Deliverable 8.3. Report on Collaborative Testing and Training Tutorials

CERTH

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DELIVERABLE INFORMATION	
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Abstract	This deliverable is responsible for developing a detailed plan and methodology for testing the iPRODUCE framework at local communities' level. This plan takes into account all the services and functionalities provided by iPRODUCE, which are tested according to the developed methodology. All the iPRODUCE use-cases related to local communities are tested thoroughly within this task. Furthermore, T8.3 provides all the necessary training services for local ecosystems and communities. To this end, animated and interactive tutorials are utilized by enabling customers, engineers and non-specialized designers from the local communities to be trained at the iPRODUCE services and facilities. iPRODUCE creates a knowledge base from training scenarios to be exploited for the training of local communities on real conditions, linking in this way education and real-life production.

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25/11/2022	V0.2	T. Kolyvas (EDLUX)	Modifications and adjustments in subsection 3.2 & 3.3
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23/12/2022	V0.6	T. Kontodina (CERTH), T. Restas (CERTH), C. Tsotakis (CERTH)	Final version, Modifications and adjustments based on peer review comments and suggestions

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PP	Restricted to other programme participants (including the EC services)	
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iPRODUCE ● Grant Agreement: 870037 ● Innovation Action ● 2020 – 2022 | Duration: 36 months

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Executive Summary

This document is a deliverable of the iPRODUCE project, funded by the European Commission's Directorate-General for Research and Innovation, under its Horizon 2020 Research and innovation programme (H2020). The document reports the results of the activities carried out by M36 within the context of WP8 (iPRODUCE OpIS Prototype and Integration and Deployment Report), particularly in the Task 8.3 that focuses on the "Collaborative Testing and Training of Local Communities".

This deliverable is responsible for developing a detailed plan and methodology for testing the iPRODUCE framework at local communities' level. This plan takes into account all the services and functionalities provided by iPRODUCE, which are tested according to the developed methodology. All the iPRODUCE use-cases related to local communities are tested thoroughly within this task. Furthermore, T8.3 provides all the necessary training services for local ecosystems and communities. To that end, animated and interactive tutorials are utilized by enabling customers, engineers and non-specialized designers from the local communities to be trained at the iPRODUCE services and facilities. iPRODUCE creates a knowledge base from training scenarios to be exploited for the training of local communities on real conditions, linking in this way education and real-life production.

Additionally, some of the developed tools (described more analytically in D4.2 OpIS Architecture & Design for Social Manufacturing II), namely the Matchmaking and the Agile Network Creation Tool are –under a user point of view – integrated in the Marketplace. For that reason, the provided user manual, does not include a separate subsection for their utilization. Finally, the Digital Fablab Kit is intended for cMDF staff and does not belong to the scope of this deliverable. For this purpose, it was not included in this deliverable.

Finally, it is of fundamental importance to highlight that as the tools of the project come to their final stages of the development process, all relevant endpoints and information will be updated to better reflect their complete integration, during the upcoming weeks, in a user-transparent way.

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1. Introduction

1.1. Scope and objectives of the deliverable

The main scope of the current deliverable is to plan and execute thorough testing of the integrated solution, while familiarizing/ training users with the operation of the overall solution. In particular, the objective is to develop a detailed plan and methodology for testing the iPRODUCE framework at local communities' level. This plan takes into account all the services and functionalities provided by iPRODUCE, which are tested according to the developed methodology. All the iPRODUCE use-cases related to local communities are tested thoroughly. Additionally, the current deliverable provides all the necessary training services for local ecosystems and communities. For this purpose, interactive tutorials are utilized by enabling customers, engineers and non-specialized designers from the local communities to be trained at the iPRODUCE services and facilities. iPRODUCE creates a knowledge base from training scenarios to be exploited for the training of local communities on real conditions, linking in this way education and real-life production.

1.2. Relation to other tasks and deliverable

WP8 – iPRODUCE Integrated Social Manufacturing Space is responsible for integrating and interconnecting iPRODUCE technological and operational infrastructure and tools. To that end, T8.3 – Collaborative Testing and Training of Local Communities is closely linked to the two tasks of WP8, namely T8.1 Operational Integration and Acceptance Testing of iPRODUCE platform, which is expected to deliver OpIS platform by integrating the core services of the digital platform, the co-creation enabling tools, the training toolkit, the social engagement application and the IPR & transactions management automation framework. Additionally, it is linked with the T8.2 – Installation of Local Hubs and Interconnection of cMDFs, which is expected to configure the local instances of OpIS on the basis of each cMDF characteristics and interconnect them to establish the federated network.

1.3. Structure of the deliverable

This document is divided into three main sections, apart from the introductory one, **Section 1**.

Section 2 entitled: "Methodology for Testing the OpIS platform" describes the methodology for testing the tools of the OpIS platform. The deliverable introduces the necessary set of actions that each user will have to conduct in order to proceed with the testing process within the framework of the local ecosystems and communities.

Section 3 called "Tutorials and User Manual of OpIS platform" includes a comprehensive presentation of tutorials and a user manual of OpIS platform, in order to facilitate the utilization of the iPRODUCE OpIS platform tools. This section is divided into other sub-sections including each tool.

Section 4 presents the report of Collaborative Testing and Training Tutorials, based on D5.11 and D5.12.

Finally, **Section 5** presents the conclusions of the deliverable.

2. Methodology for Testing the OpIS Platform

The following steps an indicative user's journey in OpIS platform, illustrated also in the following diagram (see Figure 1).

OpIS platform:

1. **Marketplace**
   a. User registration
   b. Login
2. **Matchmaking & Network**
   a. Creation of Team
3. **Marketplace**
   a. Creation of a Product
   b. Upload of Product (3D Model, Information, etc.)
4. **IPR Authoring Tool**
   a. Creation of Smart Contract
   b. Editing of Contract Terms
   c. Approval/Rejection of Contract
5. **Generative Design Platform**
   a. Detailed Product Design
6. **AR/VR Toolkit**
   a. Adding of Team Product
   b. Editing of Annotations (i.e. Colors, Textures)
7. **Mobile Application**
   a. Survey Feedback
8. **Marketplace**
   a. Offering of Product to the OpIS communtiy
9. **Agile Data Analytics and Visualization Suite**
   a. Process Feedback

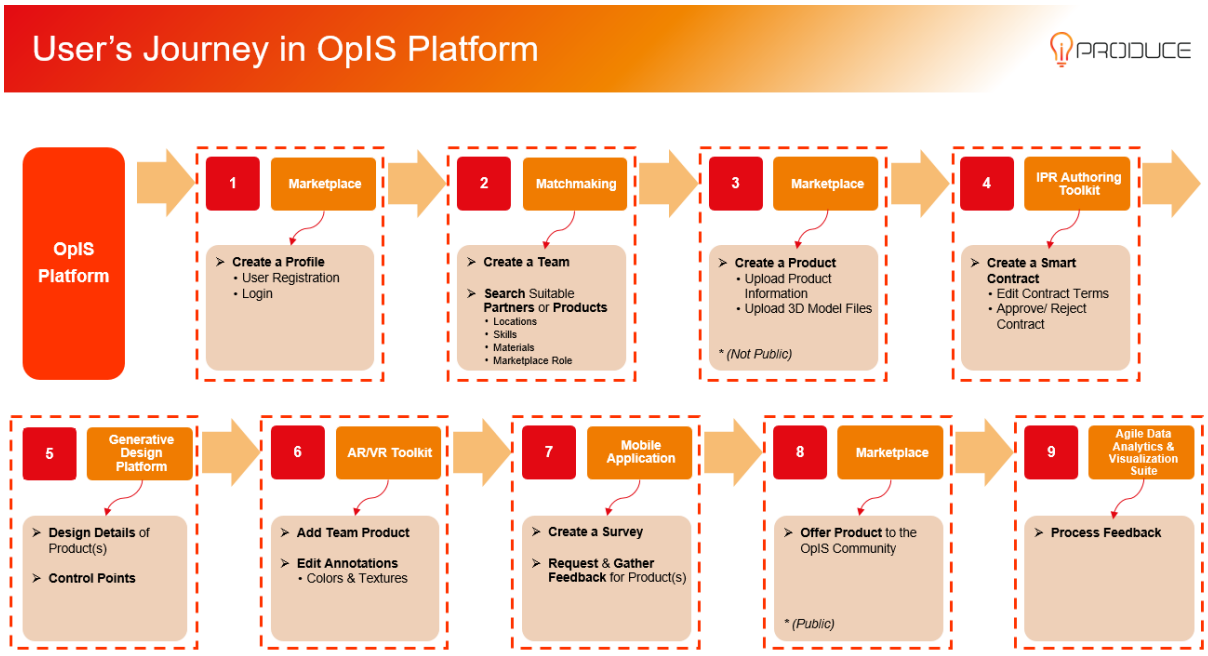

Figure 1 OpIS Platform – User's Journey Diagram

3. Tutorials and User Manual of OpIS platform

3.1. Landing Page

The **Landing Page** of the OpIS Data Repository can be accessed through the URL: *iproduce-tools.iti.gr* and includes all the platform components.

3.1.1. iPRODUCE Tools

The user can access the respective component through the **iProduce Tools** menu tab (see Figure 2, arrow 1).

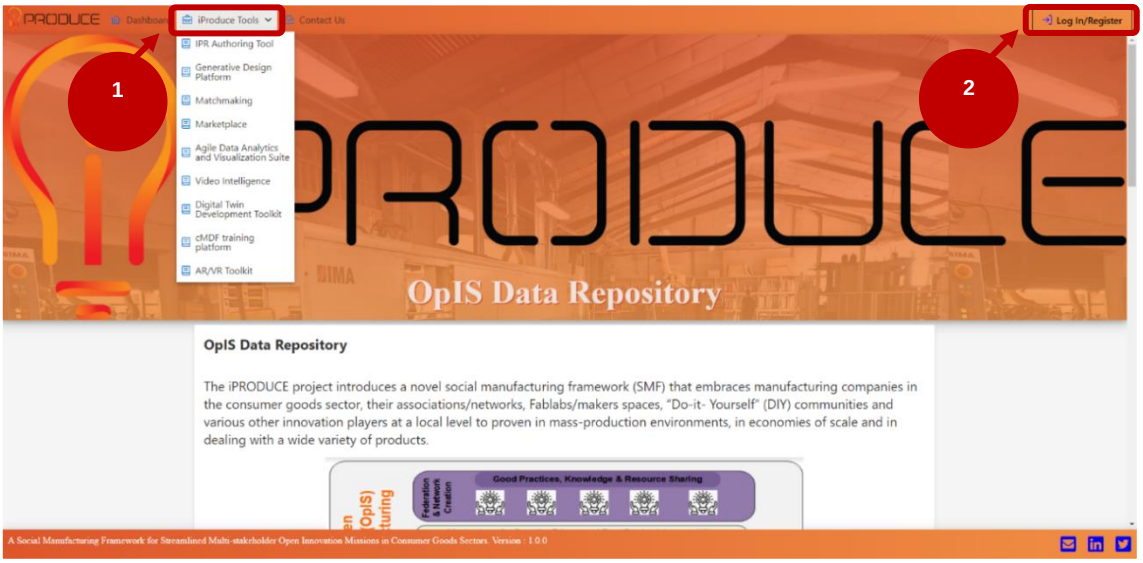

Figure 2 OpIS Platform – Landing Page

By clicking on **Log In/ Register** button (see Figure 2, arrow 2) the user can log in with his/her credentials to the OpIS platform.

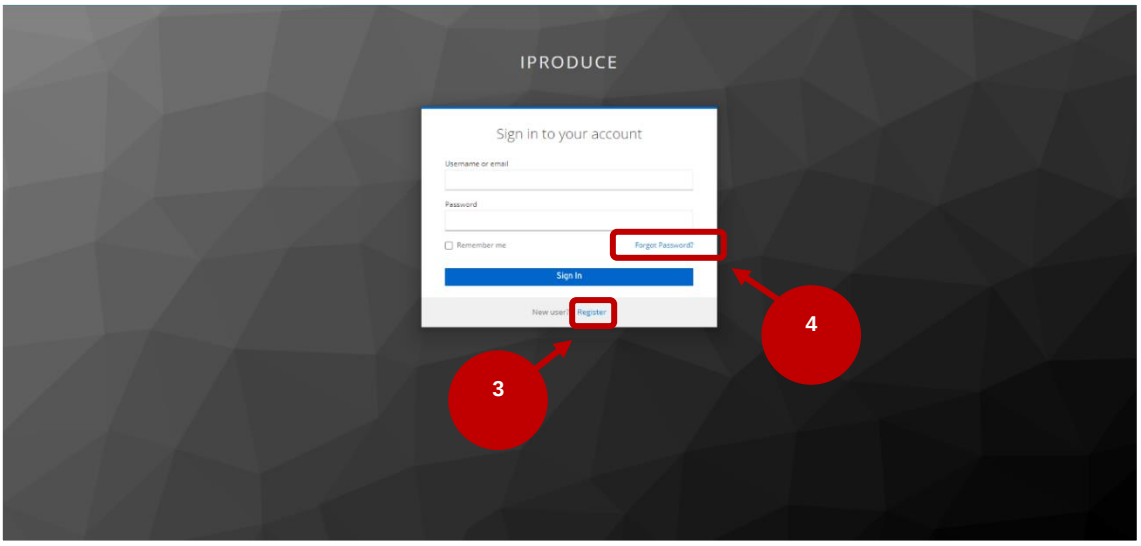

Figure 3 OpIS Platform – Log-In Page

If the user is not registered, by clicking the **Register** text button (see Figure 3, arrow 3), he/she will be redirected to the **Register Page** to create a new account by providing: First name, Last name, Email, Username, Password etc.

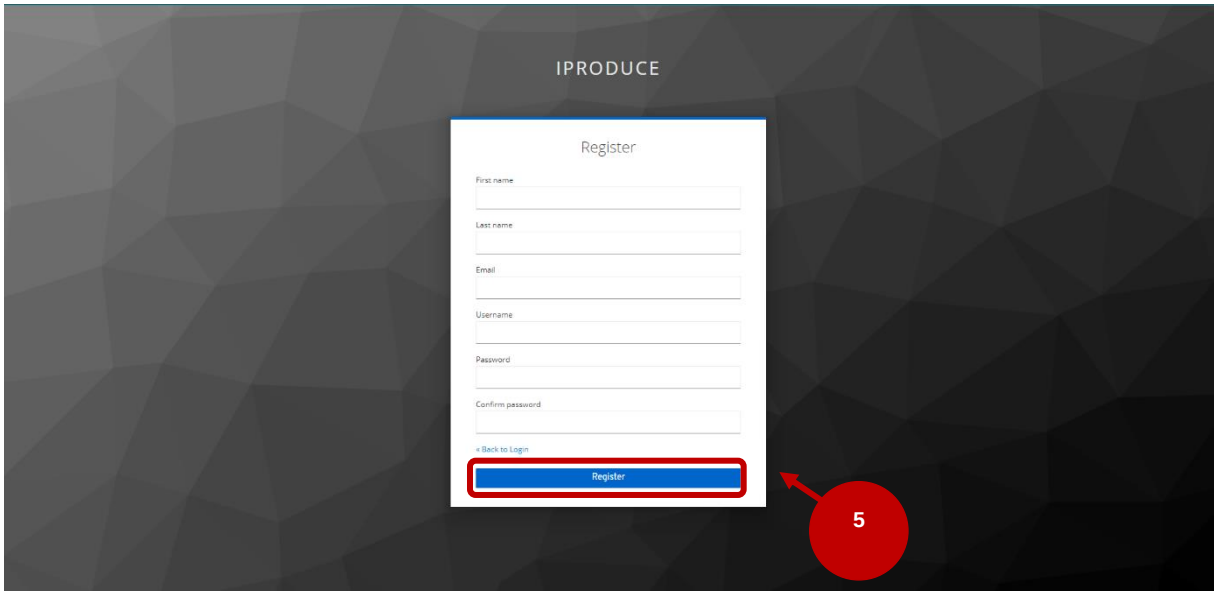

Figure 4 OpIS Platform – Register Page

In case the user has forgotten the password, by clicking on **Forgot Password?** text button (see Figure 3, arrow 4), he/she will be able to reset this password and create a new one.

3.2. Marketplace

The **Marketplace** of the OpIS Data Repository can be accessed through the URL: *iproduce-tools.iti.gr* The user can access the Marketplace through the **iProduce Tools** menu tab (see Figure 2, arrow 1). Otherwise, it can be accessed also at: *https://iproduce-marketplace.eurodyn.com/*

3.2.1. Home Page

The home page of the Marketplace is accessible by both registered and unregistered users. It presents the following:

- **iPRODUCE**, which gives access to the project's page (see Figure 5, arrow 1)
- **cMDFs** (see Figure 5, arrow 2) and (Figure 6, arrow 3)
- **Teams** (see Figure 5, arrow 2)
- **Users** profiles (see Figure 5, arrow 2)
- **Products** (see Figure 5, arrow 2)

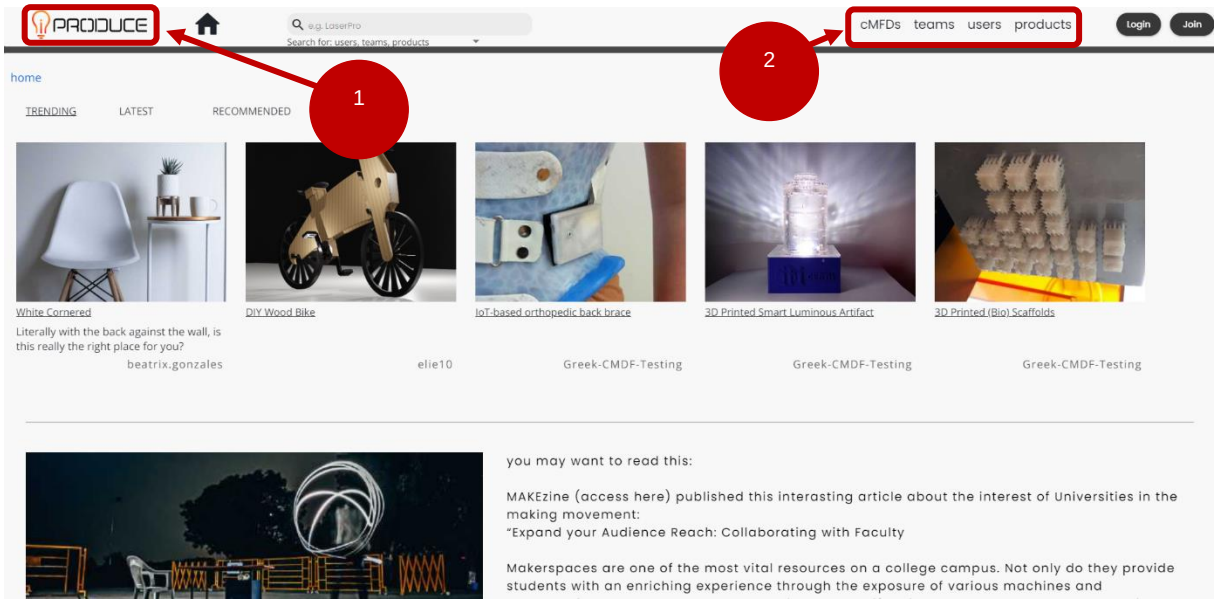

Figure 5 Marketplace – Home Page

Figure 6 Marketplace – Home Page, cMDFs Tab

3.2.1.1. Search functionality

The **Search Field** (see Figure 7, arrow 4) allows the user to search for OpIS internal information (such as users, products, teams, cMDFs, etc.) and for information about machinery available in fablabs, that has been collected by the maker community (fablabs.io).

