Project Management Report

Usability & User Experience design project

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Introduction._

Cannabidiol (CBD) market[1] is the fastest growing one in Occidental Countries, it is predicted to increase at a 40% compound annual growth rate (CAGR) from 2021 to 2028. The demand of CBD for health and wellness reasons is strong due to its therapeutic characteristics, which is a significant factor driving business growth. Furthermore, increased product acceptability and use, as a result of government approvals, is likely to promote CBD-infused goods production.

The leading position in the market is covered by North America with a revenue share of 37.3%. Europe, on the other hand, is on course to overtake United States and Canada as the world's largest legal cannabis market in the next five years. However, Europe applies an incredible number of confusing laws and restrictions to define what is legal, and what is not surrounding the use of CBD; moreover, each country has its own regulations. While a few European nations have proclaimed it unlawful to import, acquire, or possess CBD, the great majority of countries have legalised CBD products that either follow the Novel Foods Act or may be obtained through a qualified medical practitioner. Germany and the United Kingdom lead the European CBD market, with Switzerland, Austria, Spain, and Greece following closely after.

In this context is placed VAAY[2], a German brand subsidiary of the Sanity Group that focuses on the development and distribution of CBD wellness products. VAAY mission is to revolutionise the European cannabis market, building the infrastructure for these changes, sustained by the "people first" culture. Their products follow the highest quality standards using natural non-psychoactive ingredients and vary between different consumer segment, such as dietary supplements, cosmetics, food & beverages as well as products in the vaporiser segment.

As many CBD shops, also VAAY moves away from the "weed image" and presents itself as a premium and wellness business. The main target are young and adult individuals (a range of 18-54 y/o) that are conducting a stressful life and/or work. VAAY's products cover the relaxation moments of consumers' day life focusing on mindfulness and inner balance.

Because the European market[3] of CBD is quite young, VAAY has a series of growth opportunities. Most of them lead on the expansion of their market beyond country and consumer restrictions boundaries, considering the inclusion of people over the age of 55 in their consumer segment, who will find in CBD products a natural alternative to medicines. This state of affairs requires a process of user education.

In these terms a solution could be to integrate a service of hyper-personalisation[4] that will support the consumers' buying experience, guiding the users in the selection of the best formula and products based on their needs. Hyper-personalisation is an extension of standard personalisation. Whereas personalisation entails a thorough knowledge and use of customer personas, data, and analytics, hyper-personalization makes use of real-time data and artificial intelligence to create even more unique buyer experiences. These personalised experiences may be used to bring up relevant contents, products, or services that depend on the current buyer behaviour.

1   Giadha Aguirre DeCarcer, "Applying data to address Europe's burgeoning CBD market", 25 February 2020, Helth Europa, https://www.healtheuropa.com/applying-data-address-europes-burgeoning-cbd-market/98012/

2   VAAY, https://vaay.com/en/pages/ueber-uns

3   Katie Jones, "Mapped: The European CBD Landscape in 2020", 20 Augurst 2020, Visual Capitalist, https://www.visualcapitalist.com/european-cbd-landscape-in-2020/

4   Sheryl Koenigsberg, 8 December 2021, "Hyper-personalization vs Personalization: Why It's Time to Get Hyper-personal", Mendix, https://www.mendix.com/blog/hyper-personalization-vs-personalization-why-its-time-to-get-hyper-personal/

1.1_Segmentation

For our analysis we decided to rely on New Frontier Data, a data, analytics and technology firm specialising in the global cannabis industry, which has identified the main archetypes among European CBD consumers and non-consumers.

On top of that, we have to take into consideration that VAAY is a German brand, which communicates primarily in German and English, but its products and the service we want to implement have the potential to be spread in the European market. As a matter of fact, we want to take advantage of the so-called "domino effect", an increasing effect which is produced when one event kicks off a succession of similar events. In our case, entering the market of neighbouring countries which have similar legislation as regards CBD, would trigger the aforementioned effect and help VAAY's business grow incrementally and legitimize cannabis, both in its medical and recreational functions.

1.1.1_Demographic_Segmentation

For what concerns the demographic segmentation we decided to take into consideration both sexes, since wellness and CBD products are genderless. In terms of age group, we decided to focus on two main ones:

- 25-34 young adult workers (mainly millennials)

- 55+ elderly and / or retired workers (generation x and baby boomers)

Nonetheless, we decided to restrict our demographic to people with an income (or retirement benefits) of more than 17,000 €/year because we need them to have the economic capacity to afford CBD products.

1.1.2_Psycographic_Segmentation

In both demographics we believe our users to be cultured, curious and open-minded individuals with an interest for high-quality, natural, wellness products for self-care.

Since part of our analysis, and part of the market dynamics in general, is to consider various and different type of consumers we identified three groups among consumers and two groups among non-consumers.

Among consumers we selected:

- **The Receptive & Reserved:** this group uses CBD in moderate frequency, but the consumption depends strongly on friends and family; nonetheless, they have positive feelings on CBD and believe in its medical efficacy.

- **The Sceptical & Limited:** this is the other moderate group which however is not interested in trying new products. They generally have a positive impression, but they are unsure of CBD's medical claims and capabilities.

- **The Ambivalent & Experimental:** this is the least-frequent consumer group which has consumed but not purchased CBD; this group has not many reasons for using CBD and has the most conservative beliefs on it.[5]

Whereas, among non-consumers, we identified the following two groups:

- **The Cautious & Curious:** they are curious, but unsure of CBD's safety and legality

- **The Knowledgeable & Primed:** they are very curious and believe in the benefits of CBD, they are the most likely group to become a consumer.[6]

1.1.3_Target

Stemming from the analysis of the demographic and psychographic segmentations we identified two possible target segments, these are:

- **Young adult workers**, between the ages of 25 and 34, concerned with environmental issues and who are looking for new sustainable products to manage their needs, e.g., anxiety, tiredness, relaxation and so on.

- **Older adults' workers** or **senior citizens** over the age of 55 who are active, curious, looking for natural and ad hoc treatments for their ailments. This target might have heard of CBD products however, due to the misconception that cannabis often faces, they might need a bit of convincing.

5   Chris Hudock, "Introducing Five Demographic Archetypes Among EU CBD Consumers", 8 March 2020, New Frontier Data, https://newfrontierdata.com/cannabis-insights/introducing-five-demographic-archetypes-among-eu-cbd-consumers/

6   Katie Jones, "Consumer Archetypes Shaping the European CBD Industry", 31 March 2020, Visual Capitalist,https://www.visualcapitalist.com/european-cannabis-consumer-archetypes/

1.2_User_Research

1.2.1_Survey

In this section we opted for a survey on the use of CBD and the general knowledge on cannabidiols to find out trends, differences, or similarities in the answers of European participants. In particular, the main purposes of the user research are:

- Confirm our target audience

- Observe whether there is a peculiar trend in the **interest** and **knowledge** about CBD products according to the age range

- Observe whether there is a peculiar trend in the **use** of CBD products according to the age range

- Find out about what are the main needs

- Observe whether and how the **needs** change according to the age range

- Investigate **customisable shopping** preferences

Since we imagined most of the subjects would be Italian, to facilitate their understanding on the questions we created two distinct Google Forms, one in Italian and the other one in English. As a result, 50 Italian and 19 international participants filled out the form. The following paragraph depicts the Italian situation.

The result was a total of 50 replies[7], including 9 from young adults (from 25 to 34 years old), 23 from adults (from 35 to 54 years old), and 15 from late adults and elderly (over 55 years old). In the latter category, the eldest person is from 1949, followed by a few participants born during the Fifties. Although the adult group is not a target group in our research, we decided to keep their answers (see Tables 1 and 2) for consultation only.

Tables 1 and 2 compare the percentage of affirmative answers to all the questions of the Italian survey. It is possible to observe a similarity in adults and young people who admit to normally shop online, while the elderly do it only in 50% of cases. Concerning previous knowledge about CBD we notice an important gap between young adults and over 55: while almost 100% of people between 25 and 34 years old know what CBD is, the percentage of late adults and elderly is around 25%. Also, young adults and adults who are already familiar with CBD mostly replied they are not interested in finding out more, while in the case of late adults and elderly the trend is inverted. Consequently, over 55 in our survey do not shop CBD products, except one subject (who selected "pharmacy"), while adults and youngsters replies are varied [8]. Under frequent use we took into consideration only the ones who selected high frequencies (4 and 5), the result can be found below.

The next question was if they believe in the validity of natural products as we would like to deduce the general thinking towards natural options as

7   Among the replies there were three we decided to leave out of the analysis since the participants were born in 1999, thus out of the young adult's range.

8   The multiple choice in this case included: retail store, online store, pharmacy, vending machines or "other". The questionnaires will be available in the project depository.
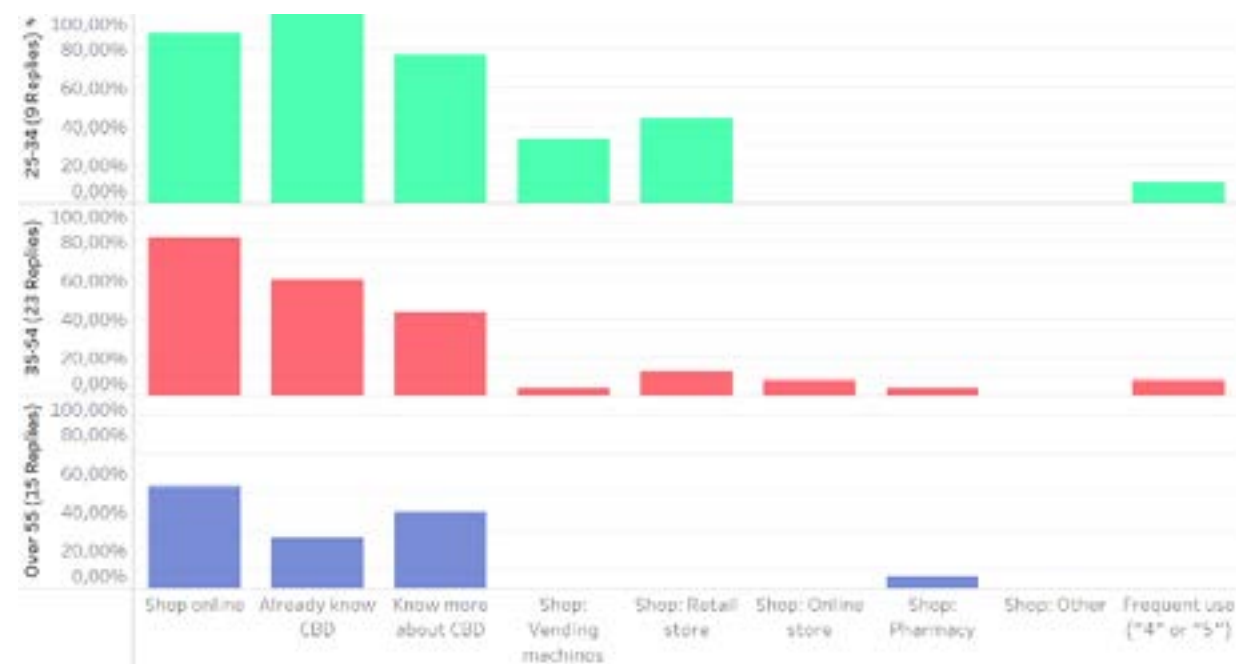
Table_1: Percentage of Italian participants who shop online and their main habits towards CBD products.

Table_2: Questions about CBD products, personal needs, and inquiry about additional services.
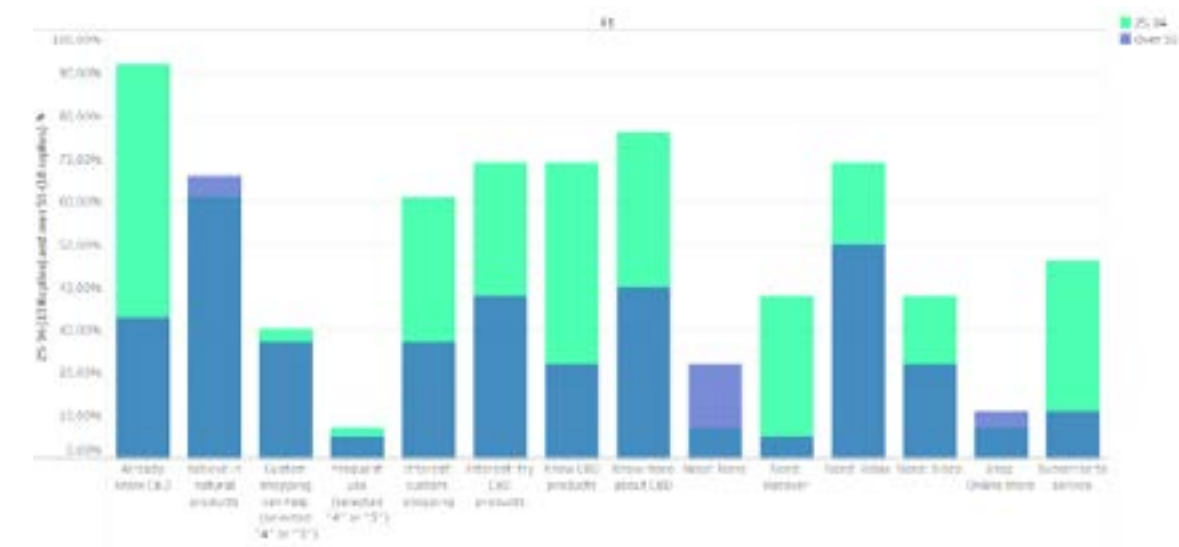
Table_3: Sum of all participants' replies. This visualisation compares the percentage of affirmative answers of young adults and over 55 to some of the most interesting questions in the survey.

CBD products for wellbeing. The answers where mostly positive: the over 55 who replied they do not believe in natural products' validity are only 4 in 15 participants (26%) and one person replied "A volte non sempre" ("sometimes, not always"); the same happens with young adults. In every category the customisable shopping is appreciated only by 30% circa of people. There is a difference dependent on the age range for the following questions which confirm that youngsters are more interested in customisable shopping and in trying CBD products than the others (5/9 and 7/9 replied "yes" respectively). No one has ever heard about VAAY, this makes sense because the German website does not deliver in Italy, only in Germany and UK.

