
- What do you think about them?
- What is going through your mind?
- You see these are a few different samples, can you tell me what you think of them? (then continue with why, what does that mean, how so?)
- Which one do you like the most/prefer? Why that one?
- Which one is most useful for you to use when helping your users select a color?
- How would you use them?
- Is there any one of them you don't like or like the least? Why?
- Can you rank them?
- **Which one instead is the most apart from it and why?**

2. Display Booklet and Toolbox:

Material:

- The printed prototype of the Book Brochure (with the samples and the NFC tag for the video and web page connection)
- The prototype of the Experience Box 1 and 2 (with the samples and the NFC tag for the video and web page connection)

Goal:

- Observe the interaction with the prototypes
- Understand if the mechanism of the box is intuitive for the user
- Understand if they prefer a more traditional interaction with the Book Brochure or if the Experience Box would work. Then check if this preference is aligned between the Prosthetic users and the CPO
- Compare the two different interactions.
 - o Which one make the user more satisfied about the final choice
 - o Which one provide the user with the right amount of information about the final choice made
 - o Which tool offer a more intuitive interaction?

Settings and procedure:

1. Provide the participant with the Book Brochure, the Experience box 1 and 2
2. Assign the task to the participant by asking him/her to complete the task with each of the three prototype one at the time
3. Observe the behavior without giving hints on how to approach the prototype. Let the participant figure it out by him/herself.

Task:

I will now assign you a task and I would like to ask you to complete this same task by using each of these tools one at the time.

I would like you to imagine that you want to buy a NAVii cover, after considering different size and colors you decide to opt and select the STANDARD size in the GREY color. Could you please show this decision-making process and the final decision with the tools in front of you?

Questions to ask after the interaction:

1. Which one of the three methods gave you the information's you need in order to make a choice in the more accessible way
2. Which action required during the interaction helped you confirm the choice you were making?
3. Were the three-interaction intuitive or did you feel any struggle during the interaction? In what ways? Why did it happen?
4. After completing the task on each of the three tools which one do you think was helping you the most during the selection process?

3. Web page

Material:

- Web page

Goal:

- Test if the interface is intuitive for the user.
- Understand if the information on the webpage is enough for the user to understand the sizes and the different colors.

Final general questions:

Print out the NAVii acquisition process and ask:

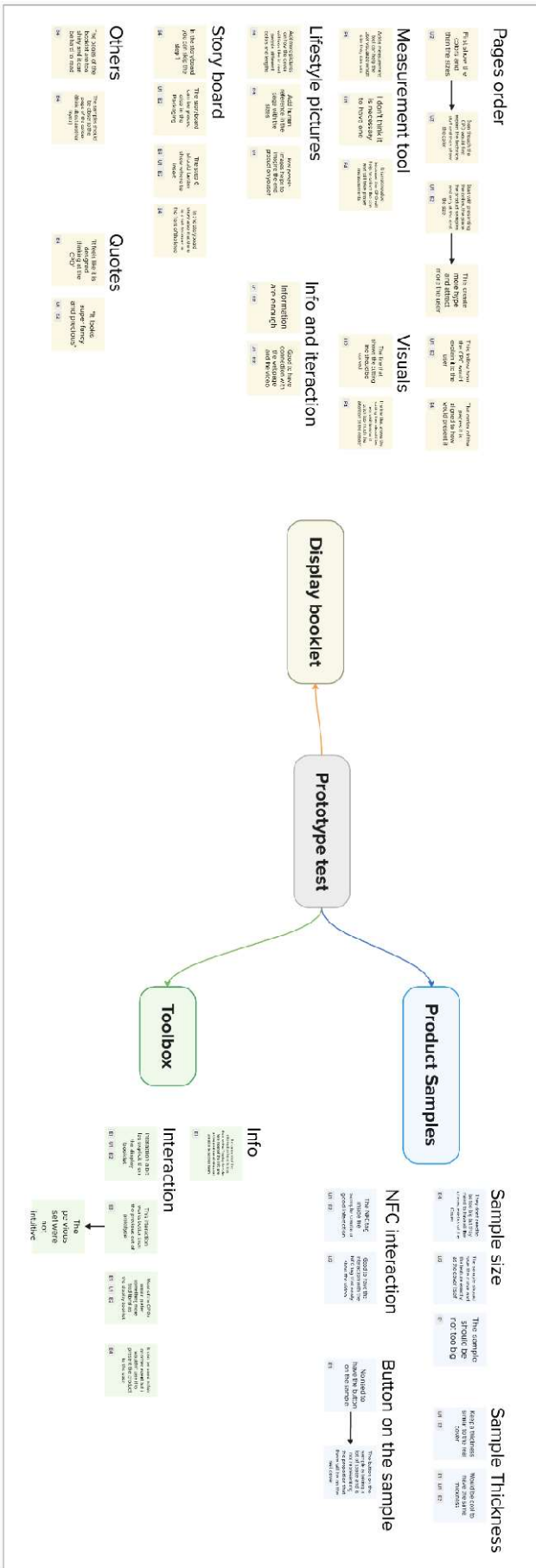
To the CPO:

- Which of the tools you interacted with would you like to use when showing the NAVii cover options to your user?
- When in the process would you use them?
- Do you think some of these tools would help you to save some time when offering the cover to your clients
- Which one do you think would make the decision process easier and shorter for the user
- Do you believe that utilizing one or multiple of these tools would result in greater client satisfaction with the final decision compared to other tools?

To the END USERS:

- Which of the tools you interacted with would you like your CPO to use when presenting you the NAVii cover options to you?
- Would those tools help you to better select the cove you want?
- In which moment of the acquisition process of the NAVii would you use these tools and why?
- Compared to the way your CPO is currently offering you customization, do you think the use of one of this tools would bring some improvement to the current procedure? If yes, in which way? If not, why not

G.4 Map of the insights



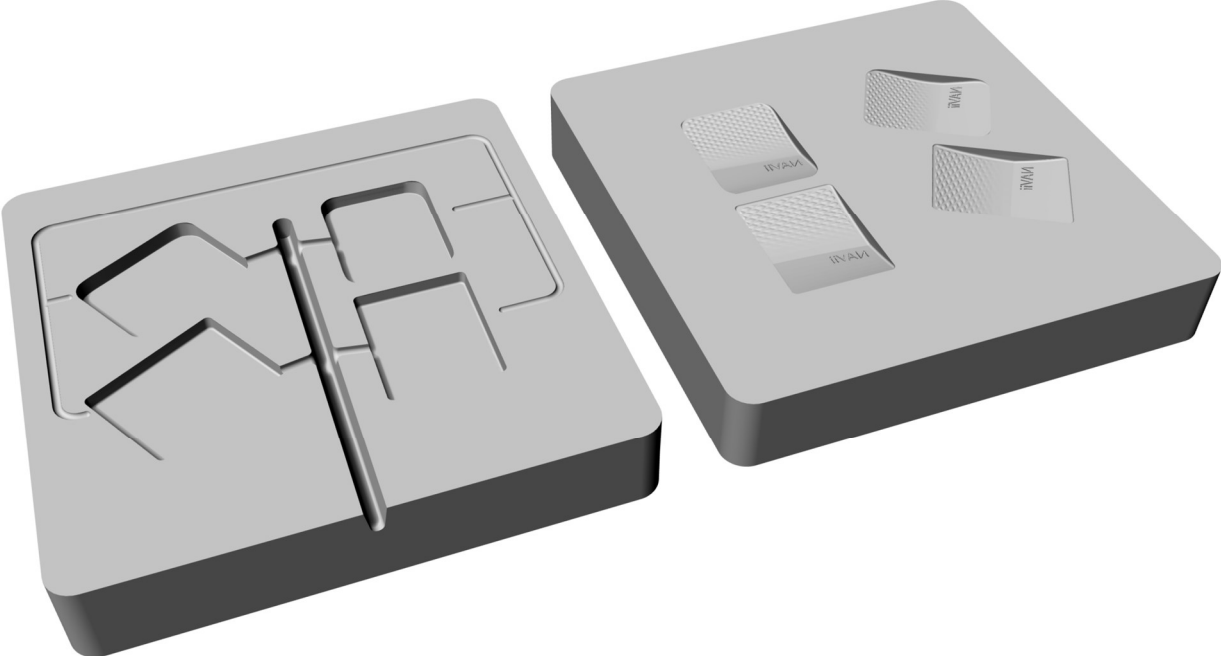
Appendix H

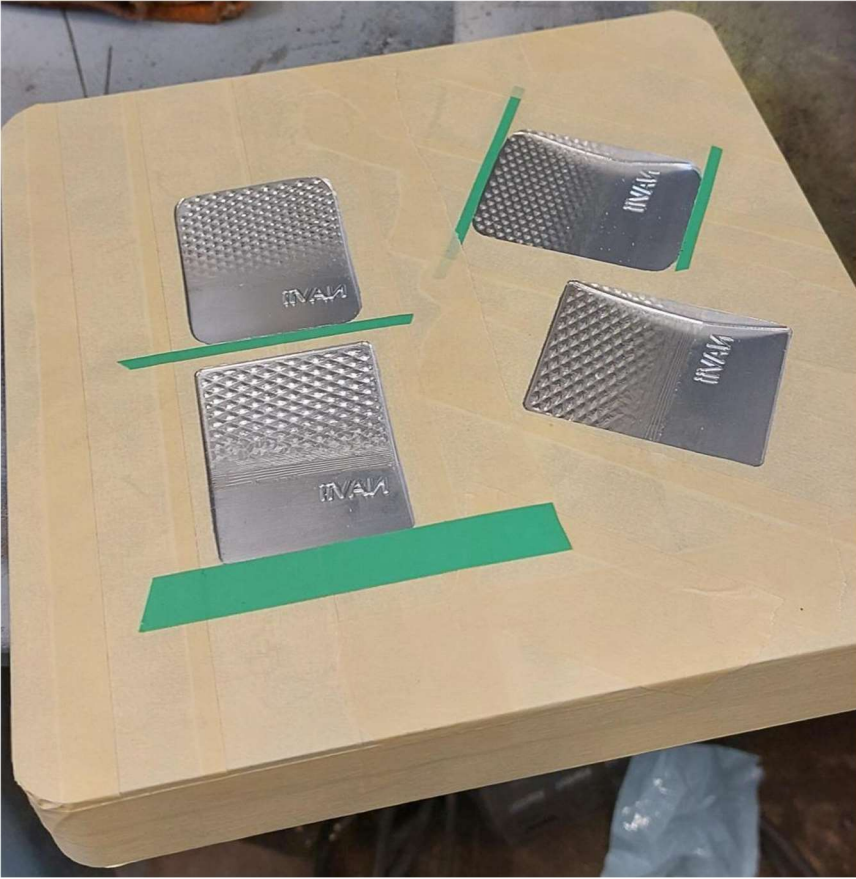




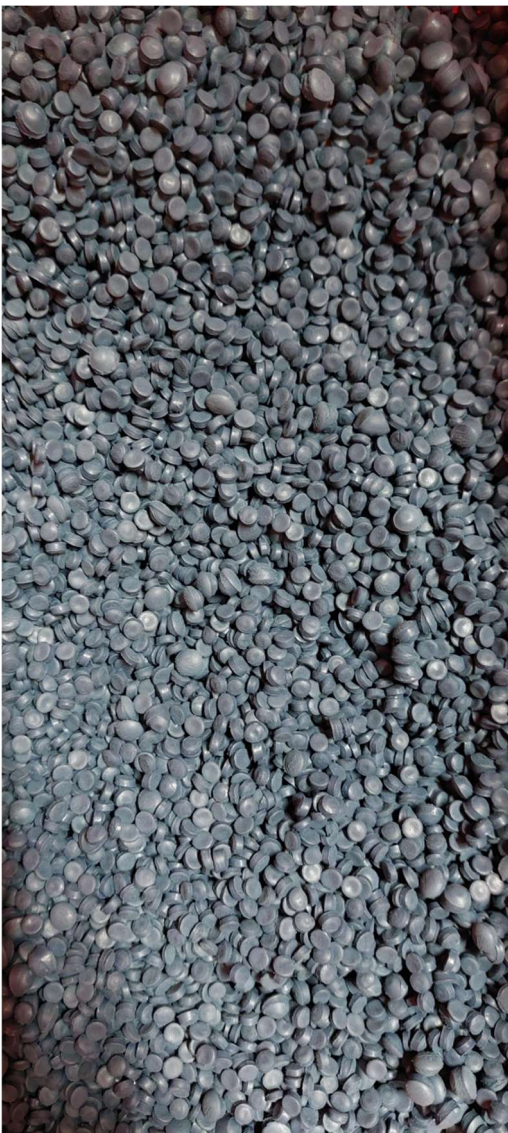


Appendix I







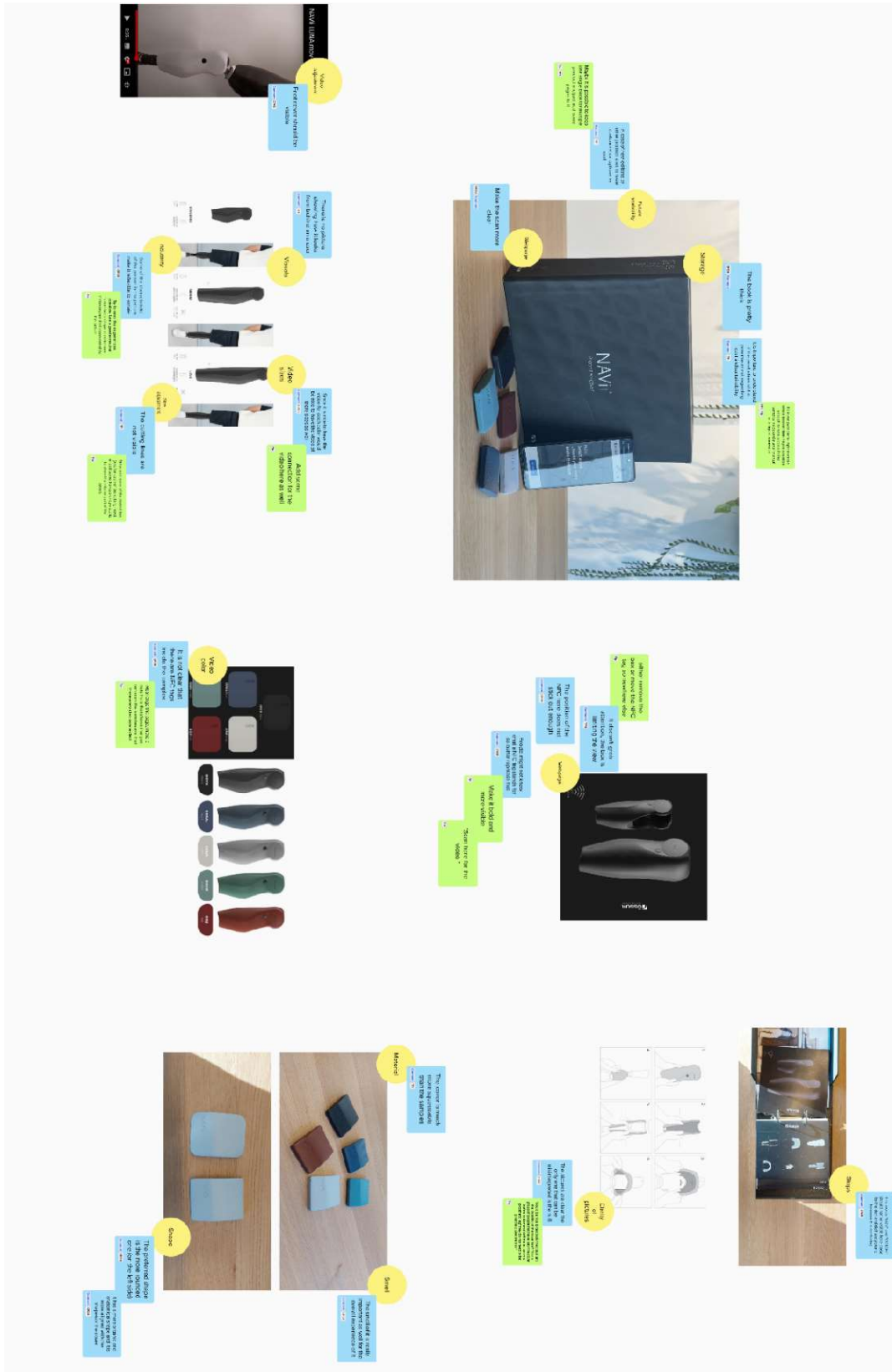






Appendix L

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Quotes

User Experience

“You are not just asking them what they want but you are giving them an experience”

“They finally get to choose, and they would not expect it because normally there is so little they can choose about their prosthesis”

“It feels premium”

“...for me as a user would be a huge plus”

“You know I really liked it from the beginning”

NAVii promotion & Presentation

“It can be a really nice marketing material, also a way to celebrate and present a new product is coming to the market”

“Every CPO clinic should have it, it would also help the users to have a better feeling of the company”

CPO Experience

“This book doesn't need many words to explain, it is honestly speaking, normally the material that we have to use is full of long text,...”

Others

While smelling the samples “The smell of it is important, sometimes some products have horrible smells, this has a smell but it's familiar one, we know this well from the foot cover and it has the smell of something new”

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