The user can select between the two options from the drop-down arrow. The links redirect the users to the corresponding page (fablab page in fablabs.io or Marketplace internal page).

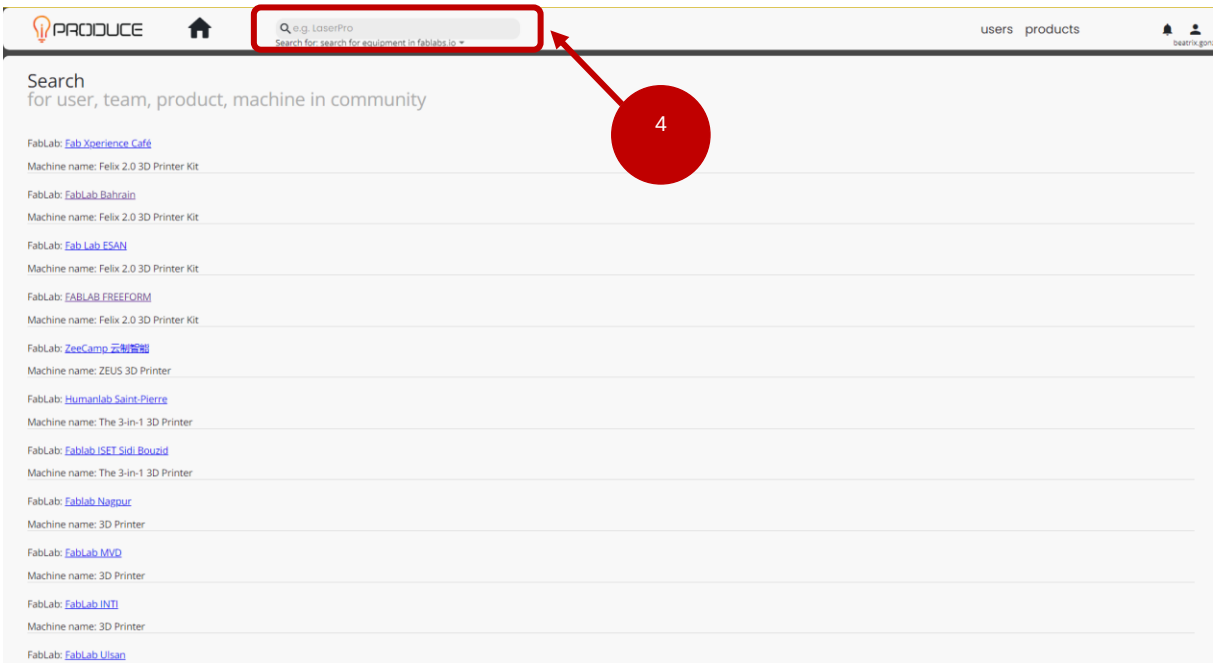

Figure 7 Marketplace – Home Page, Search Functionality

3.2.2. Registered User's Space

The user can access via the **User's Avatar Icon** (see Figure 8, arrow 5).

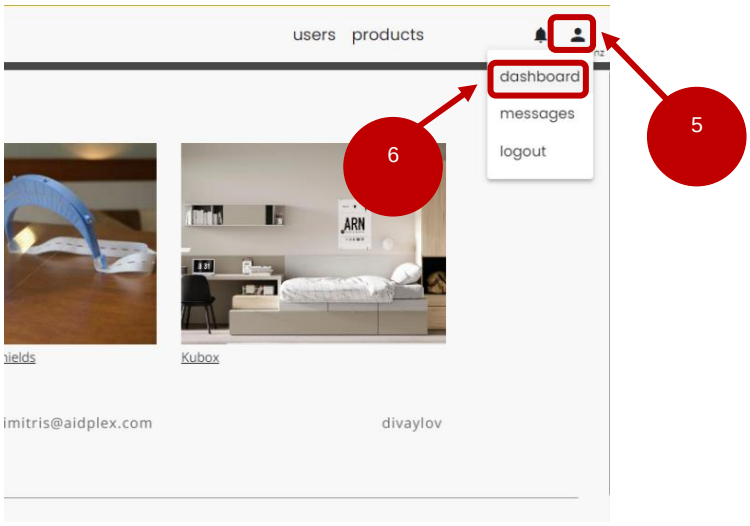

Figure 8 Marketplace – Dashboard Button

The user's **Dashboard** is the central point for navigation to the main functionalities offered by the Marketplace (see Figure 8, arrow 6).

The **Notifications** area (see Figure 9, arrow 7) is a log of the main events in which the user is "involved" that includes:

- Changes in the portfolio of the user
- Invitations to join new teams
- Answers to surveys posted by the user

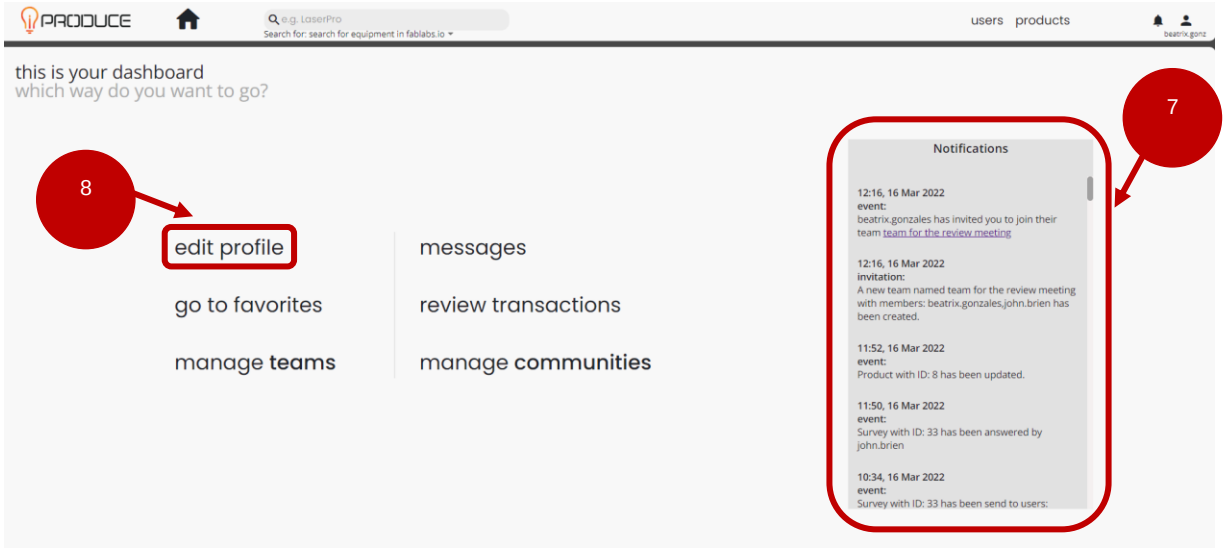

Figure 9 Marketplace – User's Dashboard

3.2.3. Edit Profile

The users can access their profile page and edit the information that is made public, by pressing the **Edit Profile** text button (see Figure 9, arrow 8). They can populate their portfolio of products by adding new products in their collection, by pressing the **+** button (see Figure 10, arrow 10).

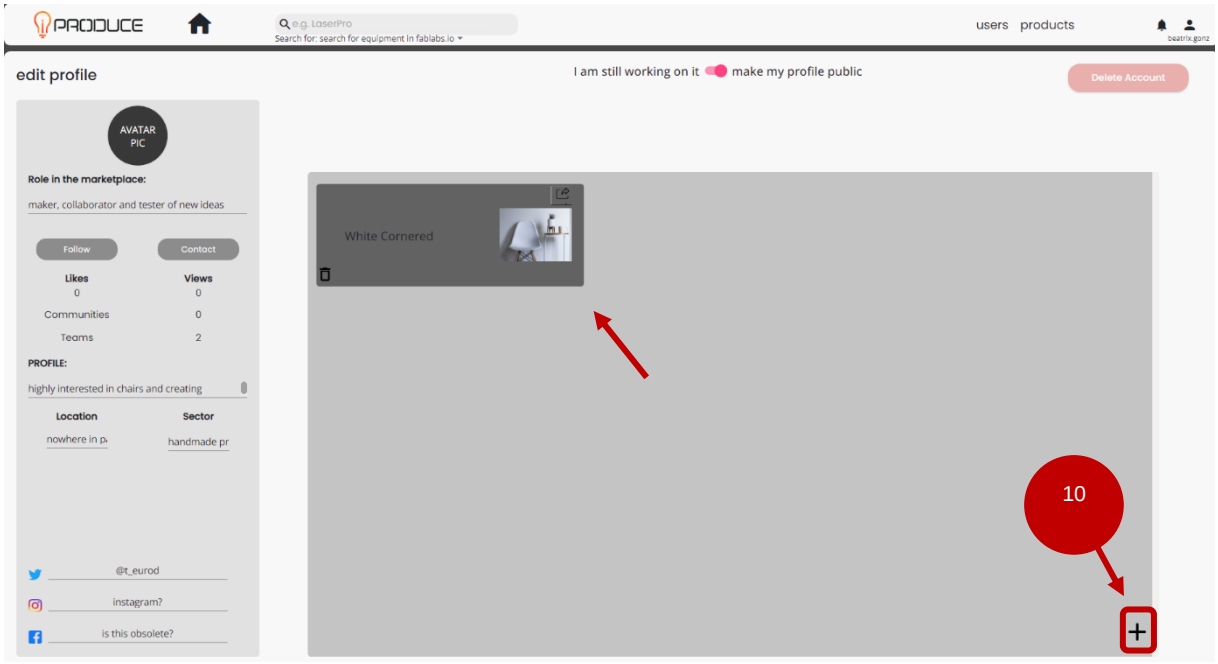

Figure 10 Marketplace – Profile Page

3.2.4. Adding a New Product

Products are described by 3 main tabs (accessible from the mid-top of the page): **Product Description, Customization Options, Survey Creation Tool** (see Figure 11, arrow 11).

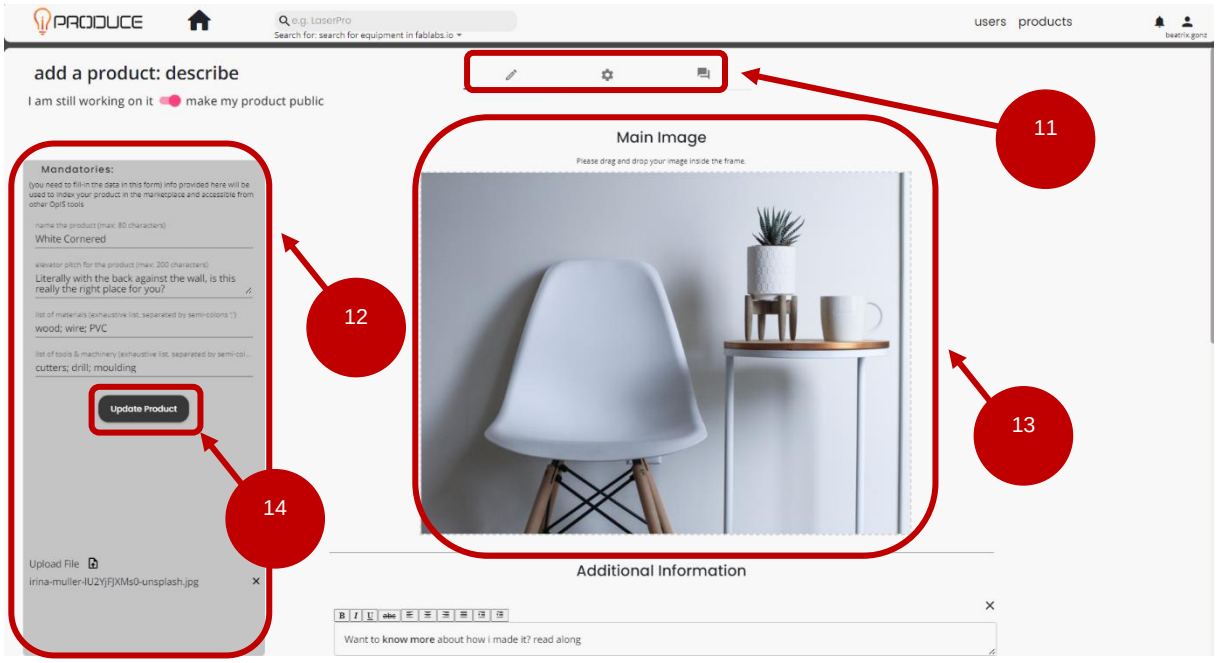

Figure 11 Marketplace – Product Page (1)

Each product is stored **if** the **Mandatories** area (see Figure 11, arrow 12) is filled-out, a **Main Image** has been added by drag-n-drop (see Figure 11, arrow 13) and the **Update Product** text button is pressed (see Figure 11, arrow 14).

Users can describe their product by adding any number of images and text, using the buttons at the bottom of the page (see Figure 12, arrow 15).

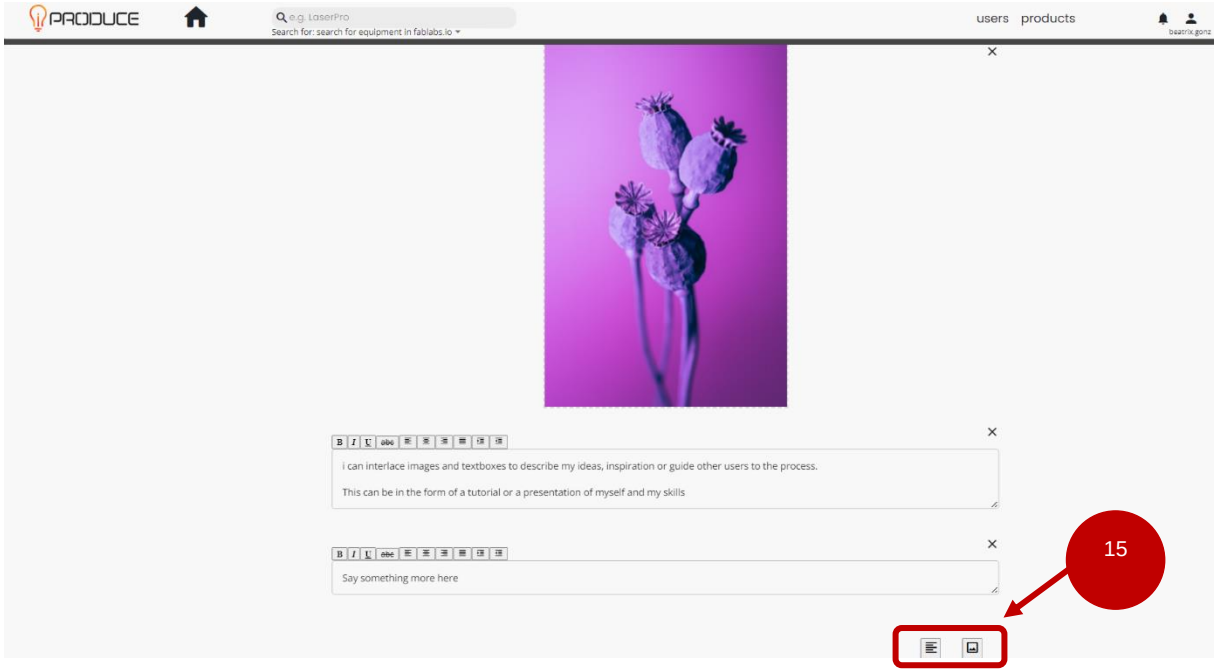

Figure 12 Marketplace – Product Page (2)

Customization Options are given in the form of free-text and presented in the second tab: (see Figure 13, arrow 16).

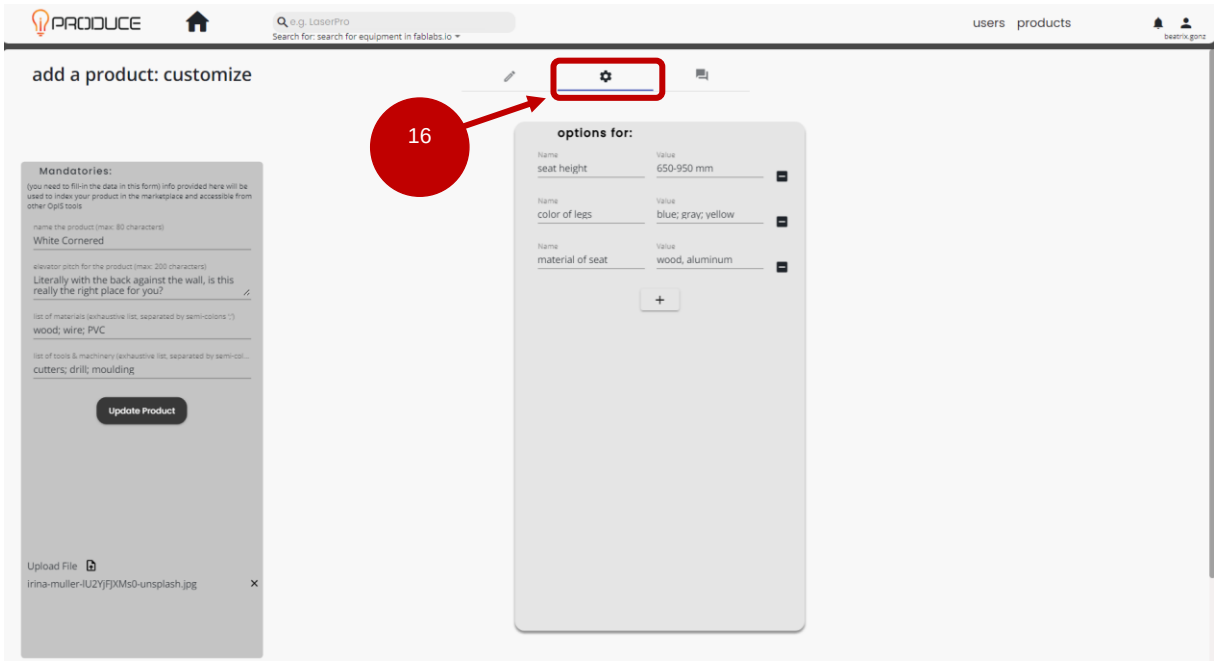

Figure 13 Marketplace – Product Page (3)

3.2.4.1. Surveys

Survey Creation Tool are a tool used to investigate certain product features, by sending questionnaires to two channels: teams inside the Marketplace, create tweets from the questions (see Figure 13, arrow 17).