Regarding the participants' needs it is possible to notice how "relax" is the most selected between the three options, followed by "sleep". Nobody over 55 years old selected "recover". We then asked if the participants would like to subscribe to a monthly delivery of recommended products and understood that most of the positive answers came from youngsters (40% circa); no Italian over 55 years old would like to subscribe.

Since the replies from people who are not born in Italy were too few to divide into age ranges and obtain significant results, we decided to merge all the replies in Table 3 with a total of 13 replies for the young adults and 18 for the over 55. It was unnecessary to keep the 35-54 years old data, since we are not focusing on this target and we already have an idea thanks to Table 1 and 2.

Despite the first answers reflect the situation of Tables 1 and 2, on "Frequent use" we can notice a little percentage of "Over 55" which confirmed making use of CBD with frequence "4", almost once a day. This person in particular replied that he usually buys at the pharmacy, in the retail store or online, this is why the over 55 percentage on "Shop: online store" of Table 3 overcomes the 0% on Table 1. Another difference comparing Table 3 with Table 2 is to be found under "Interest: Try CBD products": here we have a slight increase of affirmative answers from population over 55, which from goes from 30% to almost 40%. Furthermore, while in Table 2 late adults and elderly did never select "Need: none", in this table someone did, raising up the percentage. The same happened to "Subscribe to service", which in Table 2 was not appreciated by over 55.

People who expressed interest in customised online shopping (e.g., a team of professionals who help finding out the perfect products) are mostly between 25 and 34 years old (60%) and the over 55 who selected "yes" are 30% circa of the total number. In addition, only a little part of users thought customisable shopping can help a lot in "better understanding the properties of a product and its correct use".

1.2.1_Direct_Observation

We decided to integrate a brief interview session in which we focused only on customised shopping and a subscription service to better understand what our target audience thinks about when it comes to these topics. Starting from the Google Form final inquiries, we formulated a new set of questions, and asked 4 Italians over 55 to answer them.

9   When the interviewee was not sure about the meaning of customised shopping or subscription service, the interviewer explained it and added some practical examples.

Questions:

01 Do you know what customised shopping is?

02 Have you ever tried it / Would like to try it?

03 Do you think customised shopping could help you better understanding the properties of a product and its correct use?

04 Do you know what a subscription service is?

05 Have you ever tried it / Would like to try it?

06 Do you think a subscription service would ease your shopping?

07 Do you think a subscription service would save you some time?

Interviewed_1:

01 I am not sure.

02 I don't know.

03 Yes, absolutely.

04 Yes, they send you news and advertising[9]

05 I wouldn't try it, to me it is stressful.

06 No rather than yes.

07 Yes.

Interviewed_2:

01 Yes.

02 Yes, rather than buying randomly.

03 Yes, absolutely.

04 I am not sure.

05 I am not sure, it seems to be something difficult, and if one day I want to change or delete the account I can't do it or I can't do it easily.

06 Yes, because people tend to be online a lot and it could help.

07 Yes, because people are always in a hurry, I do not like it.

Interviewed_3:

01 No.

02 No.

03 No.

04 Yes, if you mean Amazon Unlimited.

05 No.

06 No, but if I have no other choice I subscribe. In general, I do not want subscriptions that limit my autonomy. I can find the info myself. It is bothering to me when they call to offer me purchases. They take away the fun of shopping.

07 No.

Interviewed_4:

01 No.

02 Never, but I probably would like to try it.

03 Yes and, if we speak about a CBD website, it could help understanding the right dosages to avoid side effects or addiction.

04 Yes.

05 Yes, but if I need to try a new subscription, I would like to test the products first, before subscribing. I would then subscribe only if there were "economic feedbacks", like products discounts or free shipping.

06 Yes, it will help giving more information about the products.

07 Yes. It would be quicker than going in a physical store.

1.2.1_Conclusions

Through the **User Research** we found out that a great percentage of over fifty-five-year-olds is interested in knowing more about CBD and even trying some products; about the youngsters, we found out they already know and use CBD products, but the Italian survey showed they do not usually buy them online, at least our participants. This is an interesting fact about VAAY and similar websites which in Italy are still not so common or well-known, perhaps because of the taboo or the confusion about Italian legislation on the subject. The main needs for all the participants are Relax and Sleep, though for young Italians the priorities are Relax and, secondly, Recover; for the Italians over 55 they are Relax and Sleep. In general, the customisable shopping is a service which enthuses the younger audience and some late adult, more seemingly the ones who are familiar with online shopping or people interested in having the convenience of such a service from their own homes.

The **Direct Observation** was fundamental in understanding how our audience perceives customisable shopping and subscription to an online service. As a result, two participants would like to try a hyper-personalised system; three out of four state that customisable shopping could help in better understanding the properties and the correct use of a product and they believe that a subscription could speed up the online shopping. Despite this last reply, only one interviewee would be interested in trying the subscription service and only if there were real advantages (e.g., discounts on products). About subscriptions easing the shopping, the participants are split: only two of them think it could help.

Definitively, we confirm that our service has aroused the interest of the people over 55, who are open-minded, active, curious, looking for natural and ad hoc treatments for their wellness routine. Furthermore, we can add they feel comfortable with online shopping and are interested in hyper-personalised services which will enhance their online experience.

Many distinct brands, such as Shampora (shampoo brand that allows you to have a formula tailored to your habits and hair structure) and Stitch Fix (an online retailer that provides customers with a personal stylist who selects clothing based on their preferences) use hyper-personalisation.

Care/of distinguishes itself among the welfare brands. The creators have built the whole company on the idea of customisation and client demands. Care/of, founded in 2016, delivers clients a daily vitamin pack made of high-quality components. Clients take a questionnaire about their lifestyle and aspirations, and then receive a customised prescription for daily vitamins and water-soluble supplements. Customers may still adjust the amount or type of vitamins and supplements they receive, and Care/of explains why specific goods were chosen.

This degree of personalisation works because Care/of took a tedious procedure and streamlined it to match client requirements. And, with each consumer encounter, the brand gains insight into how to improve the product and employ targeted marketing strategies. These subscription-based systems are gaining ground, allowing businesses to obtain access to customers' data as soon as they join up. In this manner, the system may offer suggestions that satisfy the demands of both existing and new clients, changing or adjusting the product based on how they engage with it. For these reasons, VAAY could find this extreme customisation subsite appealing.

2.1_Expert_ Usability_Review

2.1.1_Choice_of_Guidelines

After having considered VAAY, the existing resources and most importantly our ultimate targets, it was clear that we needed our system to be simple, intuitive but captivating. We decided to rely on the Nielsen and Molich and the Weinschenk and Barker heuristics and partially the following 58 Form Design & UX Best Practices and Build Trust Guidelines we discovered online, which we find to be particularly useful for the hyper-personalisation's service we want to implement.

From the Nielsen and Molich and Weinschenk and Barker heuristics we extrapolated the following 14 guidelines which we believe to be necessary for the successful outcome of the project:

01.   **Visibility of system status:** to create trust, while interacting with the system, the user should periodically be made aware of what happens.

02.   **Match between the system and the real world:** the language, words and concepts used are easily recognized and understood by the user; no mismatch should subsist between the real-life and the digital life.

03.   **Cultural propriety:** the cultural and social expectations of the user are fulfilled.

04.   **Fulfilment:** the interface provides the user with an acceptable and satisfying experience.

05.   **Accommodation:** the interface fits the necessities and attitude of each target group.

06.   **User control and freedom:** the possibility to undo or redo actions should always be given to the users to make them feel in control and boosting their confidence.

07.   **Consistency and standards:** the users' experience with other products (e.g., Google, Amazon, YouTube) sets their expectations, it is necessary to follow standards and platform conventions to satisfy such expectations and consequently reduce memory load.

08.   **Recognition rather than recall:** the short-term memory of humans is limited; the goal is to minimize the user's memory load by making objects, actions, and options transparent and immediately retrievable, consequently promoting recognition.

09.   **Flexibility and efficiency of use:** the interface should be flexible enough to adapt to every kind of user, from a novice to an advanced one; at the same time, it should

also enable users to customise frequent actions (use shortcuts) as they become more acquainted with the system.

10. **Responsiveness:** the interface provides the users with adequate feedback on the results of their actions and on the state of the system itself.

11. **Aesthetics and minimalist design:** the interface should only display relevant and necessary information. This is not to the detriment of good design, but it is about making sure that all the elements that do not support the page goal or the users' current tasks are removed or momentarily hindered. Simultaneously, a subtle but visible navigation system should be implemented as to allow the users to find specific information and help them in the completion of more complicated actions.

12. **Error prevention:** making assumption on faulty or error-prone situations will help to apply preventative measures for errors, both slips (unconscious errors) and mistakes, which might take place.

13. **Help users recognize, diagnose, and recover from errors**: error messages should be advertised in plain language to unequivocally identify the problem and suggest a constructive solution; these messages should also be displayed in a visually appealing way to help users notice and recognise them.

14. **User support**: the interface will foster learning and help usage.

2.1.2_Inspection_of_Care/of_Hyper-personalisation_services

Care/of hyper-personalisation service is probably the backbone of the brand. This is evident from the fact that the quiz is reachable from different parts of the website. The general quiz communication is congruous with the one used by the brand, thus creating a consistent experience. Clear, direct, and comfortable, in this case it is even more effective because it manages to create an open and transparent dialogue with the user, building a real personalised consulting experience. In this sense Care/of quiz seems to be a good example for us in order to understand how to integrate our system with the VAAY brand.

The integration of a good minimalistic design with some good practice of form fill design makes Care/of experience quite pleasant and trustable and creates a strong connection between consumer, product, and brand. At the same time, the interaction with the system provides the brand with useful information for future releases and marketing purposes. Below we will analyse section by section the Care/of hyper-personalisation system structure.

The overall structure of Care/of hyper-personalisation system is:

Figure_1: Care / of hyper-personalization quiz structure and next steps.

2.1.2.1_Direct_Analysis

Take the Quiz.

The "take the quiz" button stands out in the centre of the site's home page, together with the call to action: "find the right vitamins, proteins and collagen, customised for you". In addition, there are various calls to action scattered throughout the site to access the quiz, from the bottom of the product page to the side menu, inside of the cart, etc.

The quiz is made up of a multi-step form. Splitting the form into two or three steps creates a less intimidating first impression, increasing the form completion. Because Care/of deals with a long questionnaire, as good practice, they decided to group questions into four logical sections: Basics, Goals, Lifestyle and Values. To access each section, users need to press the button "Next question" on the down right side.

The system also provides a progress bar placed at the bottom of the page that, based on numerous proven cognitive biases such as the endowed progress effect, encourages users to complete the form. All pages are equipped with a back button in the left corner of the page that allows users to go back to already answered questions. A **Flexibility**

and efficiency of use violation is evident. The system does not? allow to have a cross navigation between questions nor within sections, forcing the user to scroll them backwards before arriving to the desired one and having to recompile all of them without having the possibility to return directly to the point where he/she was.

Begin Quiz.

Before the quiz starts, there is a "Begin quiz" section with some preliminary questions (such as name, e-mail, age etc.) to build the user profile and save their plan recommendation. This could be seen as a bad practice because is common to place sensitive information questions in the final step of a multi-step form, so that users are more likely to fill out these fields – otherwise they lose the progress made by filling out the previous steps, this is a proven cognitive bias known as the 'sunk cost fallacy'. Care/of fills up this gap by enriching each field with a clear field-title that provides information about the use of that specific data.

The system, in fact, is also asking questions (such as "what's your opinion on our product?") to get to know the consumer's behaviour and constraints with respect to the product in order to display consequent inquiries only if a user has answered in a certain way. This technique, called 'conditional logic', shortens the average length of the form, while also reducing abandonment by not displaying questions that might be irrelevant to certain users.

In order to optimise for as fewer clicks as possible, Care/of chooses field types that reduce the number of clicks required to complete. They use input and dropdown only when necessary and they mostly use radio buttons and checkboxes. Once a user fills out a question the system automatically switches to the next one, except in the case of multiple answers where he/she must press the "Continue" button to submit.

The most sensible questions (i.e., age or gender) are always presented with a button "Why we ask" at the bottom of the page that activates an alert explaining, in a clear and engaging way, how they will use that information to improve the quality of the user experience. This seems to be a good solution to manage trust issues. Engagement, on the other side, is maintained throughout the quiz thanks to selectable images and pleasant animations transition.

At the end of these preliminary questions the system informs the user about the duration of the quiz. Here, we found a violation of the **Match between the system and the real world**. The system tells the user that it will take less than five minutes, but it takes around 15 minutes.

Basics.

The first section of the quiz is "Basics". Here Care/of asks about the user's habits with the product and their interests concerning wellness issues. In addition, it asks about gender and nationality of the consumer. It is interesting to notice that the gender options comprise of a "Prefers not to say" option, accompanied by an accurate explanation on the use of this data. The data related to the nationality is instead used to inform the clients about products' availability in their countries and the legislation in force.

Goals.

The second section is "Goals". Here the quiz aims at understanding what are the objectives that the user wants to achieve with the plan. The questions are grouped according to the benefits of the products, for example hair, skin, joints, and nail wellness, sleep regularisation, relief from stress and anxiety, digestion, and fitness support.

Lifestyle.

The third section, "Lifestyle", asks about life habits of the consumer from their diet to wellness routine, to achieve the best personalisation of the Care/of experience.

Values.

The fourth section, instead, asks about consumer "Values". The goal here is to find out what the customer is comfortable with, and which restriction he/she has. The user is then asked the degree of trust that he has towards alternative, experimental and traditional eastern medicines. At the end of the quiz the system asks how the user got to know Care/of brand and starts computing the results.

Quiz result summary.

Once the user recommendation is ready, the system displays a summary page showing as many products typology as the user is interested in with a brief description and icons showing the related benefits. Here a user can choose as many product types as he wants between the one that he already uses, and the one he wants to try. Pressing the "Continue" button will take the user to the final custom recommendations page.

Recommendation.

Here, users can finally see a picture of the products suggested with a brief summary of the information received during the questionnaire. By scrolling the page, product types are shown vertically one after the other inside specific cards which describe how to use the product and list the suggested vitamins properties, if it's vegan or not, and why it was recommended. In addition, pressing the button "Learn More" shows a left side bar with the specific product page, explaining suggestion of use, ingredients and benefits, and active research on that specific vitamin.

Cart.

By pressing the "Continue" button, the user is redirected to the cart. Here the personalised Subscription Care/of Plan is divided by the selected product typology pack, which lists every specific product, price, and quantity. On the left of the page the order's details are shown, dynamically updated to each plan's change made by the user. Information about how the subscription plan works, are placed in an alert which is accessible through the "How does it work?" button.

Checkout.

By pressing the "Checkout" button a user will get to the purchase page where he/she must fill the delivery information form and add a payment method. Alternatively, users can press the logo button and continuing shopping on the Care/of web site.

2.1.2.1_Inverse_Analysis

In the previous section we analysed each part of the application to see which guidelines were and were not respected. In this section, we do the opposite: we compared each guideline against every section to check for violations. We found four violations that eluded the previous analysis:

Violation of **User control and freedom**: if the user interrupts the questionnaire before the ending and then comes back to the page, thanks to a cookies system, he will be taken back to the point he was before the interruption, but the system does not allow him/her to change the previous answers anymore.

Violation of **Consistency and standards**: Care/of decides to use a box icon instead of the conventional cart, this can create confusion when carrying out a task such as making a purchase.

Violation of **Flexibility and efficiency of use**: Keyboard key navigation encounters many errors, forcing expert users to make redundant steps.

Violation of **Help users recognise, diagnose, and recover from errors**: errors in the form fill are expressed through a barely noticeable highlight but they are always shown with an info icon that, when in hover, displays a box explaining the error.

2.1.3_Inspection_of_VAAY_Website

VAAY website has a magazine look, and also its structure and language are influenced by this medium. Products are divided in three product lines made with a specific formula that covers different relaxation moment in the users everyday life: #RELAX, #RECOVER, and #SLEEP. The communication of the brand is built around these three needs, this is also evident from the fact that the website palette is made up of the packaging colours of the three product lines.

Even if VAAY navigation is based on a menu structure, content redundancy makes it possible to have a quite free exploration. Some sections are used in support of others and the other way around. For example, products are supported by articles from CBD 101 blog. Also, users will find suggested products, and direct links to the product page, at the end of an article in Magazine section.

The overall structure of VAAY website is:

Figure_2: VAAY system structures.

2.1.3.1_Direct_Analysis

Homepage and Highlights.

The homepage is made up of an interactive carousel showing the best sellers of each product needs typology: #RELAX, #RECOVER and #SLEEP. A violation of **Recognition rather than recall** and **Consistency and standards** is immediately noticeable. Some products are shown with a "Discover Now" button, others with the "Shop Now" one, but, contrary to expectations, both buttons are linked to the product page.

The page is scrollable, and it contains the main highlights of the brand in the following order: reviews from magazine, best sellers, consumers reviews, VAAY FAQ, brand promises, CBD FAQ, needs category, product quality information, country legal information, CBD magazines, Instagram posts.

Another violation of **Consistency and standards** is found: FAQ sections and brand promises have the same functionality because they consist in a collapsed menu of already set questions that once clicked show their answer. Moreover, "Brand promises" is displayed in a different way. It is composed of clickable buttons that show a forward layer with the same collapsed menu structure used by the FAQ but with completely different stylesheet. This creates confusion during VAAY exploration.

The header page is split in two, on the left are placed all the navigation controls and, on the right, the personalisation settings. The latter includes country options, personal profile, cart, and a sound service. Country settings will change entirely the website contents, not only the language but also the best seller products, delivering information and CBD legalisation status of the selected country. The sound service provides a podcast about CBD or 3 mood tapes each of which is associated to a specific "need" that will guide the user through all the navigation experience. The cart has instead a violation of **Consistency and standards**. VAAY decided not to use the standard cart icon, instead they use a black circle with a little number counting the number of product stored.

All information about the company, consumer service, CBD resources and quality are placed in the footer, which is present in each page. In the footer is placed yet another call to action to the newsletter subscription.

Shop.

The "Shop" button is placed on the left of the header, (and is) presented with an accordion icon. It shows a sidebar with the index to the main VAAY website sections. The main sections are Products, Needs, New Item, Best Sellers, and Subscription. At the bottom, in a smaller font-size are placed Our formula, Quality Guarantee, Magazine CBD 101 and Join Club, plus the icons to social media. Here is evident a **Flexibility and efficiency of use** violation. This kind of navigation system structures users' tasks confusingly and slows down users that already know the product they are interested in.

The main sections are used by VAAY as a sort of filtering mechanism for product presentation, creating confusion during products exploration. "Products" lists all products by typology or promotions. There is also a service of Routine Sets, that provide an already built product package based on common and well-known consumers' needs. Violation of

Consistency and standards is found in the "Shop All" page. Here it is possible to browse the products' catalogue and filter them by category. Categories are the same as those shown in the "Products" list, but the display style is completely different. So, was it necessary to include this section?

The "Needs" section shows products relative to their VAAY category. "New item" and "Best sellers" are instead periodically updated and show different products dependently from the country settings. The "Subscription" section is an informative page for the VAAY subscription service that allows users to subscribe to one VAAY product and receive 10% discount on the latter and free shipping.

The smaller buttons are links to informative pages about VAAY cannabinoid quality and trust. "Our Formula" explains the formula composition used to satisfy each product's need typology. Quality Guarantee, instead, lists some product with their price, formula, ingredients, and lab analysis. Here we notice an **Error prevention** violation because users cannot tell one page from the other, they might therefore think they have made an error and missed important information.

Magazine and CBD 101 are two VAAY blogs: the first one is about CBD lifestyle, the second is a CBD and hemp wiki. Join club is the section where users can get the VAAY fidelity card.

Product Page.

The product page is shown only after the user selects a product. It presents product details, such as cost and ingredients, country delivery information and a review rate presented with the standard 5 stars scale. By scrolling, the page shows sections about ingredients, features and benefits of the product, extended users' reviews, FAQS boxes and related magazine articles. On the left side of the page we can see a "what is it" button; by clicking it, a side bar explaining how to use the product and what it is, appears. In addition, the user could write to the consumer service for future doubts or alternatively be redirected to the CBD wiki. Finally, there is also a button to add the product to the cart. **Consistency and standards** violation is evident. The sidebar does nothing but re-present the same content already showed on the product page with less possibilities, for example it is not possible to decide the product quantity, and without providing feedback if the product is added or nor to the cart. The "what is it" button does not add any value to the user experience therefore it seems to be useless.

2.1.2.1_Inverse_Analysis

Once again in this paragraph we will do the same inverse analysis we did for Care/of. Specifically, we found two violations that eluded the previous analysis:

Violation of **Flexibility and efficiency of use**: Keyboard key navigation is not working.

Violation of **Recognition rather than recall**: VAAY has three subscription option (Join us, Subscribe, VAAY points) placed all around the website and is not clear if they can all be manageable from the personal profile or not. Furthermore, names associated to the services are not descriptive at all, this is a necessary requirement if you want to propose three different marketing services.

Violation of **User support**: redundant sections in terms of content with different styles and poorly descriptive section titles make the VAAY interface difficult to learn.

Violation of **Fulfilment**: VAAY website interface as a whole does not provide the user with a fulfilling experience because of the aforementioned violations which gives the user a sense of confusion.

2.2_User_Testing

2.2.1_Testing_Protocol

For the preliminary user testing we opted for the **Discount Usability Testing**, and we chose one test subject from each of the target segments considered:

- **Tommaso,** 25 years old, student, proficient computer user, familiar with online shopping, already knows about CBD products;

- **Nadia,** 55 years old, artisan, never ordered anything online, not informed but curious about CBD products, uses the pc for basic tasks (videos, social media, etc.).

The participants were asked to think aloud during the process[10] and the two subjects had to complete a total of seven different tasks on the two sites under consideration. The description can be found here below[11]:

01. Care/of

a. Take the quiz

b. Delate a product from your cart

02. VAAY

a. Navigate in the online store and find the product "CBD Pen-Lemon"

b. Add "CBD Pen-Lemon" to the cart

c. Navigate in the online store and find the product "CBD Oil 20%"

d. Add "CBD Oil 20%" to the cart

e. Find out more about "CBD Oil 20%": what is it, how to apply and visit the grossary

f. Find what are the shopping costs

2.2.2_Testing_Process

The subjects participated in the testing process via video call[12] in two different sessions. They both agreed on recording the meeting for evaluation purposes and they were asked to share their screen. It is interesting to notice that some main differences already occurred at the beginning of the session, in particular in the approach with the technological medium used (personal computer): the first participant, Tommaso, effortlessly shared his screen while Nadia, who admitted she had never participated to a Meet call, needed a quick tutorial.

The participants were assured that the aim of the session was not to test their capabilities or difficulties while using the online apps, rather to see how the two systems work, their differences and how to improve them.

10 The "Informal thinking about method" is used in Discount Usability Testing to understand why certain actions take place.

11 During the session, the participants also tested the Shampora website, but these tasks were not included since that test layout is similar to the Care/of one, which in the end was preferred both by the audience and us.

12 We chose this methodology due to logistic issues.

We emphasized this so as not to make the subjects anxious or worried. At any rate, the usability metrics we considered for the evaluation are: success, efficiency, effectiveness, learnability, and satisfaction. We decided to base the efficiency metric analysis of our over 55 representant on the successful results of the first participant, due to the fact he represents the category of typical proficient computer user. In fact, we hypothesised that our younger user - already familiar with technology, shopping online and websites navigation - had a better efficiency.

The results are summed up in the tables below, together with some of the most relevant comments made by the participants.

TASK		SUCCESS	EFFICIENCY	EFFECTIVENESS	LEARNABILITY	SATISFACTION
CARE/OF	1.a	Yes, task completed without help	Very high, completed in 14'	/	/	Very high, but with concern
	1.b	Yes, task completed without help	High, completed in 20"	/	/	Normal
VAAY	2.a	Yes, task completed without help	High, completed in 18"	/	/	Low
	2.b	Yes, task completed without help	Very high, completed in 1"	/	/	Low
	2.c	Yes, task completed without help	Very high, completed in 16"	Easy backtracking	Good, major improvements after task 2.a	Normal
	2.d	Yes, task completed without help	Very high, completed in less than 1"	Easy backtracking	Good, major improvements after task 2.b	Normal
	2.e	Yes, task completed without help	Very high, completed in 10"	/	/	Low
	2.f	Yes, task completed without help	Low, completed in 1'7"	Minor hesitation, dead ends	/	Low

Table_4: Tommaso Results.

TASK		SUCCESS	EFFICIENCY	EFFECTIVENESS	LEARNABILITY	SATISFACTION
CARE/OF	1.a	Yes, task completed without help	High, completed in 22'*	Minor hesitation	/	High
	1.b	Yes, task completed with some help	Low, completed in 1'	Major hesitation, dead ends	/	Normal
VAAY	2.a	Yes, task completed with some help	Low, hesitation, completed in 3'9"	Useless steps, dead ends, major hesitation	/	Low
	2.b	Yes, task completed with some help	Low, completed in 50"	Dead ends	/	Normal
	2.c	Yes, task completed without help	Low, completed in 1'41"	Minor hesitation	Good, major improvements after task 2.a	Normal
	2.d	Yes, task completed without help	High, completed in 1"	Easy backtracking	Good, major improvements after task 2.b	Normal
	2.e	Yes, task completed without help	High, completed in 50"	Minor hesitation	/	Normal
	2.f	Yes, task completed without help	Low, completed in 2'	Minor hesitation, dead ends	/	Normal

Table_5: Nadia Results.

SYSTEMS	CARE/OF		VAAY	
PARTICIPANTS	Tommaso	Nadia	Tommaso	Nadia
I think that I would like to use this system frequently.	3	3	3	3
I found the system unnecessarily complex.	1	1	2	2
I thought the system was easy to use.	5	2	5	2
I think that I would need the support of a technical person to be able to use this system.	1	3	1	3
I found the various functions in this system were well integrated.	4	3	2	3
I thought there was too much inconsistency in this system.	1	1	3	1
I would imagine that most people would learn to use this system very quickly.	5	5	5	5
I found the system very cumbersome to use.	1	1	2	2

Table_6: SUS Results.[13]

2.2.3_Analysis_of_the_Results

Results reported in Tables 5 and 6 clarify what are the main differences and similarities between the interaction of two different target audiences with the systems under test.

Care/of.

Concerning the 25-year-old participant, he completed task **1.a** in 14 minutes, without help and expressed very high satisfaction at the end of the test. This aspect is shown by a final personal opinion on the experience: «[il test è] fatto molto bene, è un quiz comprensivo di tutto e senza domande ridondanti, sia in fatto di forma che di struttura» and also adding «è a prova di stupido»[14]. However, the participant was sceptical towards the idea of buying products recommended by an online test [15]: he would rather rely on his doctor's opinion or other experts' professional advice. After the question "Would it be different if there was a team of experts who recommend the products live and online?", he replied that he still probably would not trust the online process and prefer real-life advice (E1). Task **1.b** was completed without help or errors, but Tommaso added some concerns about the design choice on the shopping cart icon (E2).

The protagonist of the second session was Nadia, a 55-year-old woman who normally uses her pc for basic tasks as listening to playlists on YouTube, navigating Facebook or reading some e-mails. She admitted never buying anything online before, and this represented the first big difference and reason for the lower efficiency compared to the other participant. Also, it is important to notice that the user does not speak English, so a member of the development team translated everything, and this most likely affected the efficiency. Unfortunately, the session was split in two due to connection problems, but the participant managed to keep calm and was able to carry out all the tasks at her own pace. In the first session Care/of was tested. The participant took 22 minutes to complete the quiz and had only a minimal hesitation on where to write her e-mail (E3). Task **1.b** was completed with some help due to the hesitation the user had towards the shopping cart: she could not recognise the cart icon (E2). She said about the test «è un quiz come un altro, era facile»[16], not adding any comment on the interaction experience or layout.

VAAY.

As regards the VAAY's experience, even though the efficiency and success were generally very high, Tommaso complained about the website's bad design (E4), first noticing a deceptive background right on the bottom of the products titles [17] «Mi ero bloccato qua perché pensavo stesse caricando», «non era molto chiaro [...] c'erano delle immagini che sembravano già i prodotti [...] perché sono tutti allineati», and then saying about the overall experience: «non mi piaceva tanto il sito [...] faceva "flash" quando cliccavi le icone» [18].