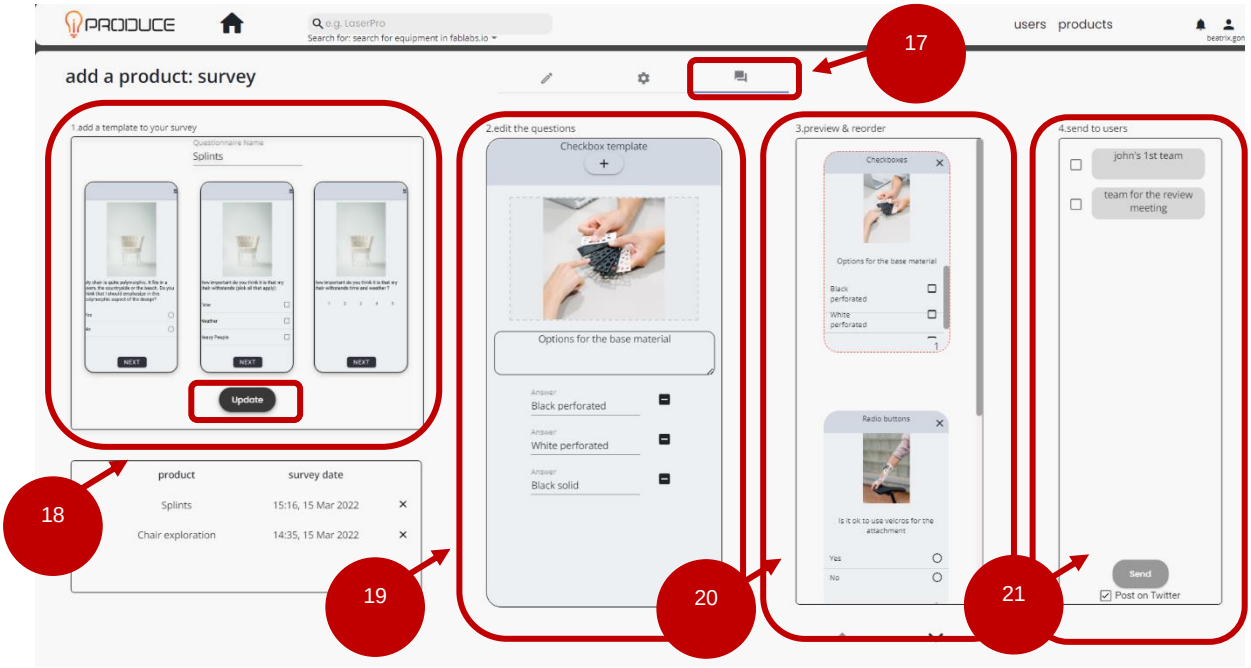

Figure 14 Marketplace – Surveys

The workflow to create a new survey is the following:

1. The user picks a template from area 1, by clicking (see Figure 13, arrow 18).
2. Fills in the respective slide by adding image and text in area 2 (see Figure 13, arrow 19)
3. Reorders the slides by the arrows (bottom of) area 3 (see Figure 13, arrow 20)
4. Creates/ updates the survey by clicking **Create** or **Update** in area 1 (see Figure 13, arrow 18).
5. Selects a survey from the list (area 1) (see Figure 13, arrow 18).
6. Selects the teams (the recipients of the questionnaire are the members of the corresponding teams) in area 4 (and chooses whether to post on tweeter in addition to sending it to the mobile app) (see Figure 13, arrow 21).

The corresponding users receive the new survey on the **iPRODUCE Mobile-App** (see corresponding subsection 3.3).

3.2.4.2. Messages

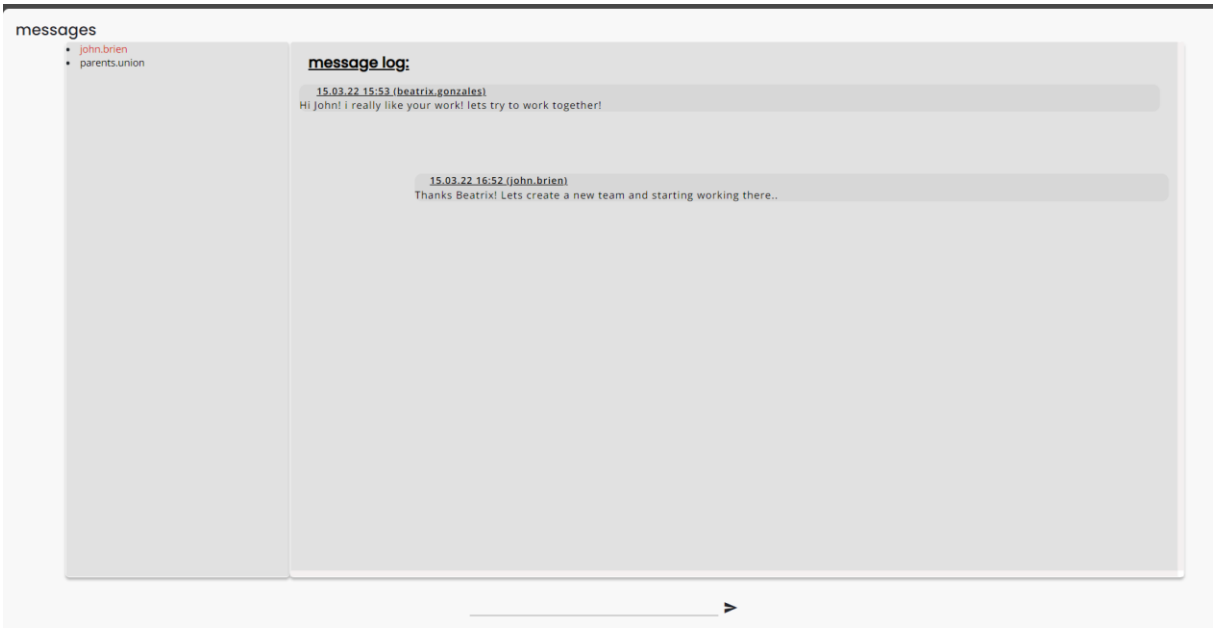

Figure 15 Marketplace – Messages

Direct (one on one) messaging with registered Marketplace users, who have “Contacted” this user.

Users are able to **Contact** one another by clicking the corresponding button in the users’ page (see Figure 16, arrow 22).

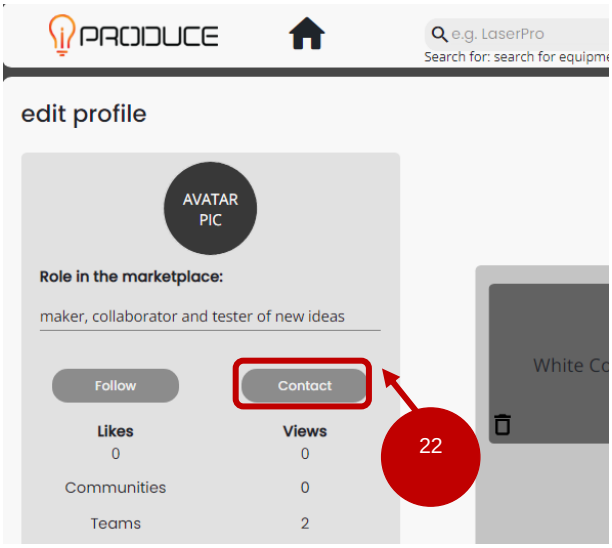

Figure 16 Marketplace – Contact

3.2.5. Teams

Teams are a way for users to collaborate with other users of the OpIS platform. They create a new entity in the OpIS platform, with a shared space inside the Marketplace. The way to create a new team is to fill-out the form on the right (see Figure 17, arrow 23). This will send out an invitation to the added users (accessible from the corresponding **Notifications** area in their dashboards). Once they accept it, they

become members of the team and the “team” is added to their teams-space in the left area (see Figure 17, arrow 24).

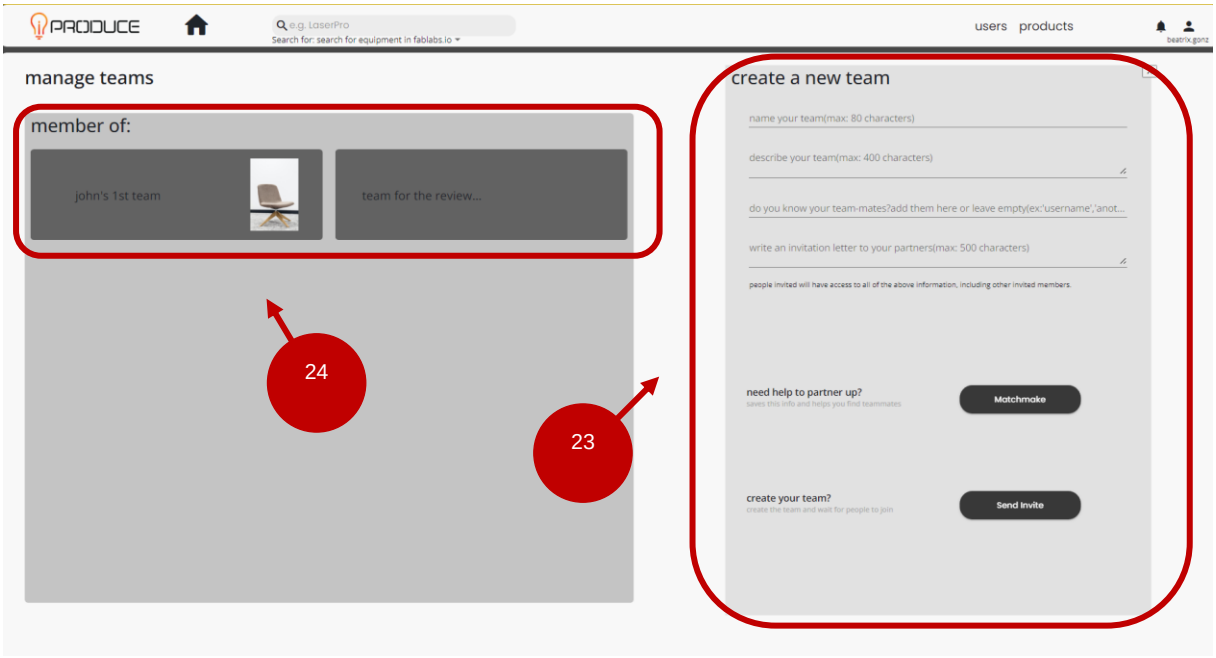

Figure 17 Marketplace – Teams Page (1)

Teams enable users to create new products collaboratively, by adding them to the team’s profile page. Their profile can be private or public, by adjusting the corresponding button (see Figure 18, arrow 25) and by exchanging messages in the team’s private channel in **Message Log** (see Figure 18, arrow 26).

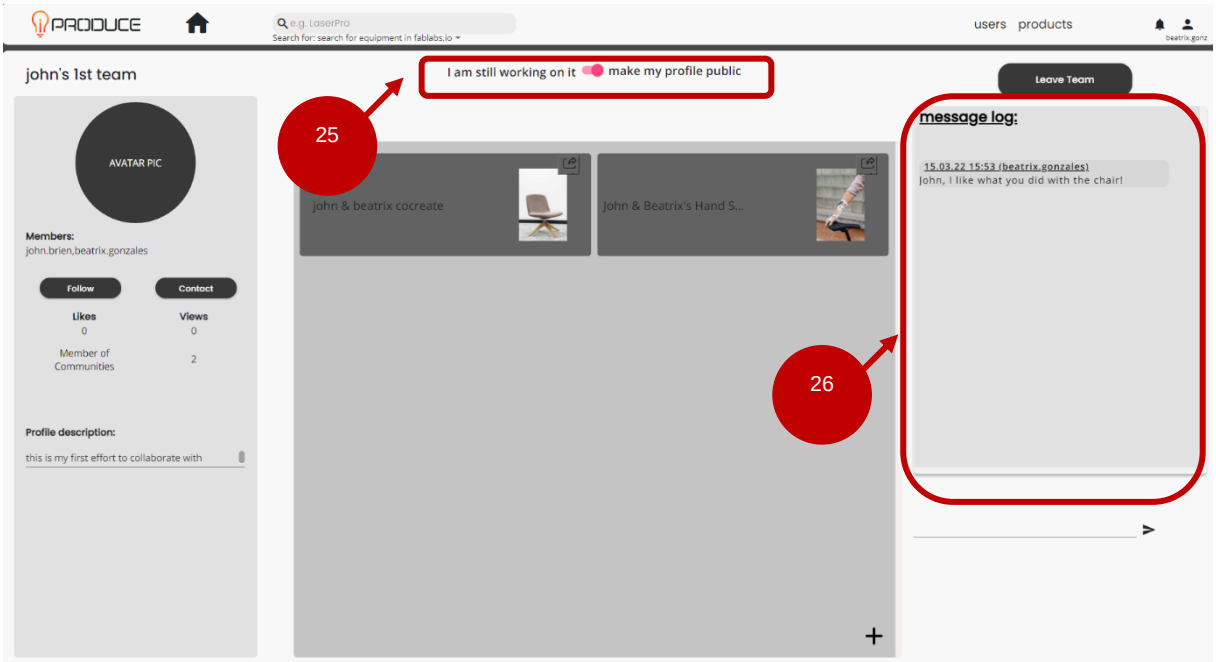

Figure 18 Marketplace – Teams Page (2)

3.3. Mobile Application

The **Mobile Application** is available for download for Android on Play Store. The app name is: **iProduce** (submitted by European Dynamics).

The functionalities presented here, have been developed based on the Use Cases described in D6.3. The survey recipient has the option to select a survey to answer from the menu. Once a survey is selected the user gets a summary of the survey to decide whether they want to participate. The slides are displayed in the sequence set by the survey creator (Figure 19). A final confirmation is asked before submission of the results to the backend (in the Marketplace).

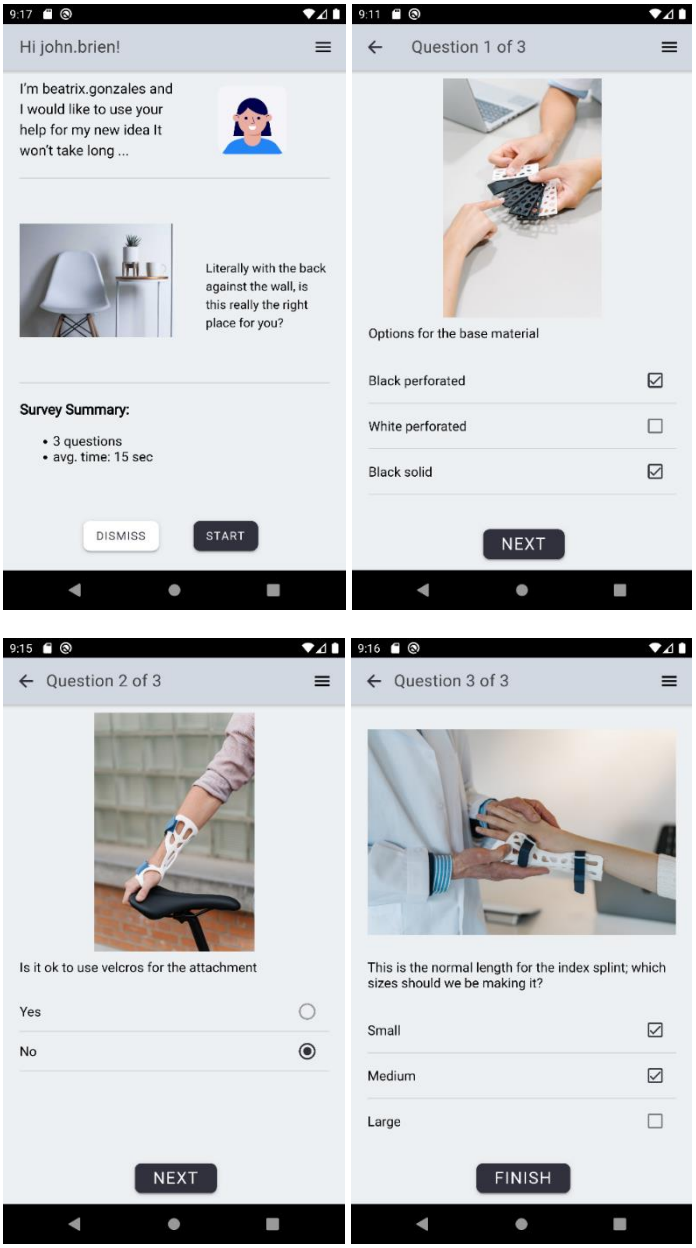

Figure 19 Mobile Application – Survey created in the Marketplace

3.4. Matchmaking

The access in the **Matchmaking** is presented in Figure 20. This tool provides a multi-criterion federated functionality by allowing iPRODUCE users to search for specific capabilities, skill, profiles, created products, etc. The main menu of the Matchmaking is demonstrated in Figure 21.

Figure 20 OpIS Dashboard – Tools Menu, Matchmaking

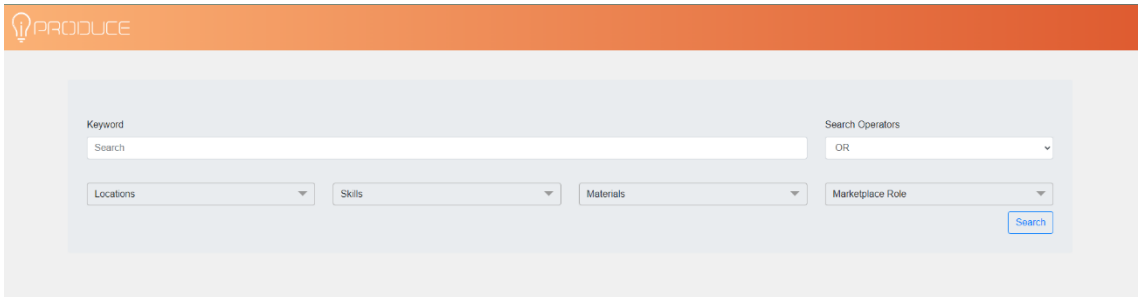

Figure 21 Matchmaking – Home Page

3.5. IPR Authoring Tool

The **IPR Authoring Tool** application is available from the OpIS Dashboard through the user's web browser (Figure 22). From the **iProduce Tools** top menu users can select the **IPR Authoring Tool** entry and access the appropriate page (see Figure 2, arrow 1).