For Nadia, the VAAY's tasks were performed with some hesitation, dead ends, and difficulties, although the positive improvements on learnability occurred during task **2.c** and **2.d**. You can notice a low efficiency value in task **2.c** as Nadia tried multiple times to click the browser's "back"

14 «[the test is] very well done, it includes everything, it is complete and not redundant, both in terms of form and structure». And «[the test is] foolproof.»

15 «Se dovessi acquistare queste cose di certo non vado ad acquistarle se faccio un quiz su internet.»

16 «The quiz was easy, it was like any other quiz.»

17 Notice how here the background image below the title "CBD oil" recalls a structured list of products, as if images are already loaded while names and prices not: https://vaay.com/en/collections/cbd-oel.

18 «I was stuck because I thought [the page] was loading, it was not so clear [...] there were images which already seemed the products [...] they are all aligned.» and «I did not really like the website [...] it "flashed" while I clicked the icons».

arrow to go to the previous webpage to find again the "Store", without success (E5). This happened because VAAY website has a hamburger menu which toggles the list of pages only when clicked. She did not add any comment on this second website. Also, both users misunderstood the section "CBD 101", at first thinking that it was the store where to find the products requested during the tasks (E6).

Table 6 shows what we already observed through Tables 4 and 5 analysis: the SUS averaged result for Care/of (76.3) is "good" and ranks as "acceptable" according to the System Usability Scale[19] ; VAAY has a score of 65 and ranks as "marginal", pointing to issues with the design, which need to be researched and resolved.

19 Here the SUS reference: https://xd.adobe.com/ideas/wp-content/uploads/2021/07/1618033073-2.jpg.webp.

2.2.3_Urgency_Curve

To better visualize the problems emerged in the user testing section we adopted the "impact vs frequency" chart: through the following plots we aim at understanding how to separate the more urgent issues from the others.

The Frequency represents the number of different users who noticed the problem (UX design team included), while the Impact answers to the question "Was it easy or difficult for the users to overcome the issue?". To rate the severity of a usability issue, we relied on the Nielson and Norman scale:

- 0 = I don't agree that this is a usability problem at all

- 1 = Cosmetic problem only: need not be fixed unless extra time is available on the project

- 2 = Minor usability problem: fixing this should be given low priority

- 3 = Major usability problem: important to fix, so should be given high priority

- 4 = Usability catastrophe: imperative to fix this before the product can be released
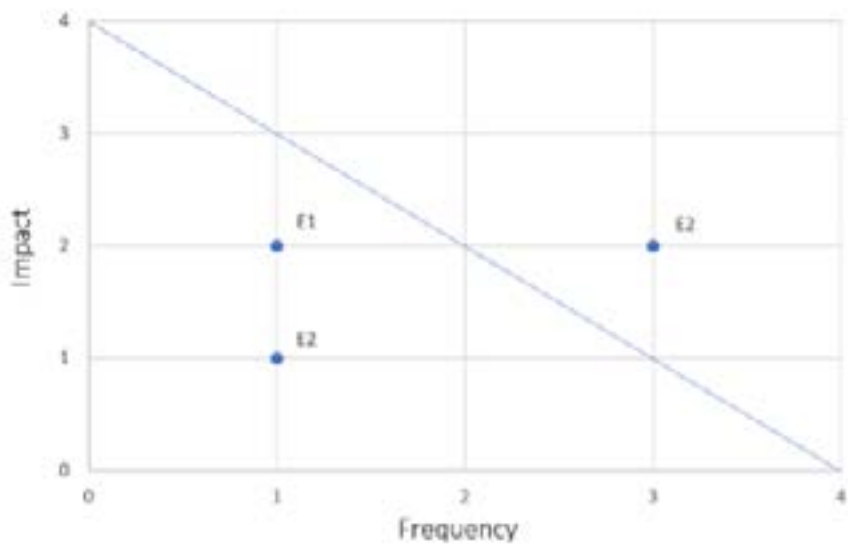
Figure_3: Care/of Urgency Curve.

We drew the thresholds right in the middle of our chart, the errors which occur above it need to be addressed first. It came out that errors 2, 4, 6 and even 5 (even if it is positioned in the threshold area) are the most urgent, and they concern:

- E2) Care/of's choice of using a non-recognisable chart icon - violation of **Consistency and standards**

- E4) VAAY's overall bad design – violation of **Fulfilment**

- E5) VAAY's menu confusing interface – violation of **Fulfilment**

- E6) VAAY's section "CBD 101" mistaken – violation of **User support**
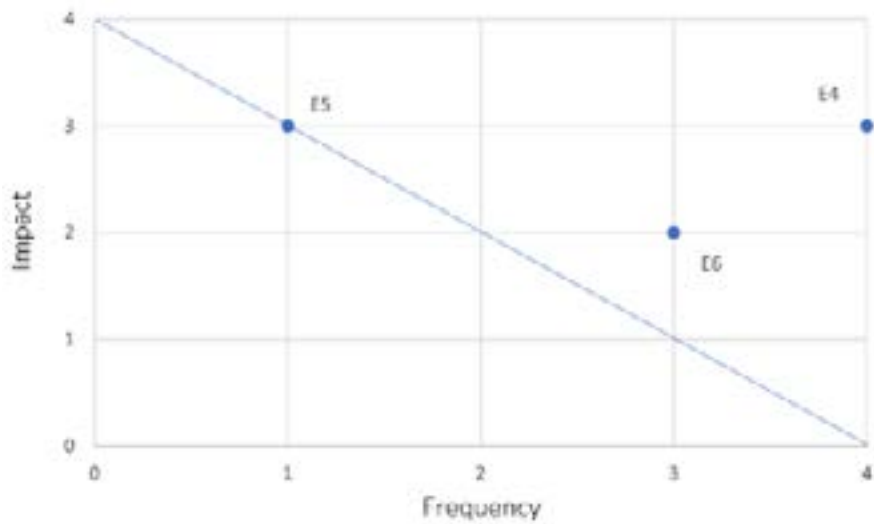
Figure_4: VAAY Urgency Curve.

2.2.3_Conclusions

We can confirm what we foresaw regarding the participants' interactions with the two systems. Altogether, the VAAY website interface resulted not functional as already highlighted in chapter **2.1.2 Inspection of VAAY website**. On the other side, the Care/of experience was appreciated by both users, however the younger participant expressed distrust towards this kind of online shopping. The urgency curves highlighted what are the problems which need immediate attention and that will be addressed first.

Afterwards, we will focus on how to create a design able to instil greater confidence in the sceptical user, as the VAAY server-side will not be renovated, since it would go beyond this project's purposes. Anyways, our hyper-customisable system will help managing the now confusing VAAY website navigation.

In this section we will tackle the feasibility study, a necessary step before designing our system, which is divided in the following components:

- The **contexts** of use in which the system is going to be used

- The **personas**, archetypal representations of the users

- The **scenarios**, a design's gimmick used to describe how a user might interact with the service.

3.1_Context_of_Use

Bearing in mind our two target audiences, the results of the questionnaires (see section **1.2**) and the existing resources we can begin identifying the intended users and tasks, and the possible constraints that the design will need to consider.

1.1.1_Intended_Users

As we have already stated in section **1.1**, we assumed our users to be cultured and open-minded individuals, which are accustomed with CBD or that are willing and eager to try it. Moreover, we deducted that these users are interested in natural products, self-care, and sustainability. Finally, we expect our users to have a high annual income because they need to be able to afford CBD's products and our hyper-personalisation service.

To summarise, we defined two possible target groups that fit into the description delineated above: **young adults**, already acquainted with CBD and its beneficial properties, as we discovered in our questionnaires almost 100% of the millennials surveyed are familiar with cannabidiols (see section 1.2.1); this particular group has the environment at heart, therefore, this segment might be actively looking for natural and environmental-friendly products to deal with stress, anxiety and facilitate sleep. The second group is that of **older adults** and/or **retired people** which, on the contrary, are mostly unaware of CBD as we have uncovered in our survey, which showed that only ca. 20% of them is familiar with CBD; nevertheless, this group is curious and perhaps eager to try it out, presumably to find natural alternatives to take care of their aches and pains.

The interest and curiosity for natural options, like CBD, and the validity of its properties is shared by both our audiences, as it was proven by the User Research (see section **1.2**). Furthermore, the questionnaires and the interviews have uncovered that even though online shopping, and more specifically the possibility of a customisable experience, is more appreciated by young adults, it is not completely disdained by older generations. At the same time, the questionnaires revealed however how a monthly subscription service is not appreciated by both our audiences, especially the older one which showed almost no interest in such service. The results of our questionnaires and of the interviews were overall positive and confirmed the data we collected and the suppositions we have made on our target audiences; nevertheless, the undeniable differences and inclinations between the two groups on the one hand, and the unanimous dislike for certain proposals on the other hand, are factors that cannot be overseen and underestimated.

3.1.2_Intended_Tasks

The tasks our system is going to support are the following:

- Start the VAAY test
- Complete VAAY test
- Complete VAAY test after an interruption
- Select product typology
- Save your recommendation
- Add a specific number of recommended items to the cart
- Add all the recommendation plan to the cart
- Delete a specific number of items from your recommendation
- Go back through recommendation history
- Change e-mail associated to recommendation plan
- Buy your plan
- Subscribe to the plan
- Share your plan with others
- Discover how VAAY uses your personal data
- Discover VAAY product availability in your country

3.1.2_Environmental_and_ Technical_Constraints

Since our targets are young adult workers and over 55 workers or retirees with an income of more than 17,000 €/year, we assume they both own digital devices such as personal computers and smartphones with which they could interact with our system.

Most likely, given the nature of the system we propose here, our users will access the system during their free time when they want to dedicate to themselves and their wellness, probably in the comfort of their homes.

3.2_Personas

Stemming from our target groups we created 6 plausible personas, the primary persona (Sandra), two secondary personas (Rebecca and Laura), two additional personas (Hwang and Alberico) and one negative persona (Roberto). For the purpose of this paper, we are going to present only the primary, one secondary and one additional persona[20].

20 All the personas can be found in the xtensio web space

Sandra

"I'm too busy to take care of myself, but I really need it!"

Bio

Sandra has always loved writing, and after she graduated in Communication Sciences in Milan she became a journalist. Sandra has always fought for gender equality, and the phenomenon of the gender pay gap, which she experienced first-hand during her profitable career.

She spends most of her time in the newsroom but she cares about leading a healthy life. Nevertheless, between pilates classes in the lunch break and her trusty hyaluronic acid cream in the morning, she always seems to have less time available, which ultimately causes her panic attacks and insomnia.

Age: 61
Work: Journalist
Family: Divorced, no child
Income: € 43.400
Location: Milan
Character: Curious and Always Updated

Reliable Dedicated
Bossy

Goals

- to manage age-related changes
- to manage anxiety and insomnia
- to find a simple but effective skincare routine to do in the morbing and before going to bed

Personality

Introvert		Extrovert
Analytical		Creative
Loyal		Fickle
Passive		Active

Technology Skills

| Novice | | Expert |

Prefered Channel

Pinterest		
Youtube		
Reddit		
E-mail		

Frustrations

- no time to get informed and buy new products
- hasn't found the right product for her wrinkles
- trusts new shops with great difficulty

Sustainability	
Comfort	
Convenience	
Efficacy	

Brands

ICON
amazon BALENCIAGA

Rebecca

"I'm looking for natural and cruelty-free skincare products."

Age: 32
Work: Nurse
Family: Single, one cat
Income: € 26.400
Location: Paris
Character: The Gentle (but lonely) Soul

Caring Gentile

Hard-worker

Bio

Rebecca is an ER nurse, she is very caring and she likes taking care of other. She doesn't take good care of herself though; she's focused on her career and on her patients and she doesn't have time for relationships. She believes in alternative medicines. She occasionally goes out with her friends to have an aperitivo, but she much prefers staying at home with her cat, Loki, watching the newest season of Bridgerton. Her work is fulfilling but stressful and her skin took a hit: she's breaking out quite a lot recently: she wants to get into skincare and making it part of her busy routine.

Goals

- to find natural and organic products
- to improve her skin
- to develop a viable skincare routine that doesn't take too much of her time in the morning

Personality

Introvert ——————— Extrovert
Analytical ——————— Creative
Loyal ——————— Fickle
Passive ——————— Active

Technology Skills

Novice ——————— Expert

Frustrations

- no time to get informed and buy new the products
- doesn't know how to interpret all the ingredients…are they good for her skin? Are they bad?
- only buys cruelty-free products

Brands

Vinted CeraVe

Wemakeup

Prefered Channel

Pinterest
Youtube
Reddit
Instagram

Sustainability
Comfort
Convenience
Efficacy

Alberico

"I'm looking for new and natural vape's liquid to improve my health"

Age: 57
Work: Divorce Lawyer
Family: In a relationship, one child
Income: € 40.500
Location: Rome
Character: Self-Made Man

Successfull Carefree

Outdoorsy

Bio

Alberico is a Roman lawyer. He has a son, Luca (16), but he's no longer with his son's mother, even though they parted amicably over 10 years ago. He has a new younger girlfriend, Cecilia, with whom he shares his passion for outdoors activities like skiing, hiking, and hand-gliding. He has a passion for vintage designer clothes. He recently quit smoking cigarettes and is now a vaper. His girlfriend keeps on nagging him on the health issues connected with synthetic vape's liquids; she would like him to quit altogether but he compromised and said he would switch to more natural liquids.
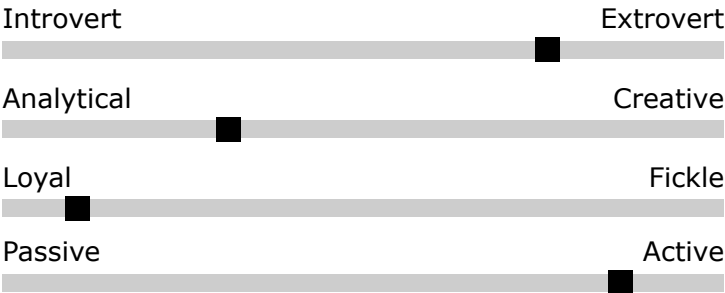
Goals

- to find new natural liquids for his vape
- to improve his health
- to try new vape's flavours

Personality

Introvert ——————— Extrovert
Analytical ——————— Creative
Loyal ——————— Fickle
Passive ——————— Active

Technology Skills

Novice ——————— Expert

Frustrations

- neither time nor a strong desire to inform himself on natural alternatives
- doesn't really like buying sight unseen; he prefers going to the electronic cigarette's shop to try the flavours out.