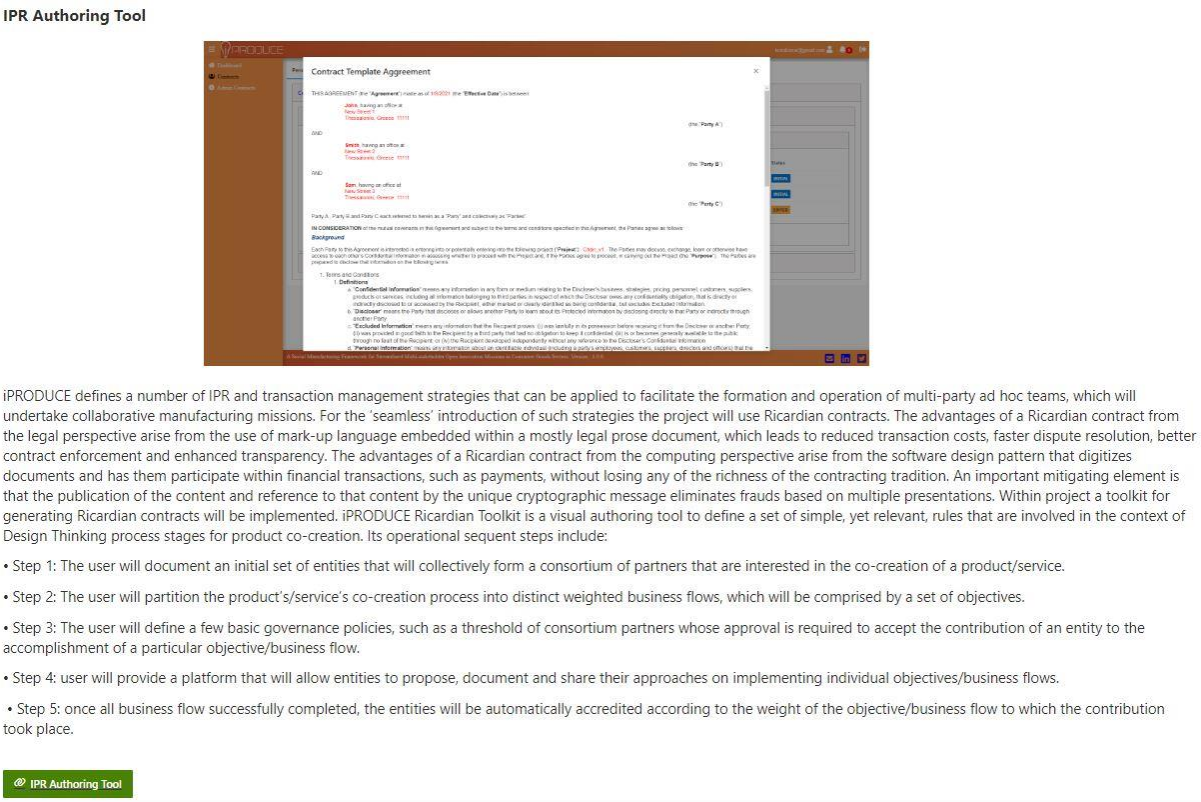

Figure 22 OpIS Dashboard IPR Authoring Tool Page

Users are presented with the central page of the IPR Authoring Tool. A brief overview and description of the available functionalities is provided in the same page. In addition, at the bottom of the page users can find the **IPR Authoring Tool** button which leads to the endpoint which contains the live version of the tool.

After the creation of a **Team Product** (via Marketplace), all the involved users will be notified through email to sign a new NDA contract. This process can be fulfilled through the **IPR Authoring Tool.**

The IPR Authoring Tool can be accessed through the **Landing Page** and through the iproduce-tools.iti.gr/ipr/ URL respectively. If the user has already logged in Landing Page, then he has the permission to access the tool. If not, the login page will appear to provide his credentials.

Users are presented with the central page of the **IPR Authoring Tool.** All the contracts of the user appear in the main screen along with their main functionalities of the tool.

The **Status** of each contract appear on the right side of the screen (see Figure 23, arrow 1), containing the information whether a contract is Pending, Rejected and Deployed.

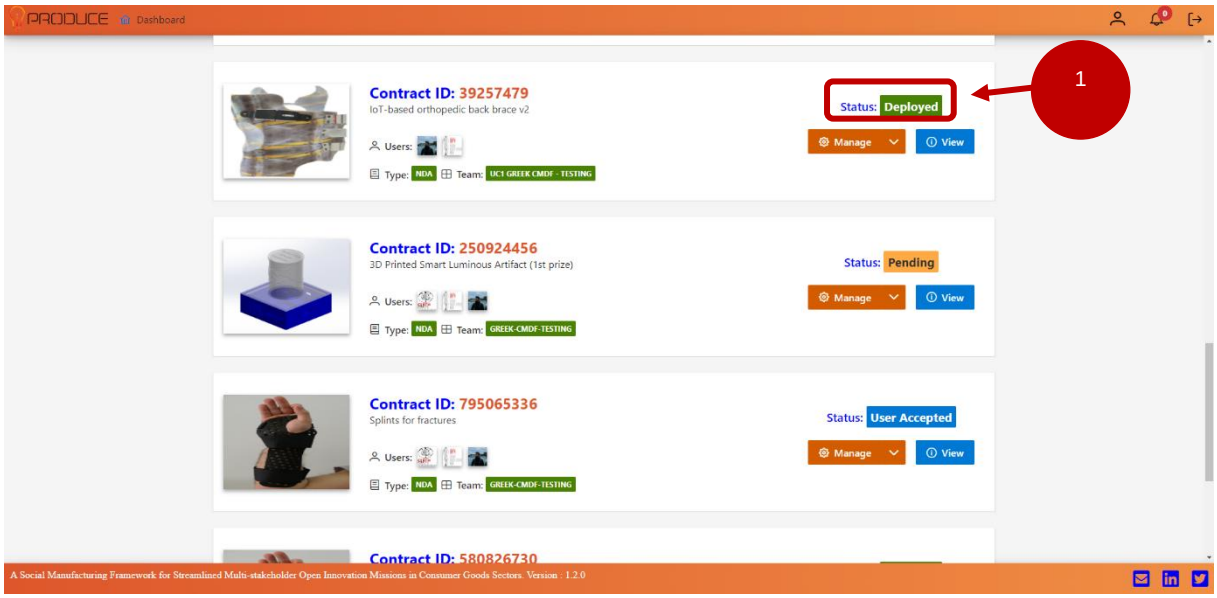

Figure 23 IPR Authoring Tool – Main Home Page, Contracts

By clicking on a **Partner Name** (Figure 24, arrow 2) (e.g. Aidplex) more details about the partner (e.g. Email, Location, Role, and Photo) appear (Figure 25).

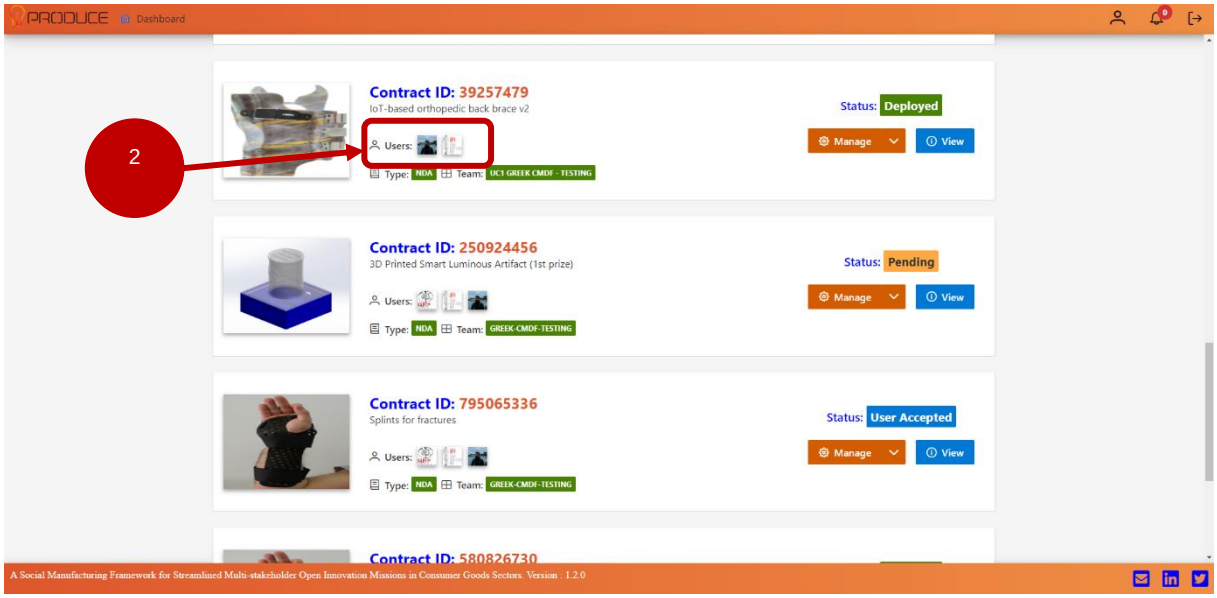

Figure 24 IPR Authoring Tool – Main Home Page, Users

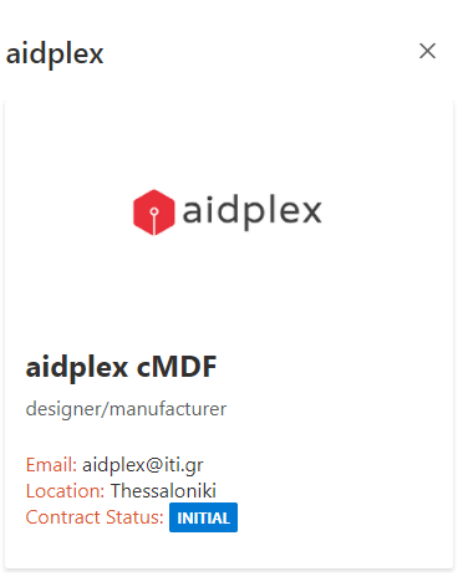

Figure 25 IPR Authoring Tool – User Details

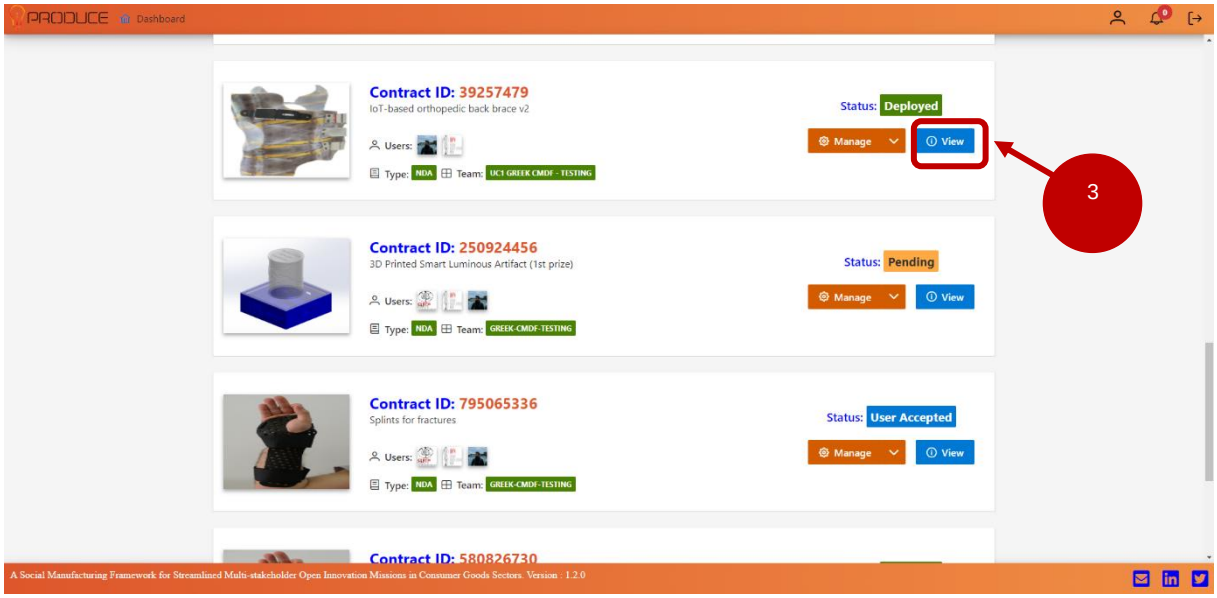

Figure 26 IPR Authoring Tool – View Contracts

By clicking **View Button** (see Figure 27, arrow 3) a Dialog box with the Template Ricardian Contract created by the IPR Authoring Tool appears (Figure 29).

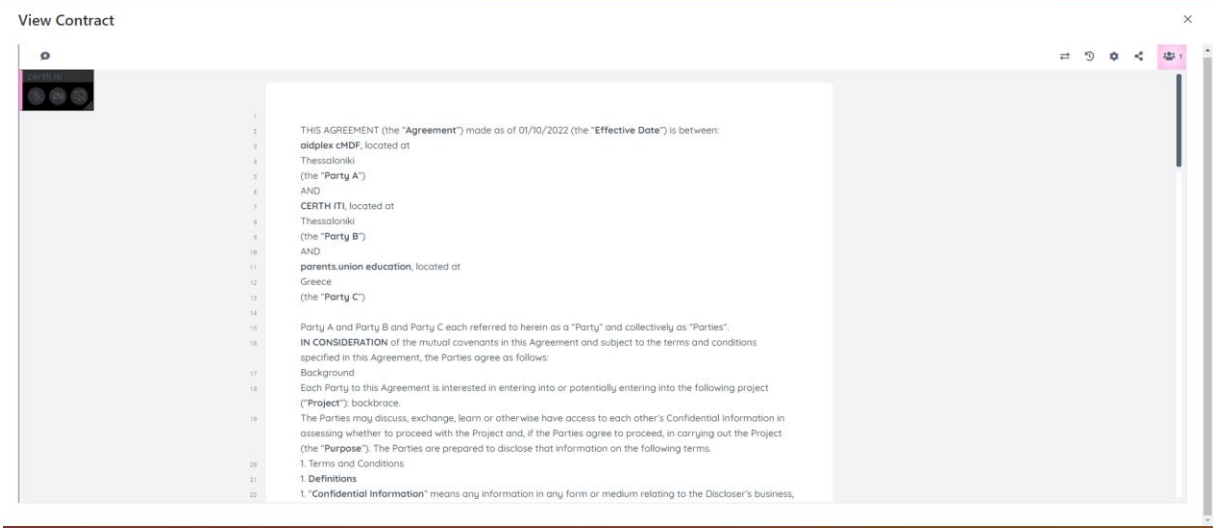

Figure 27 IPR Authoring Tool – Show Contract Component

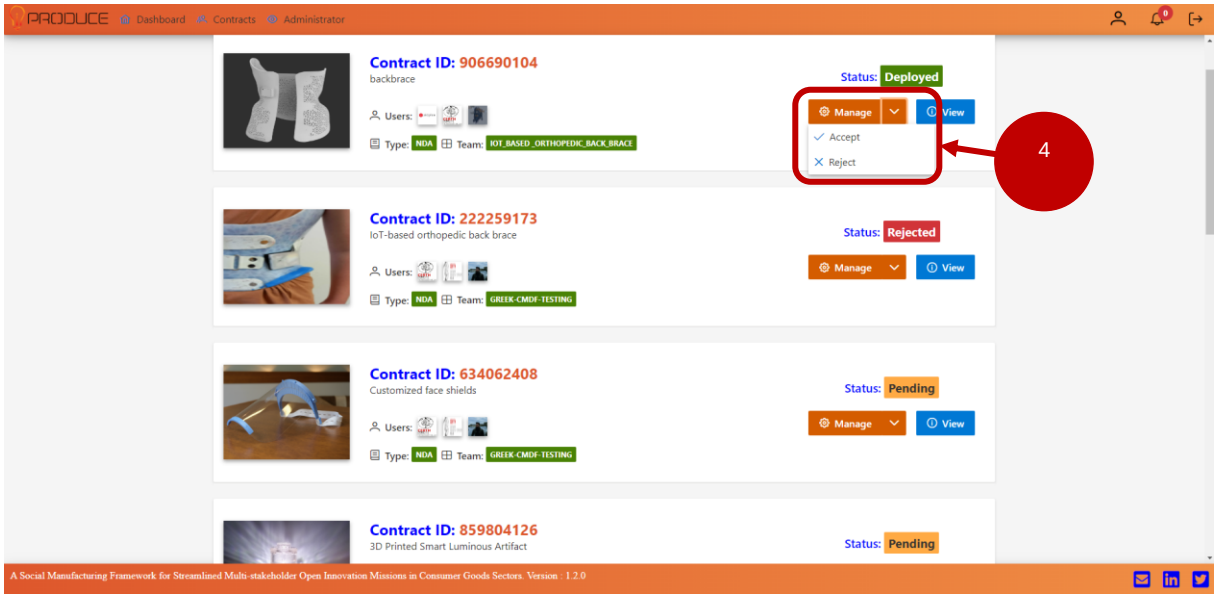

Figure 28 IPR Authoring Tool – Manage Contracts

By clicking at the **Down arrow of Manage Button** (Figure 28) component the Accept and Reject sub-Buttons appear. The user accepts the Ricardian Contract by clicking the Accept sub-Button. In case of success, a pop-up notification message appears informing the user that the contract has been successfully accepted (Figure 29). If the Ricardian Contract is accepted by all the users, then it deploys in the Block chain automatically.

Figure 29 IPR Authoring Tool – Accept Contract Notification

By clicking at the **Manage Button** component a Dialog box with the Template Ricardian Contract created by the IPR Authoring Tool appears. The user can edit the initial set of entities of the contract and update it. Moreover, through the edit contracts page, the user can create video calls, share the

screen and chat with the other involved to the contract users. Furthermore, the user can export the contract to various file formats (ex. Html and plain text). Finally, in the edit contracts page, the previous revisions of the contract are depicted. If a user edits a contract, all the involved users must accept the contract again. In case of a successful edit, a pop-up notification message will appear to inform the user that the contract has been edited successfully.