Brands

amazon eToro

Vestiaire Collective

Prefered Channel

Whatsapp
Youtube
Facebook
E-mail

Sustainability
Comfort
Convenience
Efficacy

3.3_Scenarios

We can now begin providing some usage scenarios for our selected personas.

Case_1: Medical Check-Up

Who: Sandra

Where: in her home

With whom: alone

With device: tablet

Task: take the test

After a long day Sandra is finally home. She is so tired that she decides to eat something on the fly and get ready for bed. Tomorrow is an important day because she will have to do a story on the rise of femicides after the pandemic, she and her team have been working on it for weeks. But, as soon as she lies down on her bed, her mind won't let her rest as she starts dwelling on things. Time passes and it is already 4 a.m. Sandra can't take it anymore, she needs to sleep, but melatonin doesn't help her, and she absolutely doesn't want anxiolytics of any kind. She therefore decides to kill time by reading a bit; she starts leafing through the pages of Zeit, and after a few pages her gaze is attracted by an advertisement: 'Try a free consultation from VAAY specialists. Comfortably from home on vaay. com #RELAX #SLEEP #RELIEF'. She is intrigued therefore she takes her tablet and browses the brand's website. After completing the test, she decides to save the results to her account and share them with her doctor for a second opinion. Maybe this time she can find a solution to her problems.

Case_2: Leisure

Who: Alberico

Where: at the bar

With whom: alone

With device: smartphone

Task: select product type

Alberico finishes work at 5 pm and has a habit of staying out a bit before going home to have a spritz with his colleagues. Today is no exception: the roman lawyer is sitting in a fancy bar while sipping his aperitif. He takes out his vape to puff a few hits. He is bored, his colleagues are talking about the upcoming derby Roma-Lazio but he is not much of a football fan. He takes out his iPhone 12 Pro and starts scrolling through his Facebook page; he reads a couple of articles and answers some messages. As he scrolls down a bit more, his gaze is attracted by an adv: "Enjoy the natural VAAY feeling while vaping CBD": he clicks on it, and he starts navigating the website. He opens the hamburger menu located on the upper left corner of the page and select the "Products", an additional dropdown menu opens up and he selects "CBD Vape Pens": there are a few options and different flavours. Alberico is intrigued but his colleagues demand his presence, he quickly snaps a screenshot of the page and closes the webpage; he is likely going to come back later and better navigate the website but for now his attention is completely engaged by a frenzied conversation on trading.

Case_3: Skincare Routine

Who: Rebecca

Where: in her home

With whom: alone

With device: personal computer

Task: buy your plan

After a 12-hours night shift at the ER, Rebecca heads home. Loki, her cat, greets her at the doorstep with some "meows". She is devastated, work has been hard these past days. She heads to the kitchen and turns the coffee machine on. She sprawls on the sofa and opens her computer to check her email. She sees an email from "Vaay":

> Hi Rebecca,
>
> We've seen you didn't finish your test to find your tailored CBD Cosmetic routine…don't worry we know how busy life can be sometimes. We saved your answers for you, feel free to resume it whenever you are ready.
>
> Have a nice day,
>
> Your VAAY team

She is initially confused; the brand rings a bell, but she can't remember where she heard about it. Her coffee machines chimes, the coffee is ready: Rebecca goes into the kitchen to pour herself some well-deserved caffeine. She comes back to the couch and, as she starts sipping her drink, she remembers: Camihawke, an Instagram influencer she has been following for a few years, talked about VAAY and their test in her Instagram stories. Rebecca decides to resume the test, she clicks on the email and completes the test; after she finishes it the system recommends her a few products to achieve a simple but effective skincare routine: a cleanser, a toner, a vitamin C and CBD serum, an eye cream, a moisturizer, and some sunscreen. Rebecca is content with her results and decides to go through with the purchase, the recommended products are automatically added to her cart, the price is mild and fair; she inserts her debit card info and confirms the payment. She can't wait to try her personalised skincare routine out.

Consequent to the analysis and tests conducted, we realised that our starting website needed a restyling and some additions in order to enhance the user experience and to make it appealing for our target audiences. First, we thought about which improvements should be made on VAAY's interface, structure, navigability, and the issue will be addressed in paragraph **4.1**. Secondly, we implemented a test that responds, on the one hand, to the hyper personalisation need we found through previous studies on the target, and on the other, to the need to create a facilitated navigation system for our older audience. It will be better described in the current chapter. The final product is called **Made with VAAY**.

4.1_Information_ Architecture

The existing website uses a top-down approach in its information architecture. The main sections are reachable from the homepage and each one includes various levels of sub-sites. However, VAAY's structure is slightly misleading and also redundant in some parts.

Together with the implementation of a test, it was necessary to provide an idea on how to enhance the VAAY website's interface in order to make it consistent to the standards selected previously, since we found out diverse violations (see chapter **2.1**). The outcomes of the previous analysis, evaluations and user tests helped us defining the following architecture as a starting point for the new system:

01. **Homepage:** this page is fundamental since it includes the call to action which invites new users to take the quiz. The returning users on the other side will find their recommendation page. It will give access to the fundamental functions as well.

    a. Navigation menu: a section which contains useful links to other pages.

    b. Profile management: this part will contain all user-related links and serve both as log-in for returning users and registration page for new users.

    c. Chat box: a clickable icon which opens a text message panel ready to give assistance to the user.

    d. Listen to some music: the user can decide whether to play some music according to their needs.

02. **Test page:** this is where the hyper-personalisation happens, the user will take a quiz about personal lifestyle, habits, product usage, needs and goals to find out what are the best products for them.

    a. Save your recommendations: this page is linked to the creation of a personal profile. Once the user writes e-mail and password, the products are all saved in the recommendation page.

03. **Useful information:** the place in which the novice user lands to find out more.

    a. Our promises

    b. People reviews

    c. Needs

    d. Quality and formula laboratory test

    e. FAQ: about VAAY and CBD

    f. Magazine review

04. Personal profile: in this section logged-in users can manage their own profile.

    a. Manage your subscriptions

        I. Subscription

        II. Join our club

    b. Your recommendations

    c. Order history

    d. Manage your account

        I. Name, age, etc.

        II. Payment method

05. Recommendation page: once the test is done, the user will find every recommended product in this page.

    a. Product page

    b. Quality guarantee

    c. Our promises

    d. Cart

06. Cart: here the user has the possibility to conclude the shopping and buy the products, or go back to the product pages, or for example add or delete items.

As stated before, the whole VAAY interface needs a restyling. We started by thinking about a more effective and captivating homepage and accordingly designed one which could include the most important pages, in a significant order, to increase trustability (see chapter **2.1**). Therefore, the already existing slide show will only include the "Best products" image, with a clickable button, the "Take the quiz" link, and only few other images, in order to prevent overwhelming the user with redundant content or simply an unsustainable load of information.
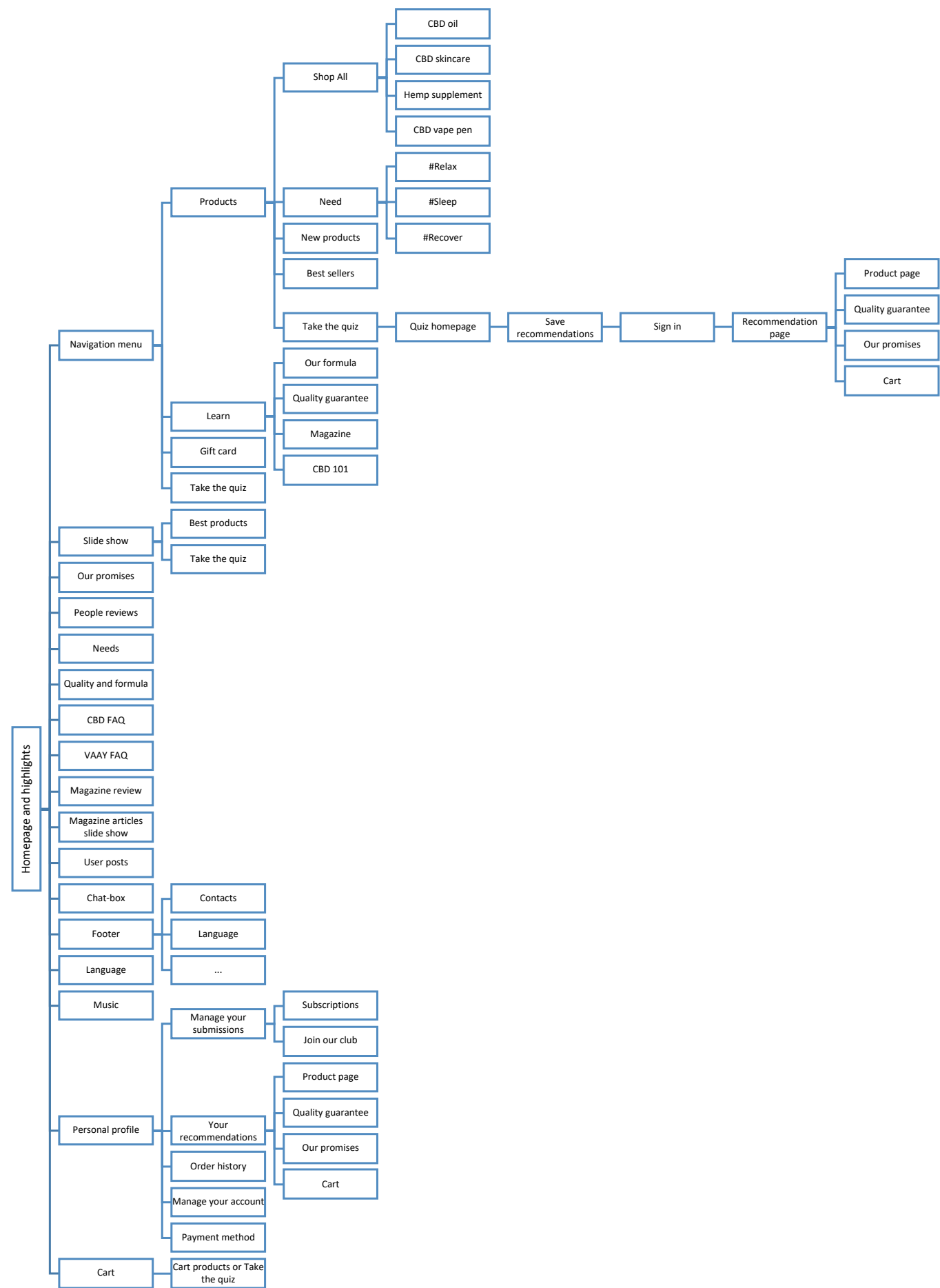
In order to make the test link easily visible in our system, we decided to place it in different places inside the new VAAY website's structure, so to enhance the call to action. The test will be available in the slide show after clicking "Discover now" and accessing the subsite, in the top left side of the navbar (before the menu), inside the "Shop" menu and even in the cart, thus prompting users to take the quiz and find out about the most suitable products for them. The overall structure of the test is split into four sections: Quiz homepage which contains the "Begin quiz" button and will explain why a user should try it; first part of the test in which some basic questions are asked in order to create a profile for the tested user; "basics" sections, about the background info of the user; user's "goals" section; the "lifestyle" sections which will include diet and fitness routine questions; user's "value" section, to understand the behaviour towards alternative medicaments. After the quiz, it follows the Recommendation page, which shows the products suggested for the specific needs. The recommendation page will include "Add to cart", "Save plan" and "Share plan" buttons, links to the specific products pages, and a "Subscribe to plan" section. The recommendations will be present inside the personal profile page, accessible from the icon in the homepage.

Regarding the links in the main page, we thought of removing some of the ones located in the upper part, the "Magazine" and "CBD101" links. In particular, the latter confounded both the users during the testing phase and made they think it was the "Shopping" icon. They will be placed inside the "Learn" menu. "Gift card" and "Take the quiz" buttons will take their place instead. The already present chat box will as well be present in the homepage, in the bottom right corner. The mood tapes and podcasts icon on the top right will be placed in the left bottom, to not complicate the user interaction and provide a clear and simpler interface near the language settings, cart, and profile buttons.

As the users scrolls the VAAY new homepage, they will see nine panels before the footer: Our promises, People reviews, How does it work, Quality and formula, CBD FAQ, VAAY FAQ, Magazine review, Magazine articles slide show, User posts. We decided for this specific order after discussing what the VAAY's priorities should be, e.g., focusing on what are the aim and promises of the brand, showing why people love their products instead of magazine's reviews. We also prioritised "our formula" section, since originally in the homepage there is only a link to that sub site, to increase the trustability towards the website, especially for new users or the consumers we previously defined as **Sceptical & Limited**[20].

The menu will have a huge makeover since it seemed not so intuitive to us, also it complicated our tested users' navigation. Instead of the five big links and the other five smaller clickable buttons, the categories included will be just four: Products, Learn, Gift card, and Take the quiz. Once again, the order chosen is significant and the ones we perceived as less important categories are added to submenus (e.g., "Best sellers" will be included in "Products" submenu). Our key word here and in the whole restyling is simplicity. Below you can find the overall idea of the new information structure for the VAAY website.

Navigation menu
- Products
  - Shop All
    - CBD oil
    - CBD skincare
    - Hemp supplement
    - CBD vape pen
  - Need
    - #Relax
    - #Sleep
    - #Recover
  - New products
  - Best sellers
  - Take the quiz
    - Quiz homepage → Save recommendations → Sign in → Recommendation page
      - Product page
      - Quality guarantee
      - Our promises
      - Cart
- Learn
  - Our formula
  - Quality guarantee
  - Magazine
  - CBD 101
- Gift card
- Take the quiz

Homepage and highlights
- Slide show
  - Best products
  - Take the quiz
- Our promises
- People reviews
- Needs
- Quality and formula
- CBD FAQ
- VAAY FAQ
- Magazine review
- Magazine articles slide show
- User posts
- Chat-box
- Footer
  - Contacts
  - Language
  - …
- Language
- Music
- Personal profile
  - Manage your submissions
    - Subscriptions
    - Join our club
  - Your recommendations
    - Product page
    - Quality guarantee
    - Our promises
    - Cart
  - Order history
  - Manage your account
  - Payment method
- Cart
  - Cart products or Take the quiz

Table_7: VAAY's new information architecture.