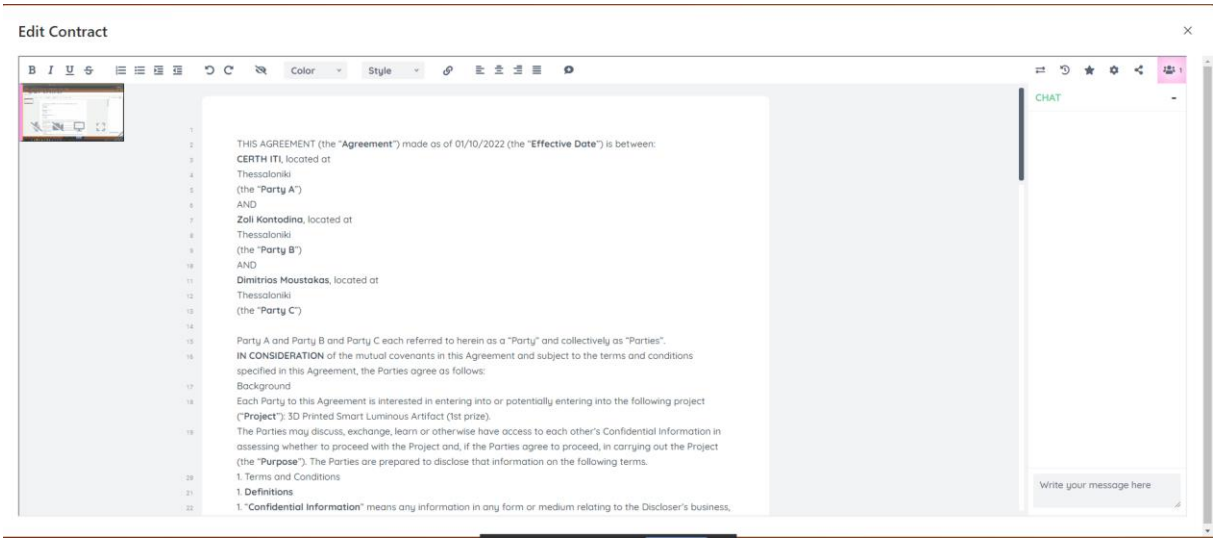

Figure 30 IPR Authoring Tool – Edit Contract Component

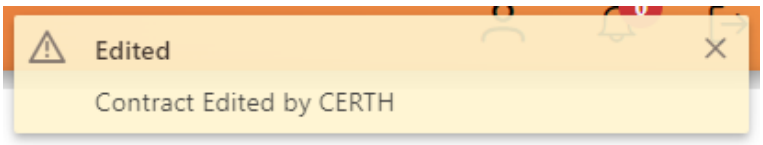

Figure 31 IPR Authoring Tool – Edit Contract Notification

By clicking at **Reject** sub-Button component, a Dialog Box appears where the user can insert the reason of this Ricardian Contract rejection. In case of a successful contract rejection, a pop-up notification message will appear to inform the user that the contract has been rejected.

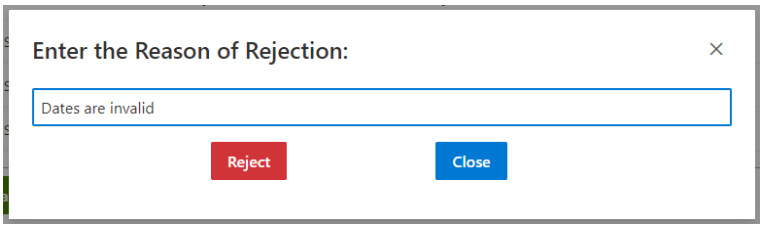

Figure 32 IPR Authoring Tool – Reject Contract Dialog

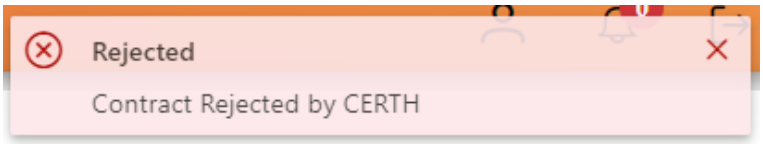

Figure 33 IPR Authoring Tool – Reject Contract Notification

By clicking the Create Contract button (Figure 29), a table component appears depicting the user's team products. By selecting a product from the table, the user has the functionality to create a new Ricardian Contract for the respective product. After the selection is done by the user a Dialog box appears prompting the user to insert the type of the Contract (ex NDA). Clicking at the **Create Contract** button (Figure 33) the new Ricardian Contract is created.

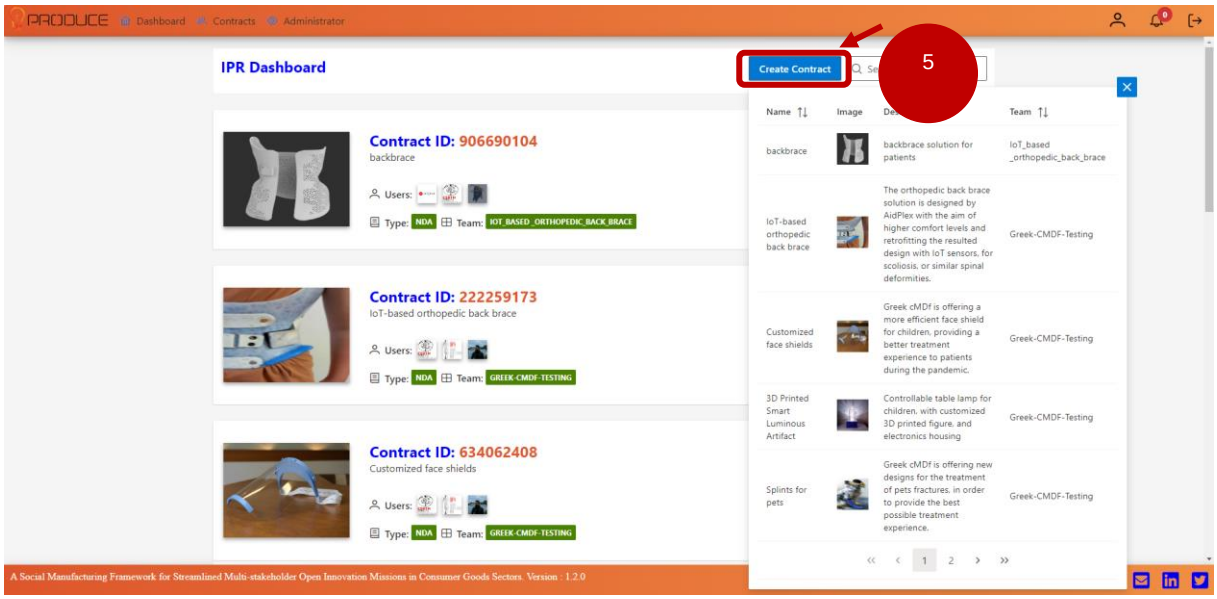

Figure 34 IPR Authoring Tool – Create Contract

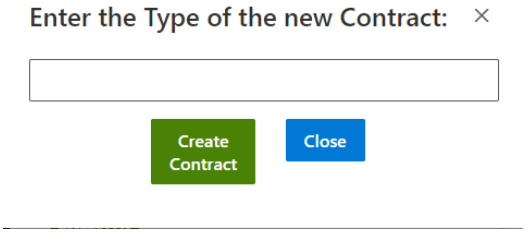

Figure 35 IPR Authoring Tool – Type of Contract

In case of success, a pop-up notification message appears informing the user that the new contract has been successfully created (Figure 29).

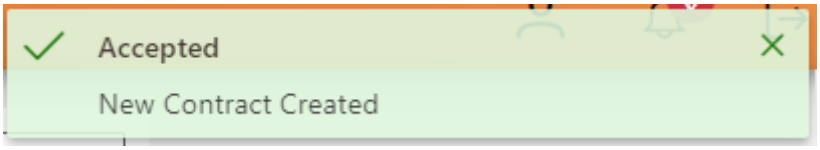

Figure 36 IPR Authoring Tool – New Contract Notification

3.6. AR/VR Toolkit

The **AR/VR Toolkit** collection of applications is available from the OpIS Dashboard through the user's web browser. From the **iProduce Tools** top menu users can select the **"AR/VR Toolkit"** entry and access the appropriate page (see Figure 37, arrow 1).

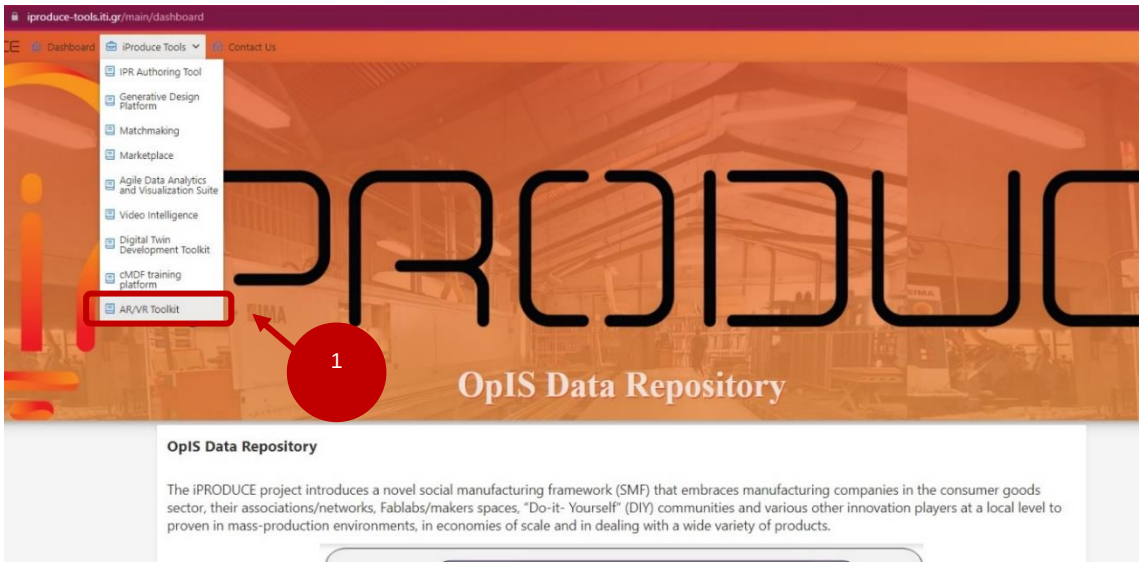

Figure 37 OpIS Dashboard AR/VR Toolkit Page

Users are presented with the central page of the AR/VR Toolkit. A brief overview and description of the available tools and their functionalities is provided in the same page.

In addition, at the bottom of the page users can find appropriate buttons that serve as an access point leading to endpoints and install files for each version included in the AR/VR Toolkit ecosystem of applications (Figure 38, arrow 2).

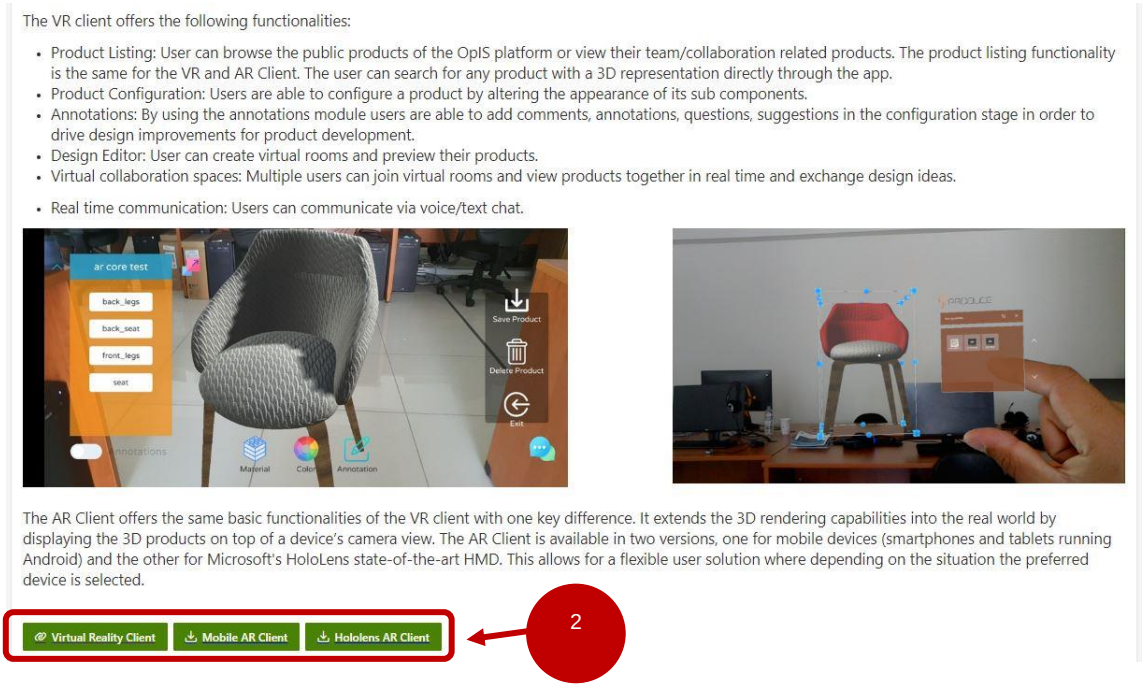

Figure 38 AR/VR Toolkit – Version Access Points

3.6.1. VR Tool

The VR version of the toolkit is provided to the users via an endpoint inside their web browsers. By selecting the **Virtual Reality Client** button from the entries in the central AR/VR Toolkit page, users are forwarded to the applications endpoint.

Depending on their authentication status (logged in or not in the platform), users are prompt with a login panel.

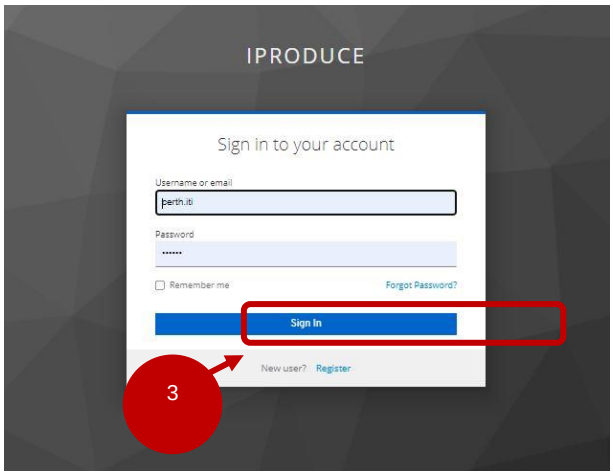

Figure 39 AR/VR Toolkit – iPRODUCE Login Prompt

After completing the login info input fields and clicking the **Sign In** button or if the user is already authenticated using the SSO services for accessing other parts of the platform, the VR Tool's loading page is presented (Figure 39, arrow 3).

Figure 40 VR Tool – Loading Page

Once the loading page is finished the user is greeted with the application's hub (see Figure 41).

Figure 41 VR Tool – Available Menu Options

The available menu options are presented to the user via a left side positioned panel.

Selecting the **"Products"** (Figure 41, arrow 1) menu entry, users are lead to the available products page, which provides an alternative view of the platform's **Marketplace**. By clicking and dragging their mouse inside the Products page, users can browse through the available collection of products.

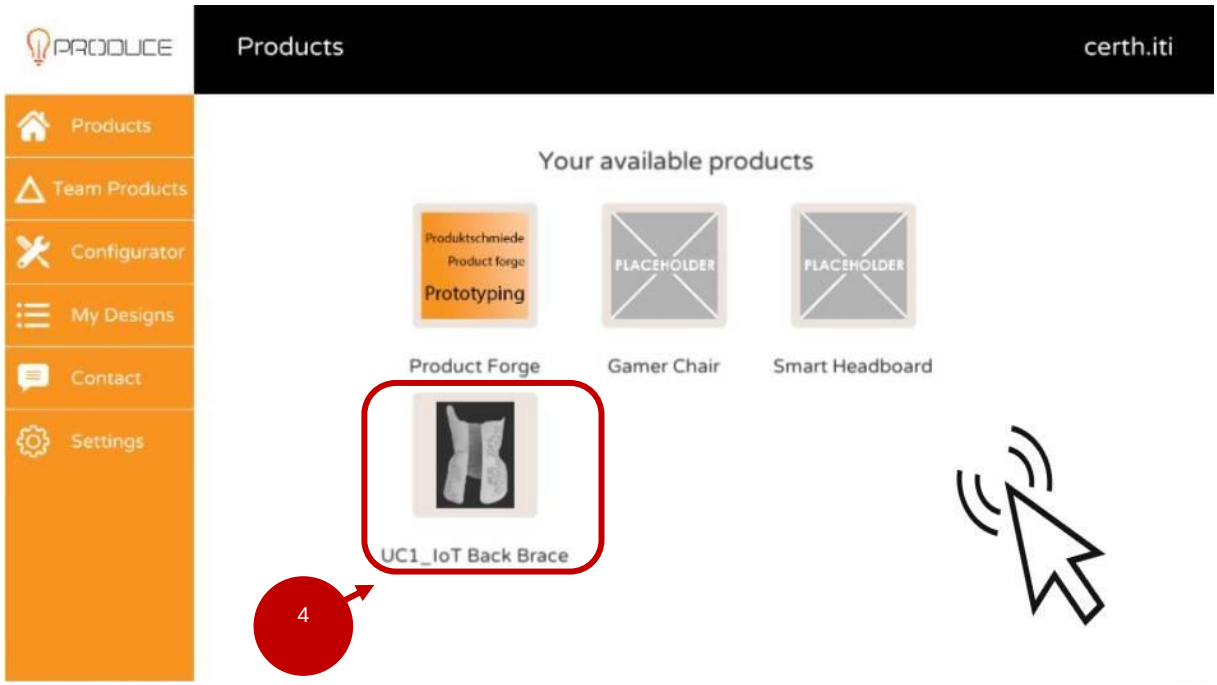

Figure 42 VR Tool – Products Menu

Selecting a Product thumbnail entry in the scrolling collection of elements opens the Product Description panel.

Figure 43 VR Tool – Product Description Panel

In this Panel users can see the current selected product's details along with a photo of it in the form of a thumbnail.

Users can add a product to their personal collection of products via selecting the **Add to your products** button under the product's detail view (see Figure 43, arrow 5).

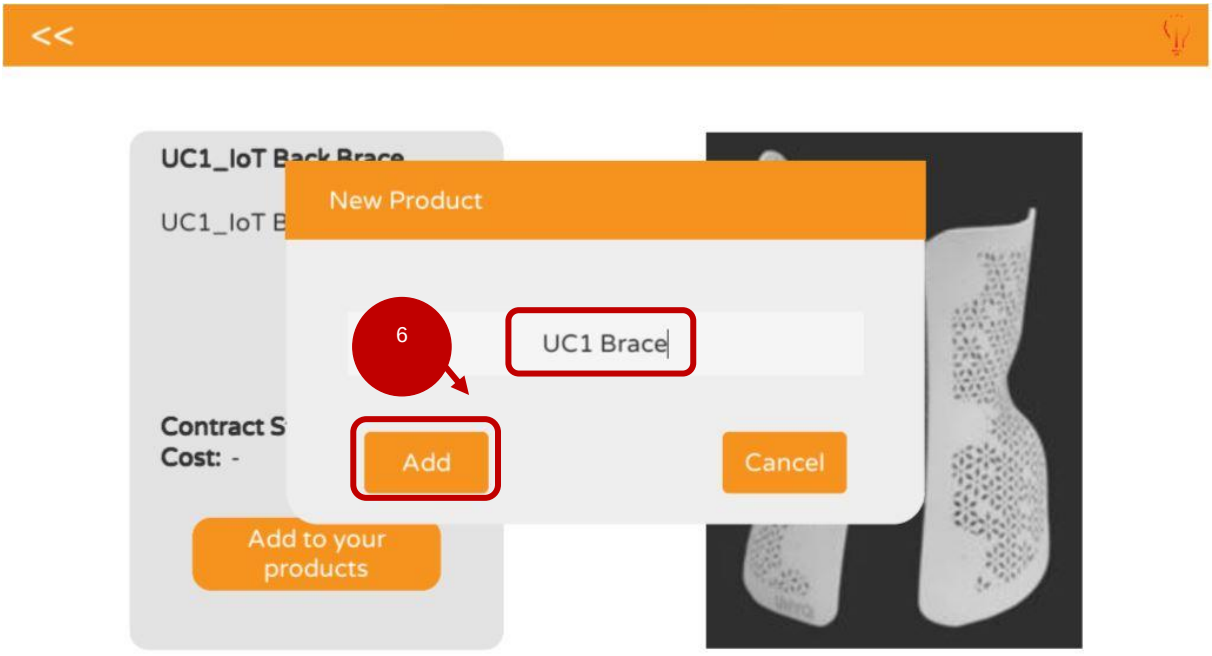

Figure 44 VR Tool – Add New Products Panel

After filling the input field with the desired name and by clicking the **Add** button the product is added to the user's personal collection (see Figure 44, arrow 6). The user is informed with an appropriate notification message at the top of VR Tool's screen (Figure 45).