4.2_CAO=S_Model

For the design of our project, we decided to rely on the so-called CAO=S model, a goal-oriented design model through which it is possible to implement applications despite challenging conditions, e.g., low budget, no usability experts, or the impossibility of involving real users. Nevertheless, the CAO=S model, when employed correctly is effective and allows a team, with little experience in the UUX field, to avoid the most common usability errors. This model simplifies the design process by defining and analysing the following components:

- the **Concepts**, the information entities managed by the system

- the **Actors**, the different users' categories that interact with the concepts (interaction with the interface and execution of different tasks)

- the **Operations**, actions that the actors perform on the system

These 3 then generate the **Structures** which are in turn tripartite in Views, Data structure and Navigation.

4.2.1_Concepts

The concepts exemplify, in the users' language, the information entities managed by the system: they indicate how the user perceives and assimilates information, independently of how they are stored in data structures. Taking into consideration our project and the final users we can identify the following concepts:

- **Personal profile**: the user's personal account on the VAAY's website

- **Test**: the test which indicates to the users the right products for their needs

- **Recommendation page**: a page where the user can visualize all the products that were recommended especially for them by the test.

- **Cart**: a temporary place to store products (with the relative price and quantity) the user would like to purchase.

4.2.2_Actors

An actor is an abstract representation of the different users' categories which interacts with the concepts of the system. We can distinguish between 2 types of actors: **direct actors** (those that will use and interact with the system's interface) and **indirect actors** (those that impact the system without actively interacting with it).

The direct actors, that we have identified in the end-users, are described through 6 different characteristics which indicate their ability to

meaningfully interact with the system:

- **Technical competency** (IT skills): ability to understand the medium (web), its contexts and the conventions of this specific mean of communication

- **Domain competency**: ability to understand what the application is truly about, and comprehension of the specific terminology used

- **Linguistic competency**: ability to understand the languages used by the interface, the linguistic nuances, the various linguistic registers, and the tone

- **Physical and visual ability**: ability to perceive and interact with the interface smoothly and naturally

- **Motivation**: ability to find a personal meaning behind the usage of the application

- **Concentration**: ability to focus completely on the application and carry out tasks without distractions.
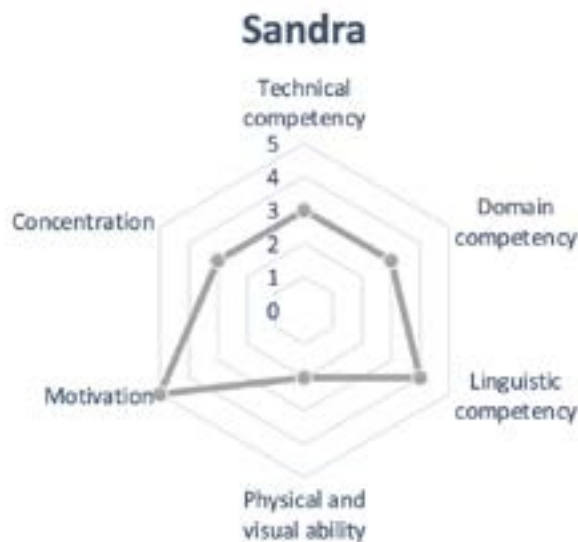
Figure_5: Sandra's radar plot.
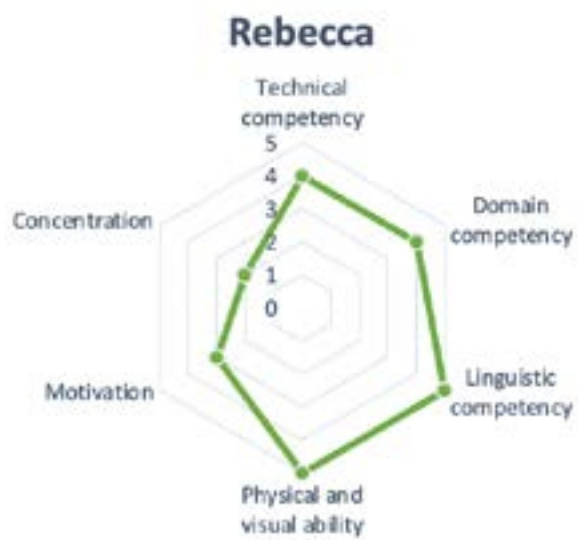
Figure_6: Rebecca's radar plot.

Figure_7: Alberico's radar plot.

As can be observed in the tables below, for each characteristic we assigned to our personas (which represent the end-users) a score from 1 to 5 where 1 corresponded to a very low value and 5 to a very high value.

We have also identified some indirect actors, namely:

- VAAY

- The experts (doctors, dermatologists, beauticians, etc.)

- The suppliers

- The shipping company

- The AI chatbots

4.2.3_Operations

In the CAO=S model, the operations correspond to the tasks; operations are based on the CRUD model:

- **Creation**: consists in the generation of one or more instances of a concept

- **View**: consists in the visualization of one or more instances of a concept

- **Update**: consists in the modification of one or more properties of one or more instances of an entity

- **Remove**: consists in the removal of one or more entities; there are 2 kinds: the elimination, the instance (or instances) does not exist anymore and is not retrievable and the storage, the instance (or instances) is not available, but it exists

4.2.4_Structures

As we mentioned earlier there are 3 types of structures:

01. Data structures (the way of storing the concepts' properties through databases)

02. Views (the presentation and visualization of the concepts)

03. Navigation (the way in which ones navigates from one view to another)

The CAO=S model is based on the creation of a table which has concepts, actors, and operation on the axis; each cell contains annotations on how the actor is supposed to execute a particular execution on the concept.

USER	Personal profile	Test	Recommended page	Cart
CREATION	The user can create his/her account once they register themselves with a valid email.	NO: prerogative of VAAY	NO: prerogative of VAAY	No: prerogative of VAAY
VIEW	The user can view their account	The user can view and supervise their test	The user can view the recommended page	The user can view the cart.
UPDATE	The user can update their account information	The user can re-take the test whenever he/she wants.	The user can change the products in their recommended page.	The user can update the cart by adding or removing items from it.
REMOVE _Elimination_ _Storage_	The user can permanently delete their account The user can delete their account and keep the information	NO: prerogative of VAAY	NO: prerogative of VAAY	NO: prerogative of VAAAY

Table_8: CAO=S model.

4.2_Interaction_ Design_Approach

The interaction design approach we decided to adopt for our project takes into consideration primarily the age of our audience and their technological skills. The challenge in our project was, in fact, dealing with such diverse and distant age groups and accommodate them in equal measure. To accomplish this, we introduced a few improvements to the VAAY's website to allow for a smoother navigation and an overall better experience; we tried to improve the structure of the site and the navigation itself which was criticized in the 2.2.3 section. We also used clear and familiar design patterns (e.g., changed the package icon with a cart icon, to resemble the well-known Amazon cart) to build trust, and prevent possible misunderstandings and errors. Finally, still in a frame of mind of building trustability, we stressed on the importance of predicting concerns and addressing them : we brought greater visibility on sections like "Our promises" and "Our VAAY formula" and we emphasized on the "People reviews".

We took care of keeping the overall layout of the website captivating and modern, while at the same time making it more intuitive, accessible, and large enough to be navigated by anyone, even an older individual with poor eyesight. The responsiveness and most importantly the flexibility of the website was very important, in the first place because we had longsighted elders in mind, but secondarily because, since our project can be experienced through different type of devices, we needed a design which adapts to different viewports.

Finally, interaction design turned out to be particularly important in the implementation of the test, a gimmick which is useful to communicate information to the intended users and which facilitates the interaction between the users (especially the older ones) and the system. The test we have in mind is a guided and self-explanatory multi-step form, a method which is proven to increase completion. The multi-step nature of this type of form is perceived as less intimidating by the users because the questions are spread evenly and also because this form usually comprises of a progress bar which motivates users to complete it.

Interaction device	Personal computer, tablet, smartphone
Interaction type	Touch, touchpad, mouse,
Design	Editorial
Design format	Interactive and step-by-step guided
Feedback and errors	Inline validation
Customisation	The products' page and the recommended page changes according to the users' needs which have been established by the test.
Localisation	Filter the entire website by language and culture (e.g., showcase only products that are legal in the country of the user and feature reviews from other customers that come from the same country of the user)

Table_9: Interaction design approach.

4.3_Blueprint

Blueprints are extremely important tools for determining which components make up our system and how they are arranged. We choose to begin with a graphical depiction of the elements that make up our scenario, as well as the relationships between them, in order to provide our application's content a more defined relational context. This entity-relationship model employs natural language to identify its elements and follows a top-down approach. Different forms of arrows and links are used to identify relationships. Items can have varying degrees of specificity and can serve as containers for other entities. We included a legend to help people understand the blueprints.
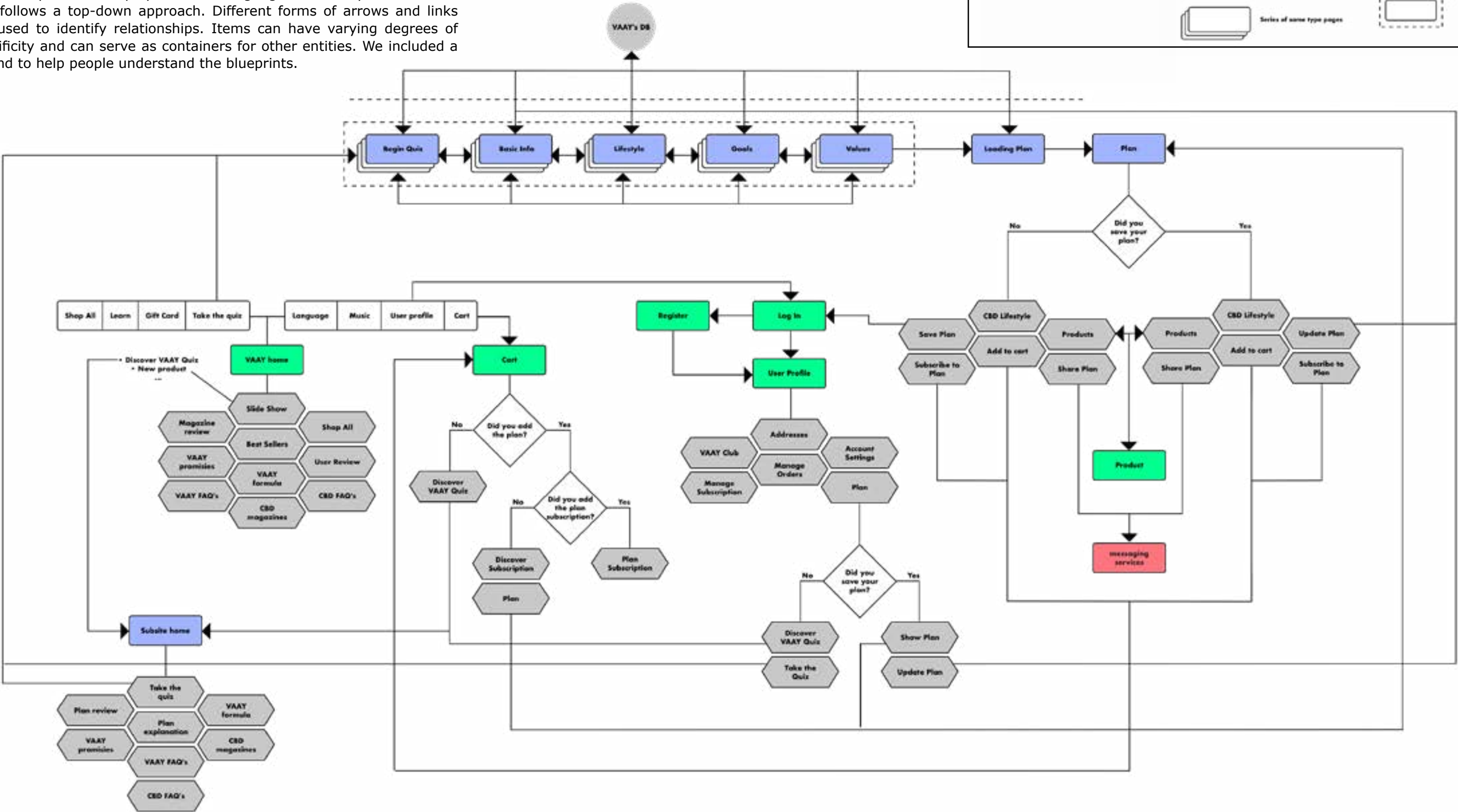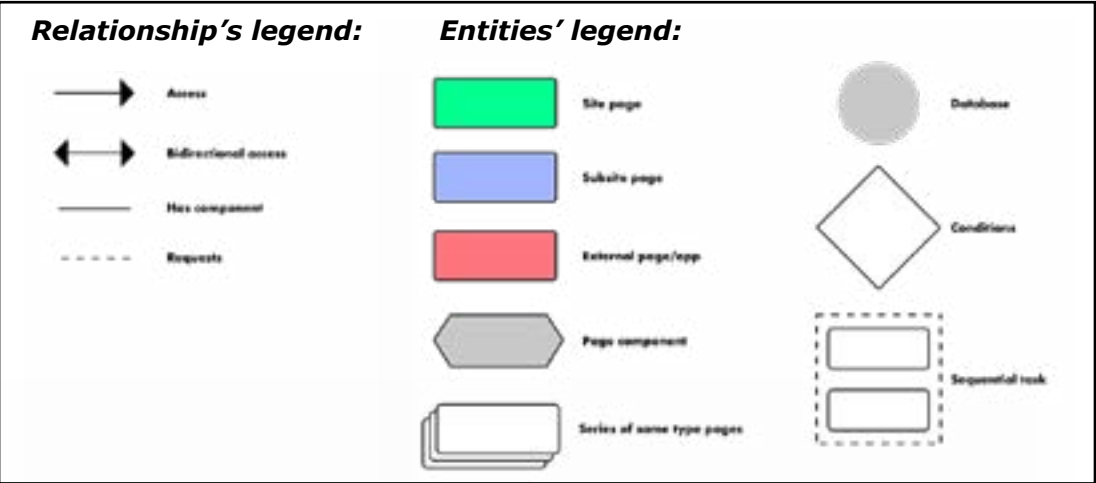
4.4_Wireframe

We opted for a wide range of website wireframes to assist us presenting the system's functional features in order to achieve our design goals. InVision, a web-based graphics editing and user interface design tool, was utilised to do this. Not only did we design the interface, but we also built a simple but high-fidelity prototype to plan the system's operation and evaluate the usability of relationship patterns between components. All the wireframes are recorded and discussed in the Final_Design.pdf file, which is included in the project's repository. The prototype is, instead, available in the appositely created InVision space.
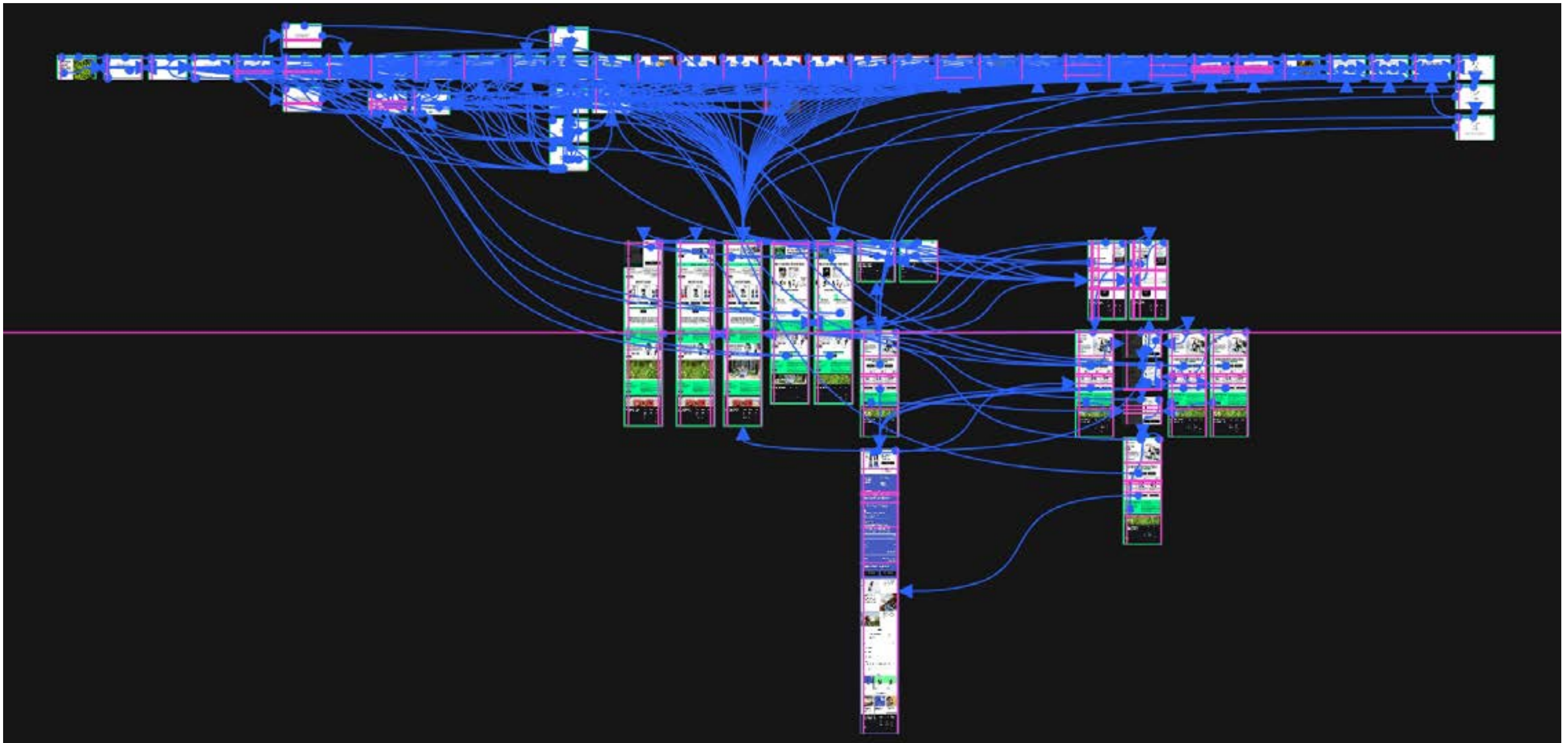
5.1_Inspection

5.1.1_Cognitive_Walkthrough

A cognitive walkthrough is a predictive method for examining the usability of an interface. It identifies the possible issues that users may encounter using an interactive system for the first time. This entails simulating the behaviour of the users when they carry out a series of possible actions. To do that we decided to use a prototype of the interface, which was implemented through InVision.

To examine the usability of **Made with VAAY** we identified the following three tasks which we believe to be the most significant:

- Take the quiz to find a natural anti-inflammatory

- Manage the plan: add/remove "CBD active & sports gel" and "CBD Massage Oil" from the cart

- Update the recommendations' diet information and share your plan via e-mail

The tasks are going to be executed by some of the fictional personas which were presented in **Section 3.2**.

Task 1 – Take the quiz to find a natural anti-inflammatory

User: **Laura**

Laura Nguette is a former javelin thrower, who suffered in her 30s from a major injury which caused annoying inflammations which still persiste today. It is her first time navigating through VAAY, she has heard of it from a friend who shared with her the plan on Facebook. Laura is intrigued and she decides to take the test.

Happy path:

01. Laura accesses the system from her pc

02. On the main page of the VAAY's website she clicks on the button "Take the quiz"

03. She clicks on "Begin quiz"

04. She inserts her name and clicks on "Next question"

05. She is greeted by the quiz

06. She inserts her age, then clicks on "Next question"

07. She is asked how she feels about hemp and among three options, she selects "sceptical".

08. She is now at the beginning of SECTION 1. BASICS, she clicks on "Next question"

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09. She answers a yes or no question on whether she has ever taken any hemp product in the past, she clicks on the no button.

10. She answers yet another yes/no question on whether her doctor has recommended CBD to her, she clicks on the no button.

11. She answers a yes or no question on whether she is required to do regular drug tests at work, she clicks on the no button.

12. She is asked to select the gender she identifies in; she clicks on "female".

13. She selects the country she lives, Germany, in a dropdown scrolling menu and then clicks on "Next question"

14. She is notified of the legislation in force in Germany as regards CBD, she clicks on the "got it!!!" button

15. She is now in SECTION 2: GOALS – she clicks on "Next question"

16. When asked what she wants to achieve with VAAY's products she can choose among many options, she selects: help inflammation, better sleeping, manage pain, overall health. She clicks on "Next question"

17. She is asked to select her top priority, she clicks on "manage pain"

18. She is asked about what is causing her pain, she selects: "inflammation", "old age aches and pains". She clicks on "Next question

19. She is now in SECTION 3: LIFESTYLE – she clicks on "Next question"

20. She is asked on how she feels about living a healthy life: among 3 options she chooses "really dedicated"

21. She is asked to describe her diet, she selects "Vegetarian"

22. She is asked about how often she exercise, she selects "rarely"

23. She is asked about her fitness routine, she selects "none of these"

24. She is asked if she smokes, she selects no

25. She is now in SECTION 4: VALUE – she clicks on "Next question"

26. She is asked about her take on alternative medicine, she selects "open".

27. When asked about a new product with promising research, she selects "learn more"

28. She is asked to tell how she learned about VAAY; she selects "Facebook"

29. Her recommendation is ready.

Task 2 – Manage the plan: add/remove "CBD active & sports gel" and "CBD Massage Oil" from the cart

User: **Hwang**

Hwang, an intern in an informatics' company, has already taken the quiz and registered on the VAAY's website. He wants to buy some products for the persistent leg cramps he has when training but first he wants to review the ingredients' list and read other athletes' opinions on said products.

Happy path:

01. Hwang is on the VAAY's website, he clicks on the user profile in the top-left of the home page.

02. The Register page opens but he clicks on the "have already an account?" instead.

03. He is redirected to the "Sign in" form, he enters his email and the password and clicks on the "Log in" button

04. Once he's logged, since he has already taken the quiz, he clicks directly on "Show recommendation"

05. He scrolls down on the recommendation page to review the products on his plan

06. Hwang selects one of the products, "CBD Massage Oil", and clicks on "Discover product"

07. He reads the product page, the ingredient list, the features, and the benefits of the current product

08. He scrolls down to see the reviews of other customers

09. He adds the product to the cart

10. He closes the current product page and he start scrolling through the recommended products again

11. He selects another product, the "CBD active & sports gel"

12. He once again reads the ingredients

13. He checks out other customer's reviews again

14. He adds the (current) product to the cart

15. He goes back to the recommendation and sees that he has the option to directly add the whole plan to the cart, he clicks on it.

16. He selects the cart icon on the top right

17. The cart pops up on the right of the page

18. Hwang reviews the cart and realizes that he has added some items 2 times.

19. He removes the duplicates by clicking on the "-" sign.

Task 3 – Update the recommendations' diet information and share your plan via e-mail

User: **Sandra**

Sandra is on the website with her iPad. She is reviewing her plan, which is mostly creams and serums. She recently began a new diet, and she would like to retake the test because many of her habits and goals have slightly changed.

Happy path:

01. Sandra is already logged into the system

02. From the home page, she clicks on the user profile in the top-left of the home page.

03. Sandra enters her personal profile page

04. She clicks on "Do you want to update your recommendation?"

05. She's redirected to SECTION 1: BASICS of the quiz

06. She takes the quiz

07. Her new recommendation is ready

08. She goes back to her personal profile and click on "Show recommendation"

09. She scrolls down and reviews her new plan

10. She scrolls up a little bit and she has 3 options: "add to cart", "update plan" or "share plan".

11. She decides to click on the "share plan" button

12. Sandra shares her personal plan with her doctor clicking on the Outlook icon

---

5.1.2_Action_Analysis

We proceed onto the quantitative analysis of specific actions that need to be performed to carry out a task successfully. This kind of assessment is called action analysis, which is an evaluation process that examines the sequence of actions required to complete a task. We decided to use an **informal** approach which evaluates tasks globally and focuses on the bigger picture. Every task will be described in general terms considering the numbers of steps necessary to accomplish a task and the minimal time of usage, which is the time required to accomplish the task in the shortest period of time.

Task	Actions	Minimal Use Timing	Outcome
Sign in	1. Click on user icon 2. Click on "already have an account" 3. Enter username 4. Enter password 5. Click on the "log in" button	00:22:35	Very simple task, the timing is proportionate to the slender number of steps.
Register	1. Click on the user icon 2. Insert first name 3. Insert last name 4. Insert nationality 5. Insert email 6. Insert password 7. Click on the "register" button	00:28:70	Simple task which can be executed directly in a single page. The timing is proportionate to the numbers of steps.
Take the quiz	1. Click on the "Take the quiz" button 2. Click on "Begin quiz" 3. Inserts name, click "Next question" 4. Insert age, click on "Next question" 5. Select one of the options 6. SECTION 1. BASICS, click on "Next question" 7. Answer a yes/no question 8. Answer a yes/no question 9. Answer a yes/no question 10. Select a gender 11. Selects country, click on "Next question" 12. Read the CBD regulation of the country selected, click on the "got it!!!" button 13. SECTION 2: GOALS –click on "Next question" 14. Select the buttons that apply to you; click on "Next question" 15. Select one button 16. Select one option among 3 options 17. Select the radio button that apply to you. Click on "next question" 18. Select the radio button that apply to you. Click on "next question" 19. Select an option among multiple options	03:37:97	This task is the most complex and long one of the system. Nevertheless, the organization of the sections and little tricks (e.g., progress bar) help maintaining the attention of the user until completion.

Task	Actions	Time	Comment
	20. Select an option among multiple options. Click on "Next question" 21. SECTION 3: LIFESTYLE – click on "Next question" 22. Select an option among 3 options 23. Select an option among 4 options 24. Select an option among 3 options 25. Select an option among 3 options 26. Answer a yes/no question 27. SECTION 4: VALUE – clicks on "Next question" 28. Select an option among 3 options 29. Select an option among 3 options 30. Select the radio button that applies to you 31. Recommendation is ready		
Visualize personal plan (already logged in)	1. Click on user icon 2. Click on "show recommendation" 3. Scroll down 4. Visualize the products in your plan	00:09:41	The task is simple, and the timing is proportionate.
Visualize cart (already logged in)	1. Click on the cart icon 2. Visualize cart	00:05:98	Easiest task and fastest one as well, because it can be accessed from basically any page of the website.
Review a product page (already logged in)	1. Inside the personal page, click on "show recommendation" 2. Scroll down 3. Click on "discover product" 4. Read general info (price, amount of product) 5. Scroll down 6. Read section "how to use it" 7. Scroll down 8. Read section "What is it" 9. Scroll down 10. Read ingredients table	01:07:88	The task is fairly simple, the timing is proportionate to the number of steps. It may take longer if the user is unexperienced or if they are very thorough and/or sceptical.

Table_10: Action analysis.

5.1.2_Heuristic_Analysis

The final step of the inspection consists in the heuristic analysis, an inspection tool which evaluates the usability of a system by verifying whether said system adheres to universally recognized guidelines. For the sake of consistency, we are going to use the set of guidelines we identified in section **2.1.1** stemming from both the 10 heuristics of Nielsen and Molich and the 20 heuristics of Weinschenk and Barker.

23 The correction of this violation is present in the final design report.

GUIDELINE	VIOLATION
1. Visibility of system status	In the quiz, despite the presence of a progress bar, the user does not understand at what point of the test they are[23]
2. Match between the system and the real world	/
3. Cultural property	/
4. Fulfilment	/
5. Accommodation	/
6. User control and freedom	The user should perhaps be given the possibility to go back to specific sections of the test whenever he/she desires instead of having to retake the test starting from SECTION 1
7. Consistency and standards	/
8. Recognition rather than recall	Accessing the personalised plan perhaps involves too many actions.
9. Flexibility and efficiency of use	The VAAY system is best suited to experienced users rather than novice ones. There are little shortcuts, and some actions could be further simplified.
10. Responsiveness	The only way to go back is by using the browser arrow and by clicking on the home icon. The implementation of breadcrumbs should be taken into consideration, especially in the recommended products page.
11. Aesthetics and minimalist design	/
12. Error prevention	/
13. Help users recognize, diagnose, and recover from errors	/
14. User support	The test is mostly self-explanatory, and it is supported by a "Why we ask" explanation but not much is said about the test itself and the meaning behind each section.