Figure 45 VR Tool – Product Added Notification Message

In **Team Product's** (Figure 41, arrow 2) menu option in the central menu of the VR Tool, users can find the available **Team Products** found inside the platform's **Marketplace.**

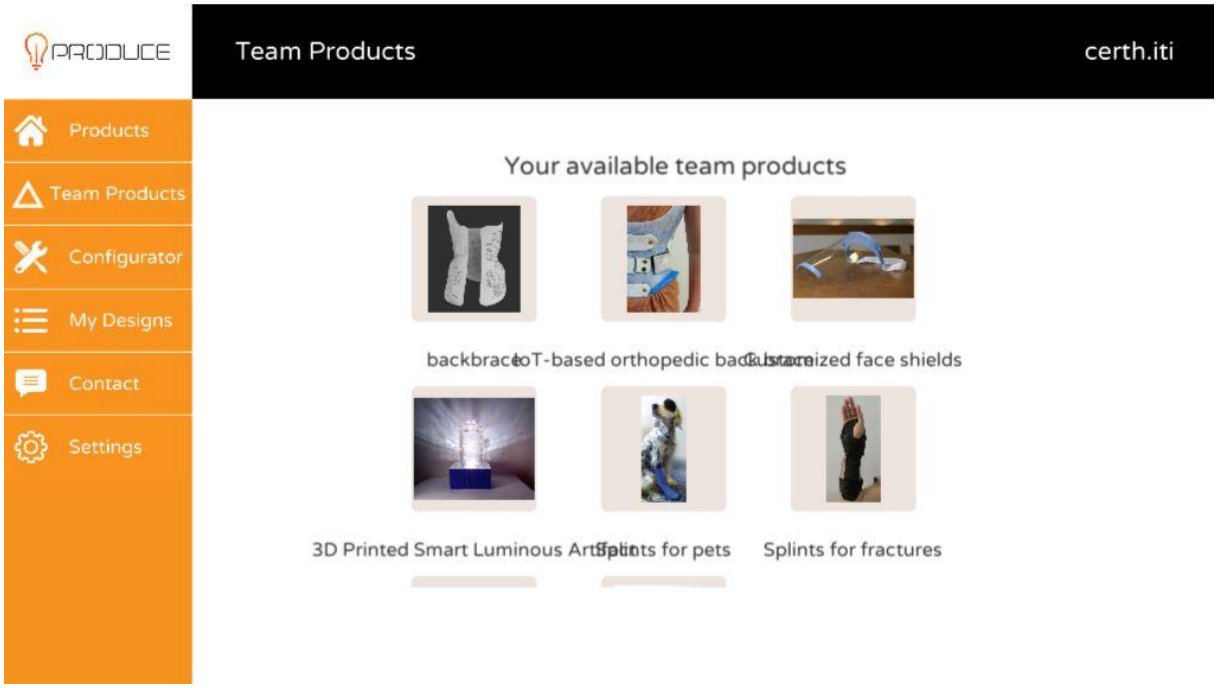

Figure 46 VR Tool – Team Products Page

Users can expect the exact same process to be followed for a product's details inspection and for adding a new product.

Products or **Team Products** added by a user, can be found in the **Configurator** (Figure 41, arrow 3) option via the central page of the VR Tool.

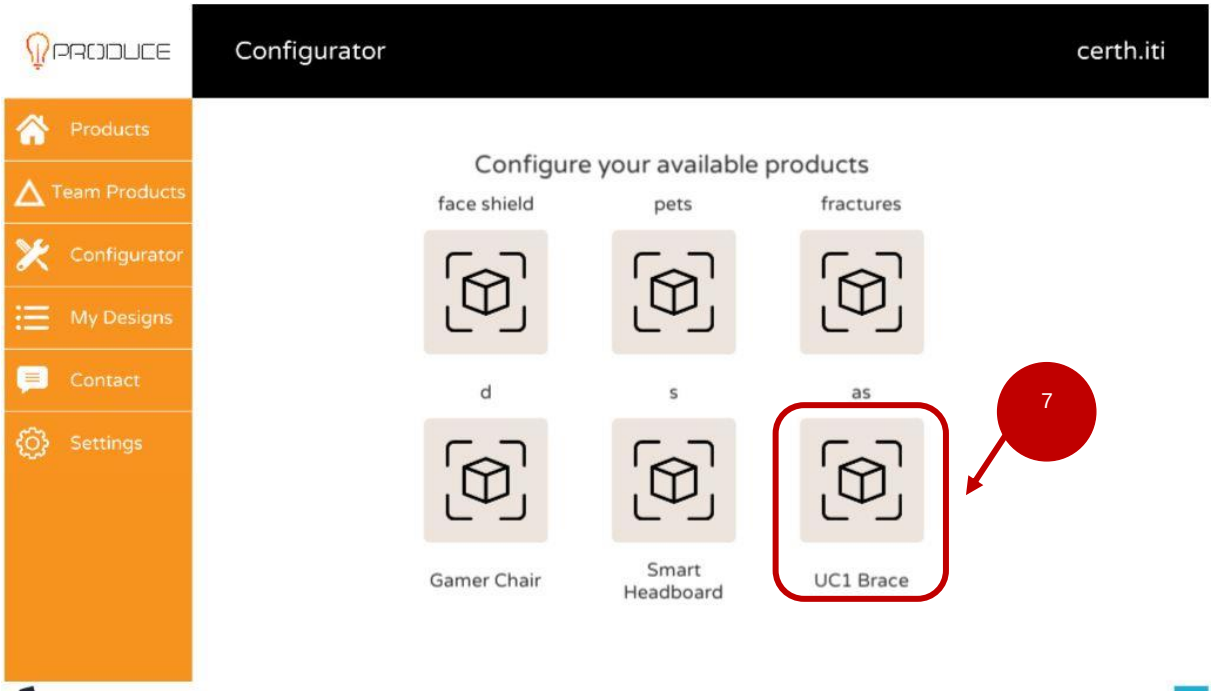

Figure 47 VR Tool – Configurator Page

The **Configurator** page serves as the personal collection of products added to a user's profile for further personalization and customization.

Once a Product entry is selected from the scrolling collection of items by the user (see Figure 47, arrow 7), the loading process begins and is presented to the user through the appropriate panel (Figure 48).

Figure 48 VR Tool – Configurator Loading Process

Once the loading process's completion status reaches 100%, the Configurator mode is enabled and presented to the user.

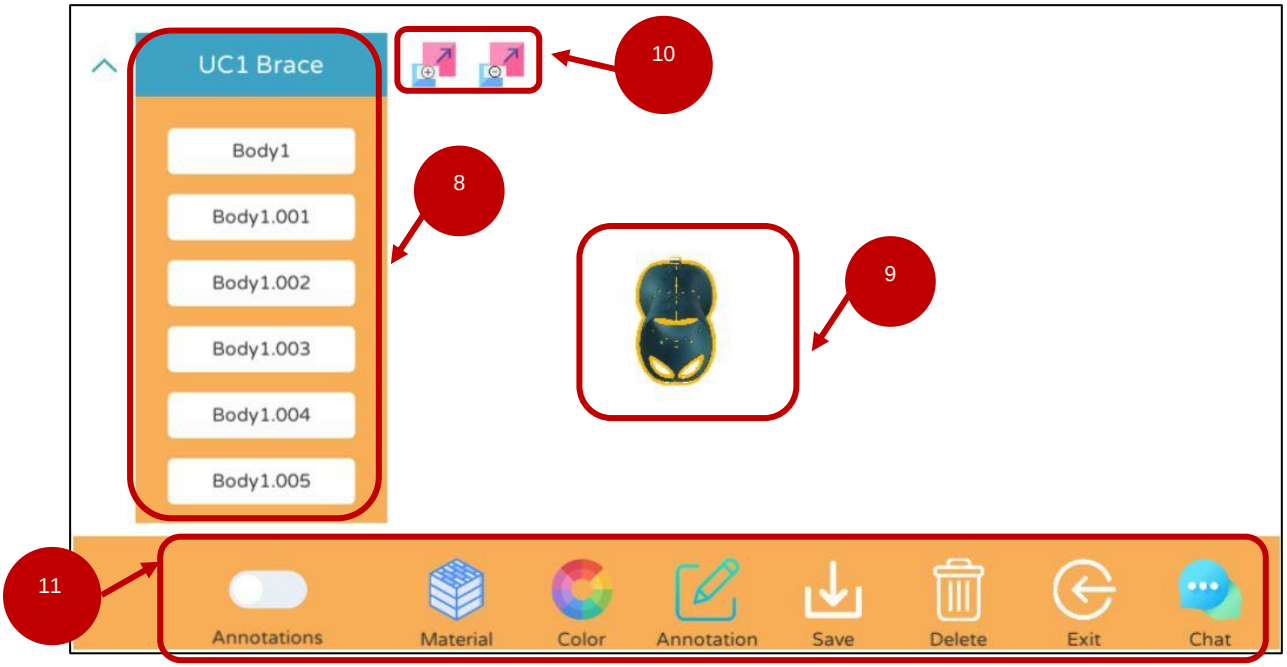

Figure 49 VR Tool – Configurator Mode

Inside the Configurator Mode's page the **Product Parts List** (Figure 49, arrow 8), **Loaded Product** (Figure 49, arrow 9), and **Configurator Tools** (Figure 49, arrow 10), functions can be found.

The **Loaded Product** appears centered in the user's view. While **holding** the **right click** and moving their mouse, users can rotate their view around the product. The mouse **scroll wheel** is used to **zoom in** or **zoom out.**

The **Product Parts List** contains the detected parts that comprise the product's 3D model. Users can select their desired product part for further customization from the list.

The Configurator Tools contain the following list of functionalities:

1. **Annotations Toggle:** Switch on/off the appearance of created product annotations
2. **Material Button:** Once clicked the available material choices for a particular product is presented
3. **Color Button:** Once clicked the available color choices for a particular product is presented
4. **Annotation Button:** Prompts the user to create a new product part annotation
5. **Save Button:** Saves and uploads user customisations to the Data Repository
6. **Delete Button:** Deletes the current selected Product from the user's Configurator collection
7. **Exit Button:** Exits the configurator mode
8. **Chat Button:** Opens the user chat panel
9. **(+)(-) Scaling Button:** Once clicked it makes the product appear bigger/small respectively.

Once the user has selected a product part from the list and the **Material button** is clicked, the available material options appear. The same functionality can be found via the **Colors button** for choosing a desired color.

Figure 50 VR Tool – Material Selection

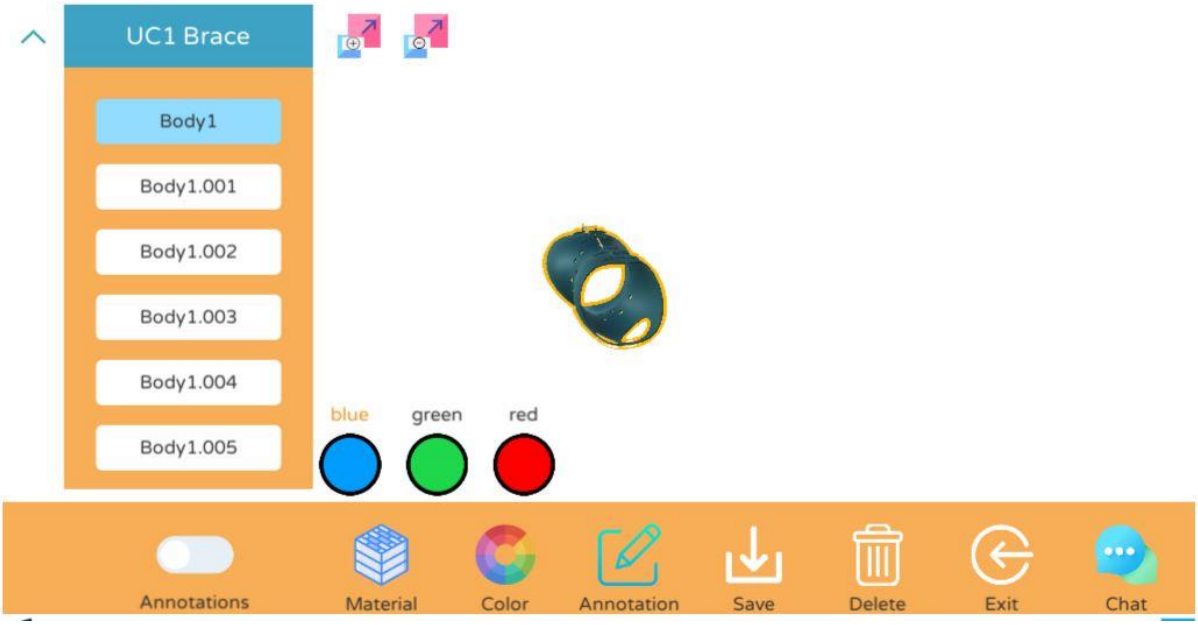

Figure 51 VR Tool – Color Selection

Using the **Annotation** button users can fill the Input Field that is presented and annotate with text the selected product part (Figure 52, arrow 11).

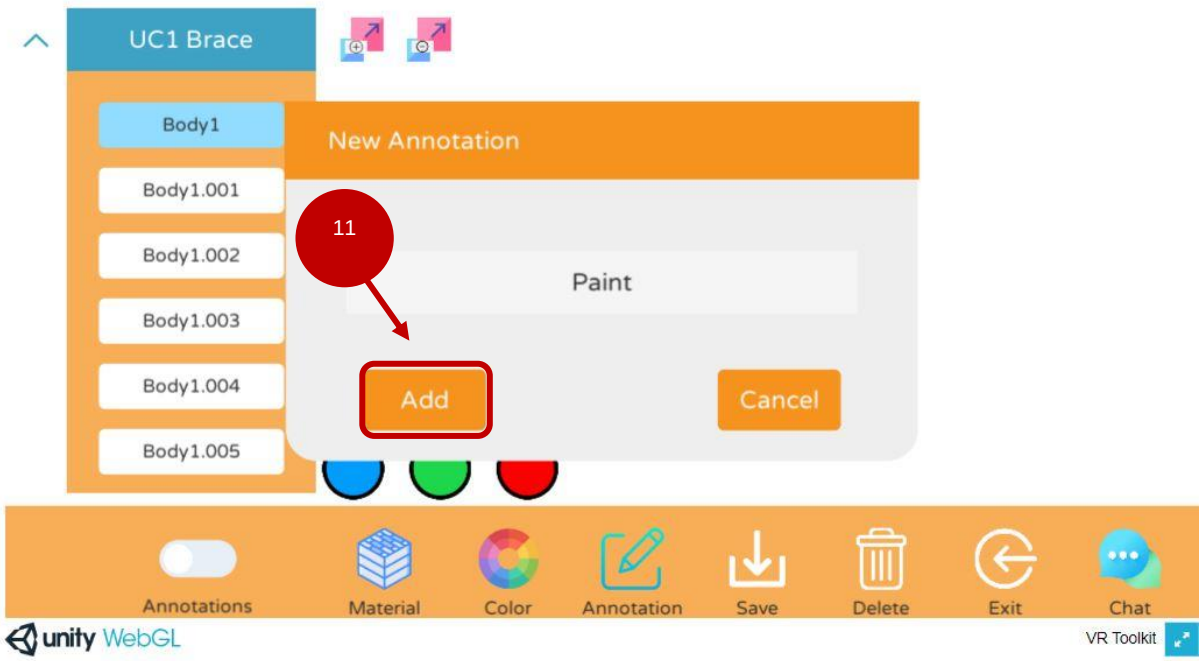

Figure 52 VR Tool – Product Part Annotation

Using the **Add Button** on the panel, the annotation creation process is finalized and the user is informed with the appropriate notification message at the top part of the VR Tool's screen (Figure 53, arrow 12).

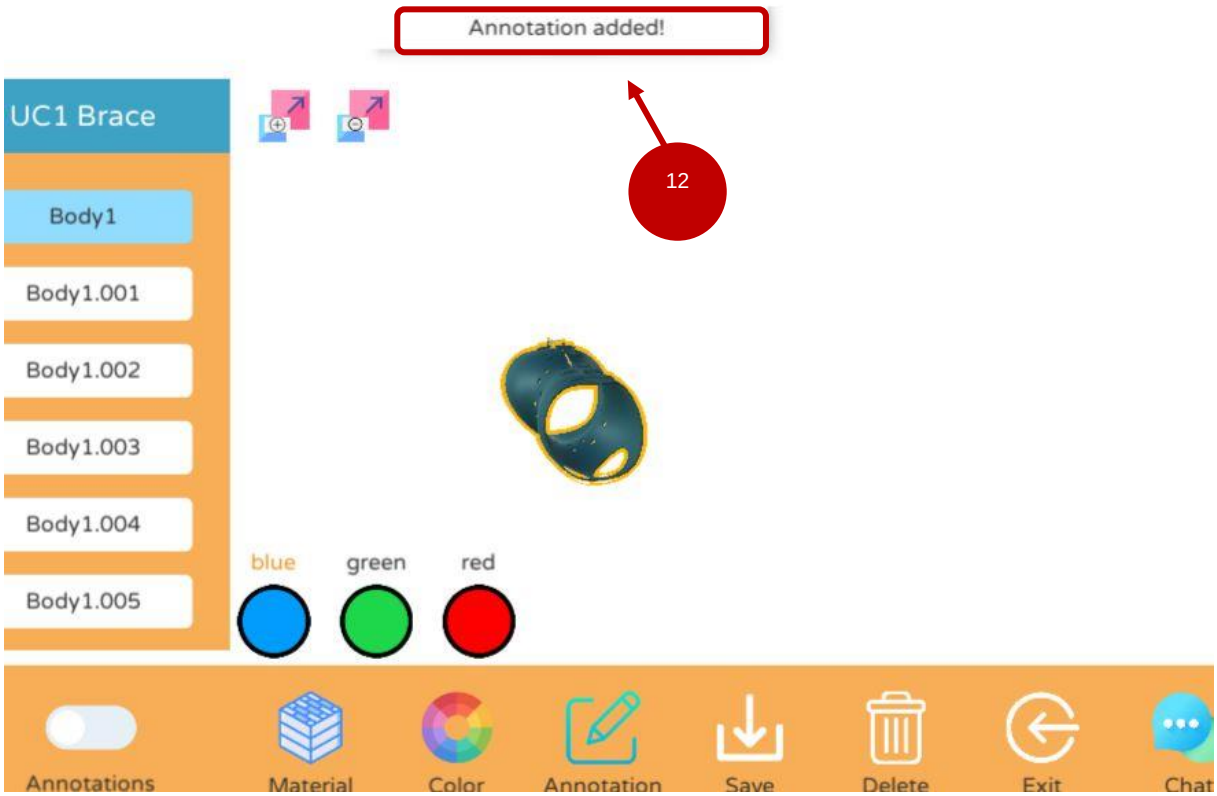

Figure 53 VR Tool – Annotation Added Notification

Next, users can see the available annotations via clicking the **Annotations Toggle Button** (Figure 13, arrow 13).