Table_11: Heuristic analysis.

5.2_User_Testing

5.2.1_Testing_Protocol

For the final user testing once again we opted for the Discount Usability Test, as it was the best fitting way for evaluating the user experience. We asked four people to participate: two test subjects from the "young adults" target segment and two from the over 55.

- **Tommaso**, 25 years old, student, proficient computer user, familiar with online shopping, already knows about CBD products

- **Letizia**, 25 years old, working student, uses the pc and smartphone for various tasks, familiar with online shopping and CBD products

- **Nadia**, 55 years old, artisan, never ordered anything online, not informed but curious about CBD products, uses the pc for basic tasks (videos, social media, etc.)

- **Sergio**, 56 years old, engineer and artisan, familiar with online shopping, proficient computer user, not informed and slightly sceptical about CBD products

Even in this case, the participants were asked to think aloud during the process, and they had to complete a total of eight tasks. It was important for us to divide tasks 1 and 7 into two subtasks in order to analyse the presence or absence of significant effectiveness and efficiency issues.

01. Take the quiz
    a. Find the call-to-action button
    b. Take the quiz
02. Save your recommendations
03. Log in
04. Explore your recommendations and discover more about "Hemp Sleep Spray"
05. Add your recommendations to cart
06. Add another Hemp Sleep Spray to cart
07. Update your plan
    a. Find the update button
    b. Retake the quiz
08. Subscribe to your plan

5.2.1_Testing_Process

The subjects participated in the testing process via video call or in presence and they allowed the recording for evaluation purpose; if online, they were asked to share their screen.

The participants were assured that the aim of the session was not to test their capabilities or difficulties while using the prototype, rather to see how the system works and eventually how to improve it. Again, the usability metrics we considered for the evaluation are: success, efficiency, effectiveness, learnability, and satisfaction. The evaluation of the efficiency metrics (e.g., low efficiency, very high efficiency, etc.) is established on the values described in the Action Analysis chapter **5.1.2**. Of course, in the Action Analysis, tasks like "Take the quiz" with a duration of 3 minutes and 30 circa has this kind of extent due to the completeness of the simulation: in the Action Analysis, every single action was measured, for instance filling in the text input fields (name, age), or reading carefully every Quiz question and maybe the relative "Why we ask?". These actions are not (always) performable in the final prototype - which, for a matter of purposes of this report is not complete (see Final_Design.pdf) - consequentially the timings differ from the ones reported in the Minimal Use Timing column of Action Analysis (Table 10). Namely, the Efficiency timings in the **Made with VAAY, your hemp routine** tables are shorter than the Action Analysis ones[24]. At any rate, we consider these values significant and valid when a task results successful and the timing is below the Action Analysis reference value. Concerning the tasks which are not present in the Action Analysis, the evaluation of the metrics mentioned before is based on the most proficient participant's results, as happened in chapter **2.2.2**.

Table 12 and 13 show the results of the younger part of the audience. It is interesting to notice how, even if they both succeeded in task 1, they needed a hint by the User tester. Participant 1, Tommaso, made a note about how many steps one needs to do before actually beginning the quiz, and was slightly concerned about it. It is important to underline that in a hypothetical use of the system a user would access the VAAY website, explore it and then find out about the Test through the various call-to-action links, and, possibly, would be curious to try it. In the user testing phase, task number 1 was extremely specific ("Take the quiz") and probably due to the limitations of the prototype it did not let the user feel completely free to use the system as it was not a real website[25]. Anyways, Letizia also commented on that task, saying the "Take the quiz" button was difficult to find at first and that it could be useful to change the writing in the homepage button which quotes "Discover now", or also to make the upper link "Take the quiz" somehow more visible.

Tables 14 and 15, resume the results of the two over 55-year-old participants. Here, we find the first unsuccessful task: Sergio was not able to complete task 1.a and asked for help after only 36 seconds he was scrolling the prototype. On the other hand, Nadia was able to complete the task without help, finding the "Take the quiz" link no one noticed before, on the top left of the homepage. In general, she needed some help for every other task, since she does not speak English: this is something that significantly slowed her down during the test and that is necessary to take it into account while reading the efficiency results. This happened even with Sergio, but in a more modest way and did not affect the time scores so much. One could notice the presence of more

24 E.g., the prototype does not require the user to fill in their own data during the log in process, thus shortening the action a lot.

25 At first, most of the participants had doubts about how to use the prototype because the lack of the hand pointer mouse when over a button or a link, even though they were informed that the prototype was not fully functional. This eventually led to some hesitations, useless steps or dead ends.

dead ends or effectiveness issues in Tables 14 and 15 than the previous two Tables.

As the tasks were varied, the learnability was found only in task number 7.b for every participant, when they had to take the quiz again. Satisfaction is mainly normal and in very few cases high or low. The SUS results (see Table 16) reveal that every participant selected a Neutral (3 points) or a higher reply (two selected "5") to the question "I think that I would like to use this system frequently", showing normal to high satisfaction towards the Made with VAAY, your hemp routine system.

The System Usability Score calculated on the participants' answers reveal that **Made with VAAY, your hemp routine** system is acceptable. We notice a slight difference between the average results which focus on the two targets: the young adults' average SUS result is 95, in other words an excellent score. On the other hand, the remaining participants' totals are either very high (100) or near the "marginal" score (67.5) . The average total is 89.37, outlining an excellent System Usability Score.

TASK		SUCCESS	EFFICIENCY	EFFECTIVENESS	LEARNABILITY	SATISFACTION
Made with VAAY, your hemp routine	1.a	Yes, task completed with help	Low, completed in 1'27"	Hesitation, dead ends	/	Low, with concern
	1.b	Yes, task completed without help	High, completed in 2'21"	/	/	Normal
	2	Yes, task completed without help	High, completed in 2"	/	/	Normal
	3	Yes, task completed without help	High, completed in 1"	/	/	Normal
	4	Yes, task completed without help	Very high, completed in 3"	/	/	High
	5	Yes, task completed without help	Very high, completed in 4"	/	/	Normal
	6	Yes, task completed without help	Very high, completed in 1"	/	/	Normal
	7.a	Yes, task completed without help	Very high, completed in 2"	/	/	Normal
	7.b	Yes, task completed without help	High, completed in 2'	Easy backtracking	Good, major improvements after task 1.b	High
	8	Yes, task completed without help	High, completed in 7"	Dead ends	/	Normal

Table_12: Tommaso's Results.

TASK		SUCCESS	EFFICIENCY	EFFECTIVENESS	LEARNABILITY	SATISFACTION
Made with VAAY, your hemp routine	1.a	Yes, task completed with help	Low, completed in 1'	Minor hesitation, useless steps	/	Normal, with concern
	1.b	Yes, task completed without help	High, completed in 2'2"	/	/	Normal
	2	Yes, task completed without help	High, completed in 2"	/	/	Normal
	3	Yes, task completed without help	High, completed in 2"	/	/	Normal
	4	Yes, task completed without help	Very high, completed in 5"	/	/	High
	5	Yes, task completed without help	Very high, completed in 3"	/	/	Normal
	6	Yes, task completed without help	Very high, completed in 1"	/	/	Normal
	7.a	Yes, task completed without help	Very high, completed in 4"	/	/	Normal
	7.b	Yes, task completed without help	High, completed in 1'57"	Easy backtracking	Good, improvements after task 1.b	Normal
	8	Yes, task completed without help	High, completed in 5"	/	/	Normal

Table_13: Letizia'z Results.

TASK		SUCCESS	EFFICIENCY	EFFECTIVENESS	LEARNABILITY	SATISFACTION
Made with VAAY, your hemp routine	1.a	**No**	Low, failed after 36''	Hesitation, useless steps, dead ends	/	Low
	1.b	Yes, task completed without help	High, completed in 2'46''	/	/	Normal
	2	Yes, task completed without help	High, completed in 1''	/	/	Normal
	3	Yes, task completed without help	High, completed in 3''	/	/	Normal
	4	Yes, task completed without help	Very high, completed in 3''	/	/	High
	5	Yes, task completed without help	High, completed in 10''	Dead ends	/	Normal
	6	Yes, task completed without help	Very high, completed in 2''	/	/	Normal
	7.a	Yes, task completed without help	Very high, completed in 2''	/	/	Normal
	7.b	Yes, task completed without help	High, completed in 55''	Easy backtracking	Good, improvements after task 1.b	Normal
	8	Yes, task completed without help	High, completed in 29''	Minor hesitation, dead ends	/	Normal

Table_14: Sergio's Results.

TASK		SUCCESS	EFFICIENCY	EFFECTIVENESS	LEARNABILITY	SATISFACTION
Made with VAAY, your hemp routine	1.a	Yes, task completed without help	Normal, completed in 1'16''	Useless steps	/	High
	1.b	Yes, task completed without help	Low, completed in 5'11''	/	/	Normal
	2	Yes, task completed without help	High, completed in 5''	/	/	Normal
	3	Yes, task completed without help	High, completed in 2''	/	/	Normal
	4	Yes, task completed without help	Normal, completed in 11''	Dead ends	/	Normal
	5	Yes, task completed without help	High, completed in 10''	/	/	Normal
	6	Yes, task completed without help	High, completed in 8''	Dead ends	/	Normal
	7.a	Yes, task completed without help	High, completed in 6''	/	/	Normal
	7.b	Yes, task completed without help	Normal, completed in 2'50''	Easy backtracking	Good, improvements after task 1.b	Normal
	8	Yes, task completed without help	High, completed in 16''	/	/	Normal

Table_15: Nadia's Results.

SYSTEMS	VAAY QUIZ			
PARTICIPANTS	Tommaso	Letizia	Nadia	Sergio
I think that I would like to use this system frequently.	4	5	5	3
I found the system unnecessarily complex.	1	1	1	3
I thought the system was easy to use.	5	5	5	4
I think that I would need the support of a technical person to be able to use this system.	1	1	1	2
I found the various functions in this system were well integrated.	5	4	5	2
I thought there was too much inconsistency in this system.	1	1	1	3
I would imagine that most people would learn to use this system very quickly.	4	5	5	3
I found the system very cumbersome to use.	2	1	1	2
I felt very confident using the system	5	5	5	3
I needed to learn a lot of things before I could get going with this system.	1	1	1	3
SUS TOTALS	92.5	97.5	100	67.5
AVERAGE (focus on target audience)	95		83.75	
AVERAGE (total)	89.37			

Table_16: SUS of **Made with VAAY, your hemp routine**

2.2.3_Conclusions

In general, the younger audience complained about the intricacy in finding the "Take the quiz" button and suggested either decreasing the number of steps to find it or to make it more visible. One of them said the Subscription page was not so clear, but this is part of the prototype limitation. On the other side, the late adults did not add anything about task 1.a - also, one of the two was the only participant to complete the task without help - but they pointed out they would rather prefer an Italian version of the website, as they did not understand many parts of the system and needed help. Every participant agreed on the simplicity of the system, and they confirmed having a good user experience; one of the two over 55 explained that he liked the hyper-personalisation factor and that it would certainly simplify and speed up the online shopping.

Finally, when the tester asked whether in their opinion it could be useful to have a chat box in which one could ask for help to VAAY experts, all the participants agreed that it could be a good idea if one has perhaps a doubt during the Quiz or while navigating the website.

With **Made with VAAY, your hemp routine** we wanted to redesign the user experience of the VAAY's website. The goal was to make the website more intuitive and user-friendly and implement a hyper-personalisation service that met the specific needs and limitations of the over 55.

The adjustments on the structural level allowed, on the one hand, to avoid distraction and thus catch the users' attention and, on the other, they enabled the users to comfortably access information and to carry out numerous actions without running into preventable errors. Besides, the subtle yet effective changes that the design underwent improved the experience of VAAY's current customers (which are mostly millennials) but has also unlocked the doors to older users, whose needs and difficulties are finally taken into consideration.

In fact, the final user testing results show that the system is suitable both for the younger audience and the over 55-year-olds, whose average SUS of 89.37 highlight its effectiveness, efficiency, and satisfaction. Most of the tasks were successfully accomplished without assistance (92% completed without help over a total of 40 tasks for 4 users). Furthermore, some noteworthy comments were that the hyper-personalisation provided by the VAAY quiz could speed up and help the online shopping and that the system was simple and intuitive to use. One important hint from both the late adults was to implement an Italian version of the quiz or, possibly, of the entire website. This suggestion will be considered for future versions of the system.

Stemming from the inspection (in particular from the violation the **User support**) and the user testing, the website could be further expanded and enhanced by taking the already existing VAAY's chat, through which one can nimbly write a message to the VAAY's team when in need of information and making it an AI chatbot which responds interactively and directly to the users' doubts and concerns, especially regarding the health and legal aspects correlated to CBD products. This could improve the usability of the system and the trustability of the company.

Due to the limitation of time, we were not able to further investigate the interest towards the subscription service (present in the prototype) which was deemed useful by a considerate number of participants. This service would guarantee users with their favorite products delivered at home periodically.

Always in a personalised experience mind set, another gizmo that could further be implemented is the point system which represents an effective strategy that attracts and engages clients by helping them obtain discounts and/or privileges. Successful examples of companies that implement this type of strategy are Trenitalia and Italo, two Italian train operating companies and Shein, an online fast fashion retailer. VAAY has a point system implemented, the points can be obtained in several ways: buy products, create an account, follow VAAY's Instagram account and/or like VAAY on Facebook, sign up for the newsletter, make a review, etc. The strategy is however not effectively advertised nor promoted, and the points obtained can be spent only on a limited number of products.

With **Made with VAAY, your hemp routine** the points could be gained through the already existing methods and by taking the test and sharing the personal plan, though, following the examples of the aforementioned companies, VAAY's point system could be further implemented by rewarding the users with more privileges and more points that can be used for every single product instead of just a few of them.

An additional tool that could be implemented is a smart-phone application, that would allow the users to have VAAY at hand and allow them to manage their plan conveniently from their phones.

In conclusion, we can say that the VAAY subsite we implemented, **Made with VAAY**, reflects the brand's values not only on a 'people first' policy level, but it goes beyond by creating a unique and appealing consulting experience that involves VAAY's loyal customers and attracts new ones.