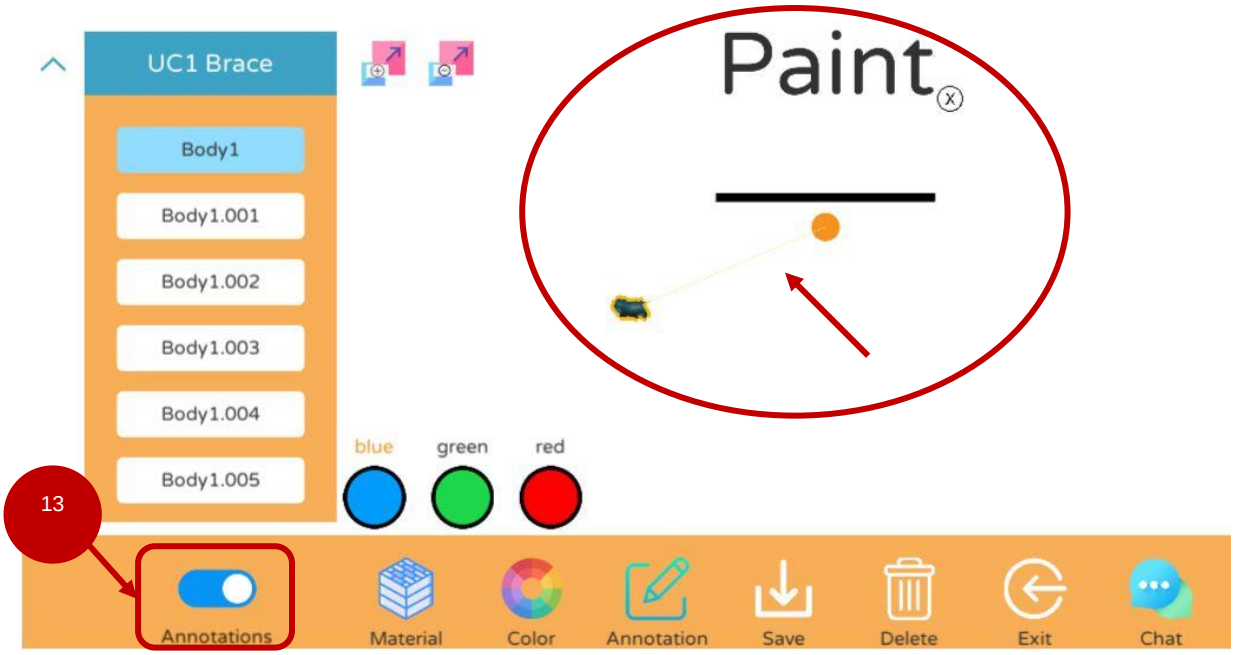

Figure 54 VR Tool – Annotations Toggle Button

Users are advised to zoom-out using the **mouse scroll wheel down** action to be able to see the appeared annotations adequately enough. Annotations appear attached via a line to the appropriate product part.

The **Chat button** is also available through the Configurator Mode's user interface selection of tools.

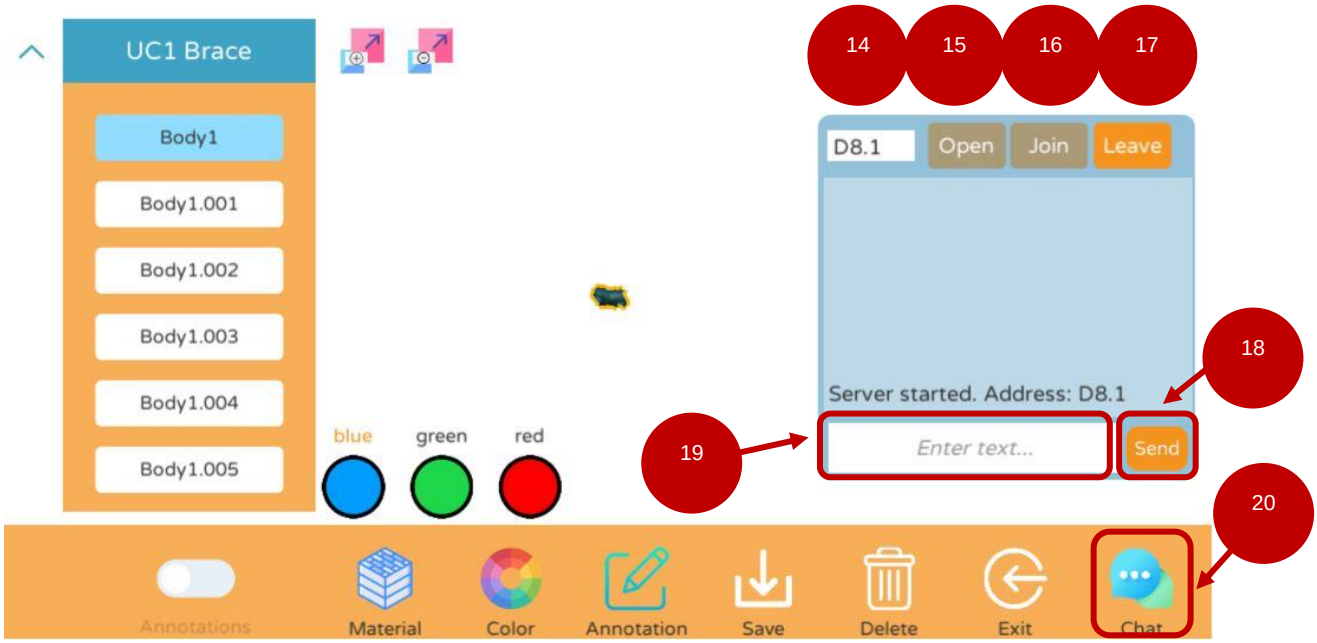

Figure 55 VR Tool – Chat Function

Once clicked it reveals the **Chat Panel** which features the following functionalities:

1. **Chat Name Input Field (14):** Users can enter the desired chat room name
2. **Open Button (15):** Creates a chat room

3. **Join Button (16):** Joins an already existing chat room using the chat name input field info
4. **Leave Button (17):** Leaves the current chat room
5. **Send Button (18):** Sends the typed message from the Enter Text Input Field
6. **Enter Text Input Field (19):** Used for entering the user's desired text

All exchanged messages appear inside the Chat Panel's space. The Chat Panel can be closed by clicking the **Chat Button (20)** again.

Finally, users can save their changes using the **Save button (21),** delete the current selected product from their Configurator Collection of items using the **Delete button (22),** and exit the configurator mode using the **Exit button (23).**

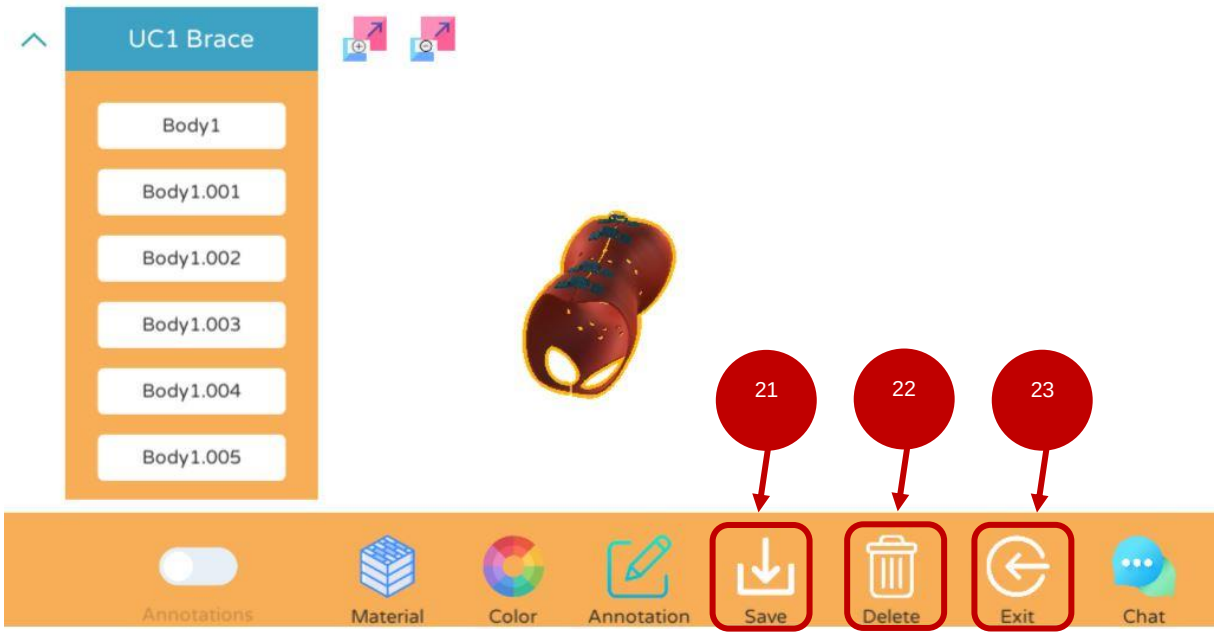

Figure 56 VR Tool – Save, Exit & Delete buttons

Using the **My Designs (24)** menu entry from the VR Tool's central hub, users can see the available design rooms under the **Configure your available designs** legend.

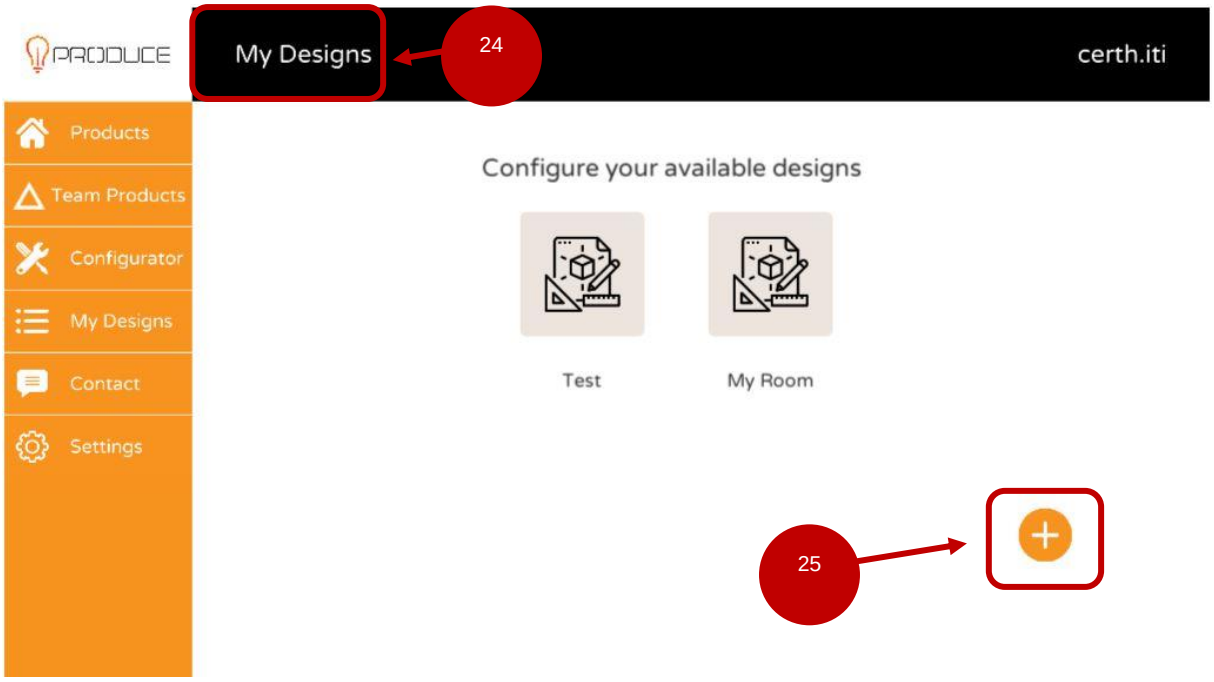

Figure 57 VR Tool – My Designs

Users can click on the **New Design Button – (+) (25)** to open the **New Design** creation panel.

Figure 58 VR Tool – New Design Creation Panel

Users are required to fill the text input field with the desired name for their room and by clicking the **Add (26)** button on the same panel, the design creation procedure is finished. The room is created and the user is informed with the appropriate notification message at the top of the VR Tool's screen.

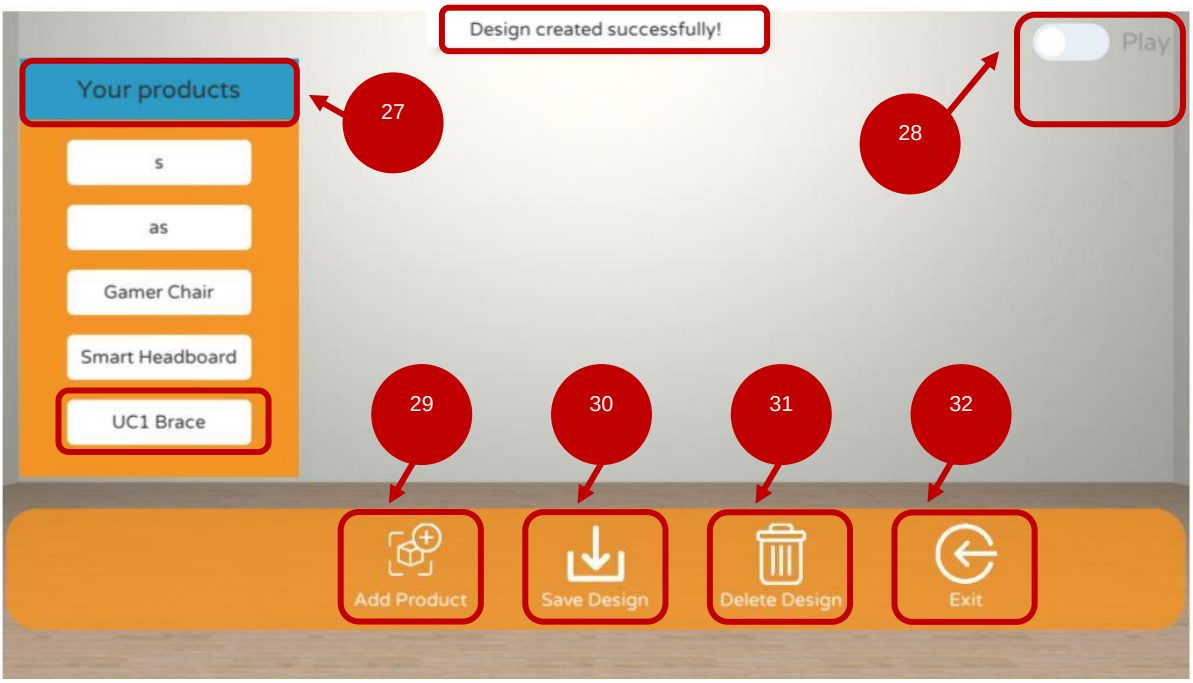

Figure 59 VR Tool – Design Room

The **My Designs Mode** contains the following functionalities:

- **Your Products (27):** User scan browse the list of available products from their **Configurator Collection** and click on a product to directly import it to the room for further customization
- **Play (28):** Toggles **Play Mode**
- **Add Product (29):** Enables the Your Products menu
- **Save Design (30):** Saves any changes made during the mode's activation
- **Delete Design (31):** Deletes the Design Room and its contents
- **Exit (32):** Exits the Design Mode

Once a product is clicked from the list, it is directly imported into the room and the user is informed through a loading dialog with a loading progress percentage counter.

Figure 60 VR Tool – Design Import Process

The loading process is finished and the selected product is placed in the 3D Design Room. In addition the **Room Products (33)** list of elements appears.

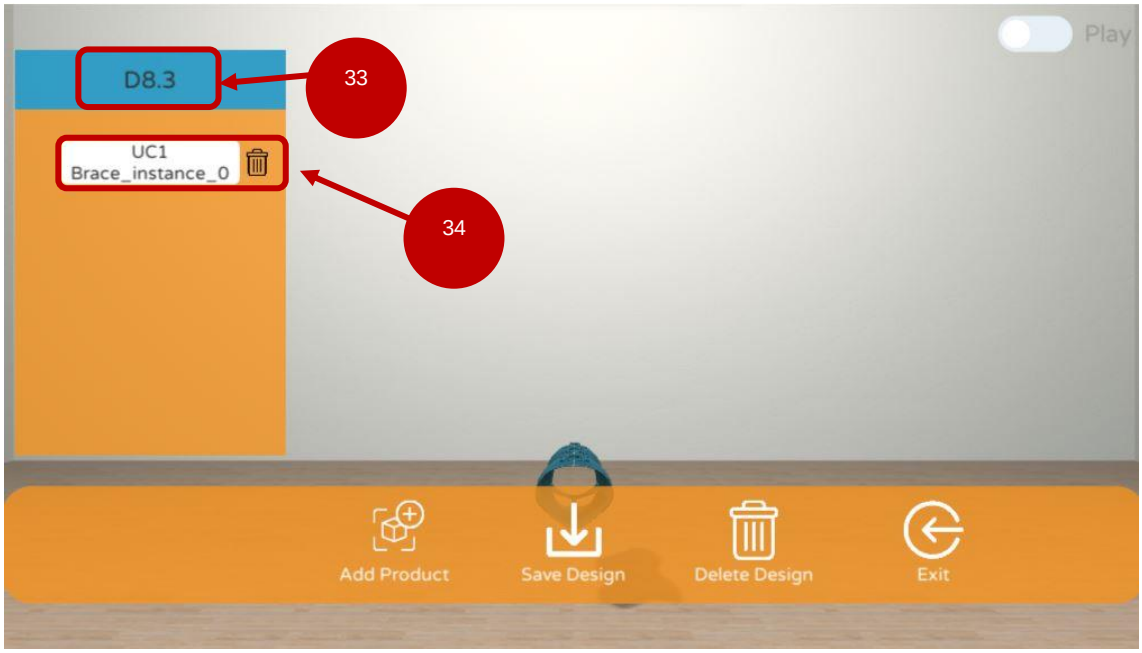

Figure 61 VR Tool – Product Imported into Design

Items inside the Design Room can be deleted by using the **Delete Room Product button (34),** which is positioned next to each product entry. Additional items can be added to the same room by clicking again the **Add Product** button, and select a desired product as done previously.

The **Play Mode** toggle can be used by users to activate the play function of the Design Room, which enables a first person perspective inside the 3D Room's Contents.

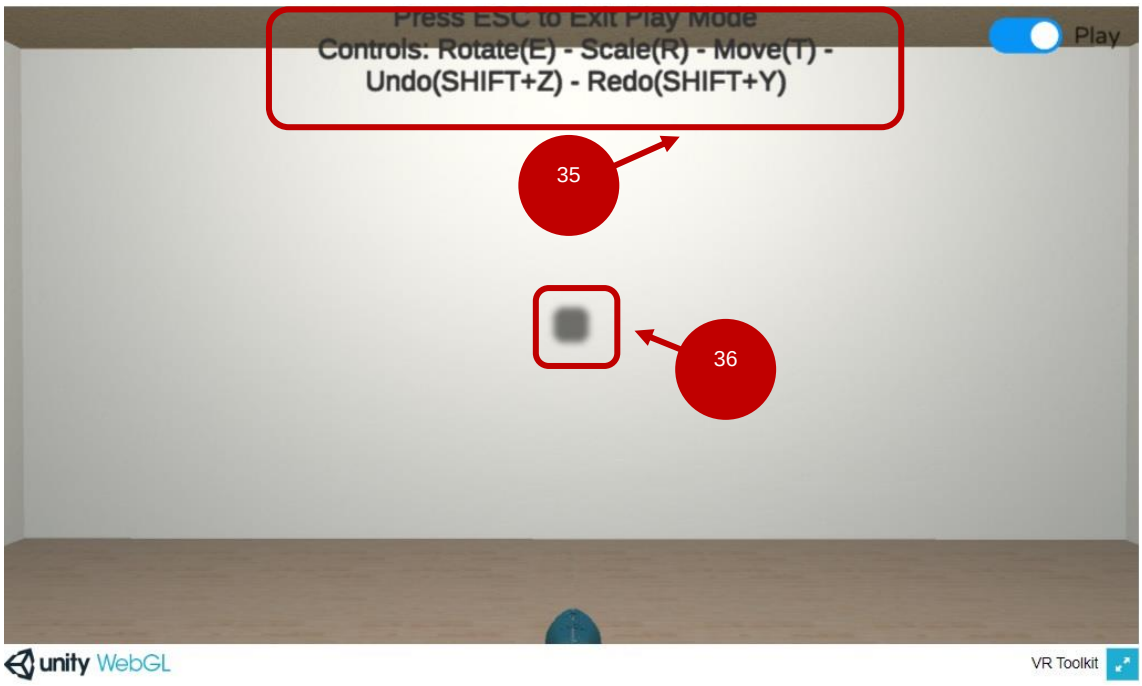

Figure 62 VR Tool – Design Play Mode

Users are informed for the mode's available functions through the **help text (35)** at the top of the screen. At the center of the user's view there is a **dot-crosshair (36)** to help users with aiming while moving

through WASD controls in the room. While moving the mouse and using the movement controls, users have the ability to click on a product inside the room to enable the 3D transform gizmo controls.

The available tools can Rotate, Scale and Move an available product and can be activated with the **E**, **R** and **T keyboard buttons.**

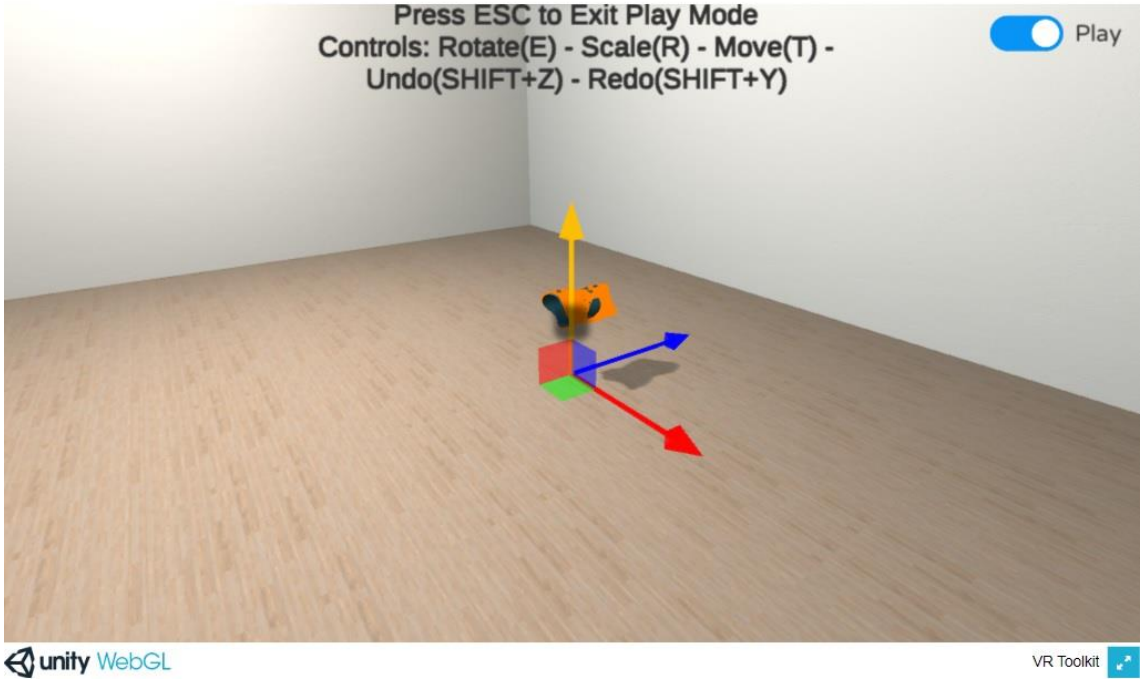

Figure 63 VR Tool – Play Mode Product Move Tool

Figure 64 VR Tool – Play Mode Product Rotate Tool

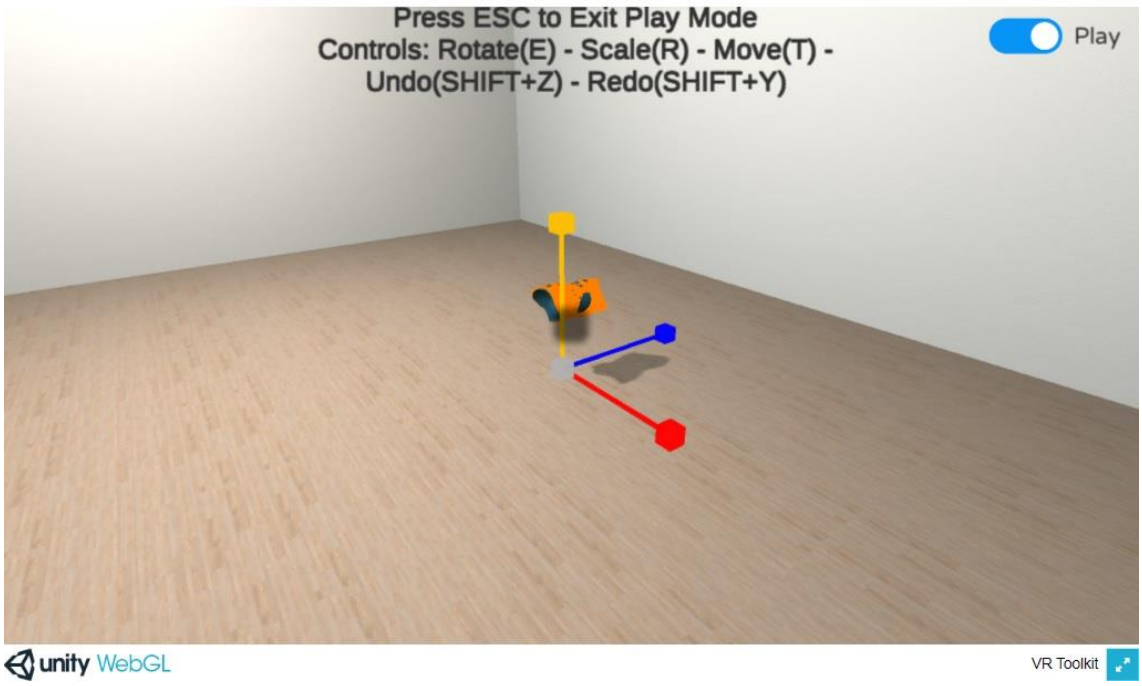

Figure 65 VR Tool – Play Mode Product Scale Tool

Users can aim, **click and drag** the available axis on each tool to move, rotate and scale the product accordingly.

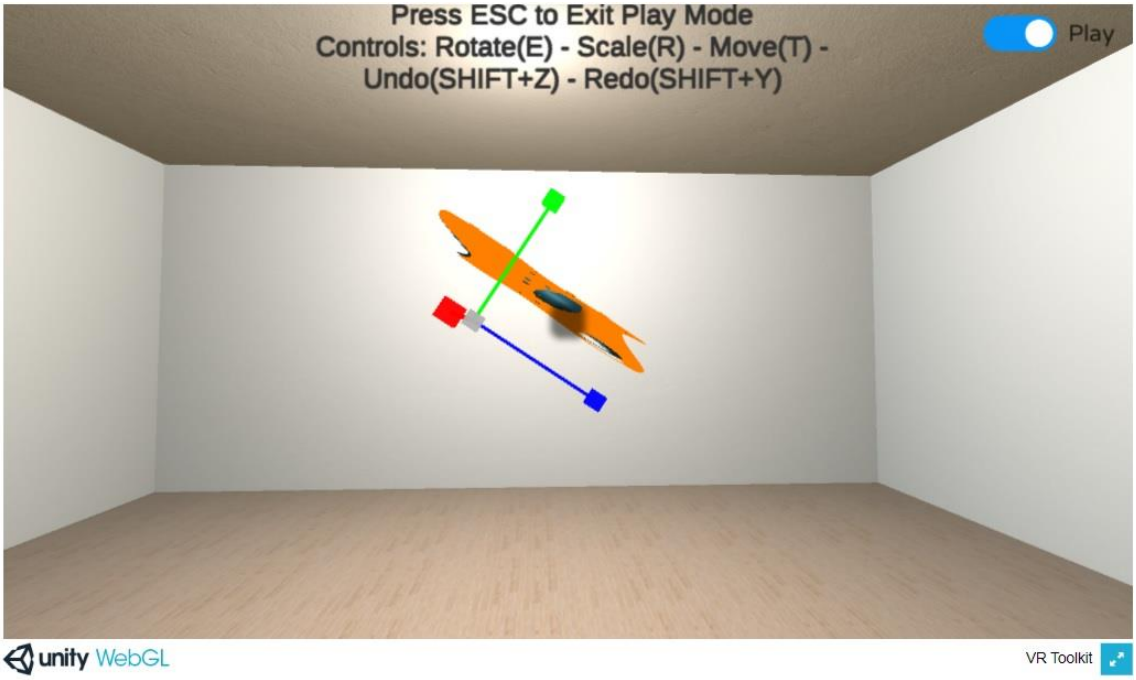

Figure 66 VR Tool – Product Manipulation Results

Users can press the **ESC button** on their keyboards to exist **Play Mode.** Using the **Save Button** they can save their changes. Finally the **Exit button** enables the users to go back to the VR Tool's central hub once again.

3.6.2. AR Tool

The AR version of the toolkit is provided to the users via an **apk installation file** via the appropriate button in the AR/VR Tookit's page inside the OpIS Dashboard. By selecting the **Mobile AR Client** button from the entries in the central AR/VR Toolkit page, users are prompt with a file download dialog.

The downloaded apk file can be installed to the user's **Mobile Android Device.**

Once the Mobile AR Client is installed and opened, the user is greeted with the application's **splash screen**.

Figure 67 AR Client – Splash Screen

The user logins with his credentials in the Mobile AR Client through his device's screen.

Figure 68 AR Client – Login Screen

Once the application loads, by selecting the **Products** tab the user is presented with an overview of the currently available products in the Marketplace.

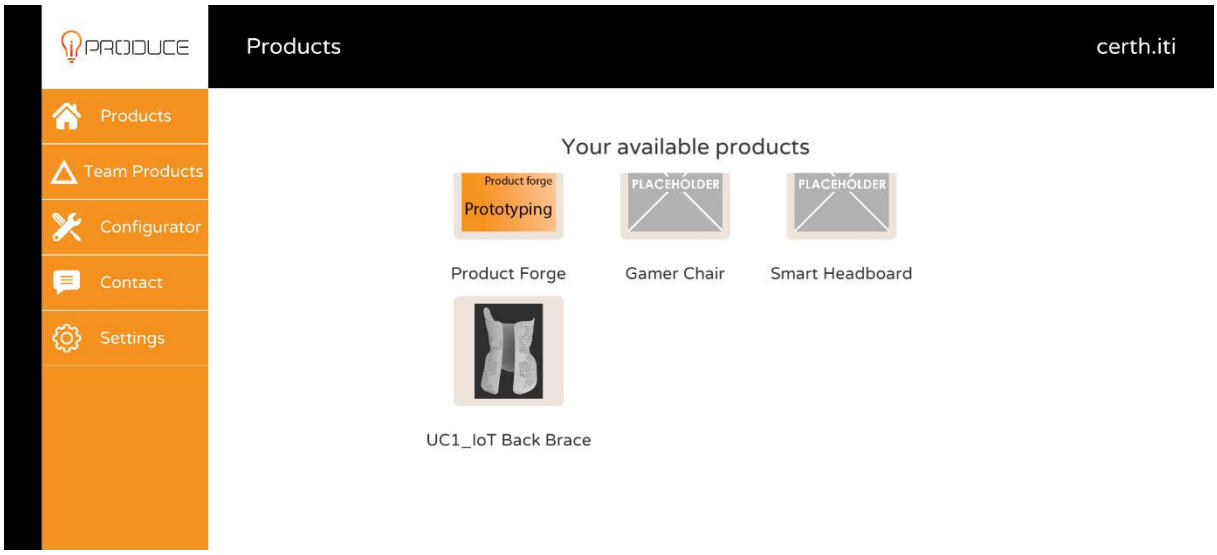

Figure 69 AR Client – Products Tab

Once a product's thumbnail is selected, the product overview screen appears, which contains the product's relevant information (name, description, IPR Contract Status and cost).

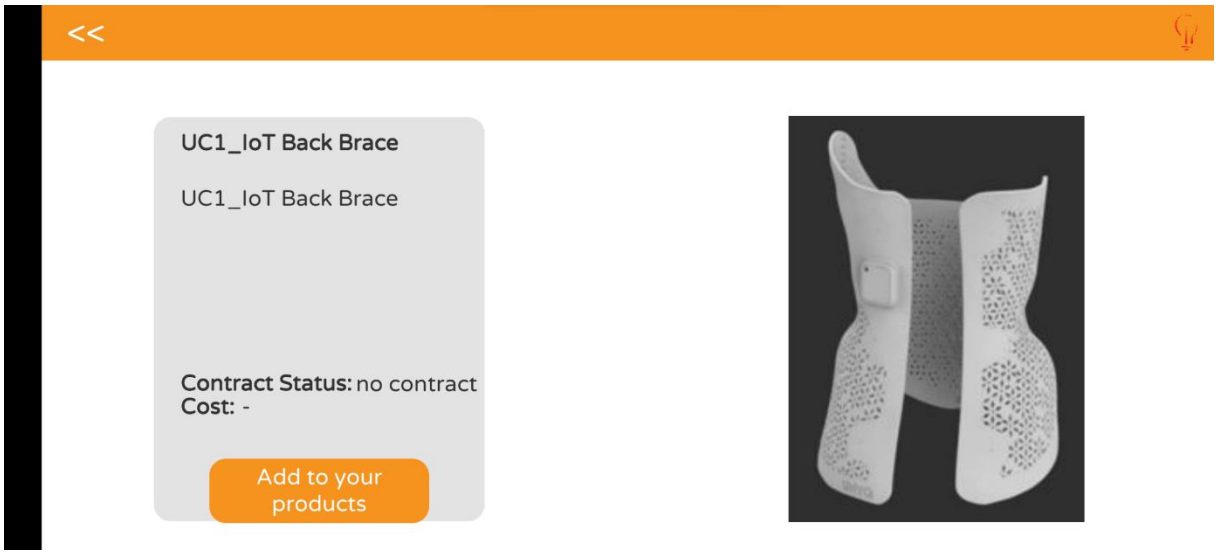

Figure 70 AR Client – Selected Product Overview

By selecting the **Add to your products** button, the user can add the selected **Product** in the **Configurator Tab** by specifying a name in the visible input field.

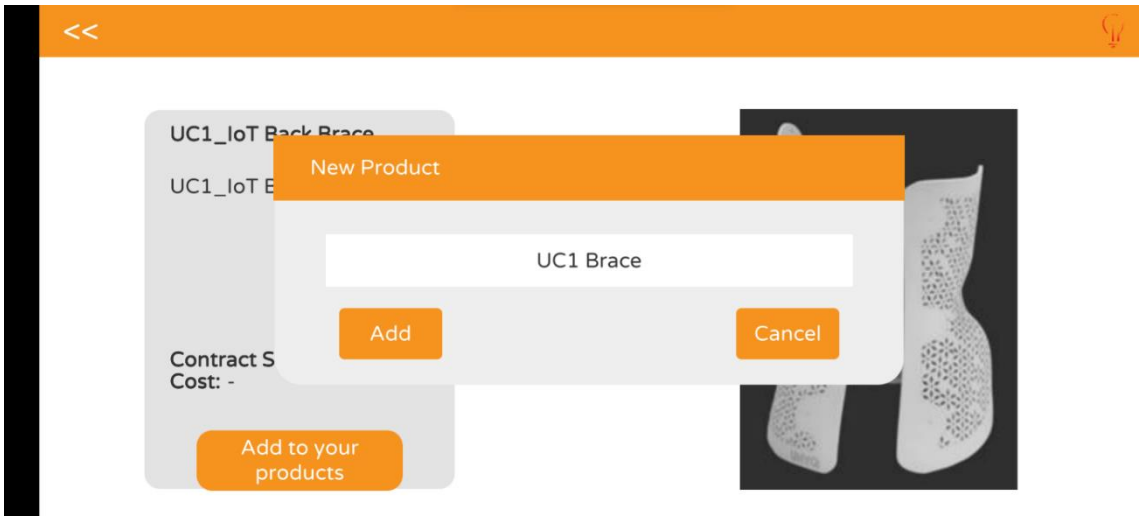

Figure 71 AR Client – Add a Product

By selecting the **Add** button, the procedure is finalized and the product is added to the user's **Configurator Tab** as the notification at the top of the screen informs the user.

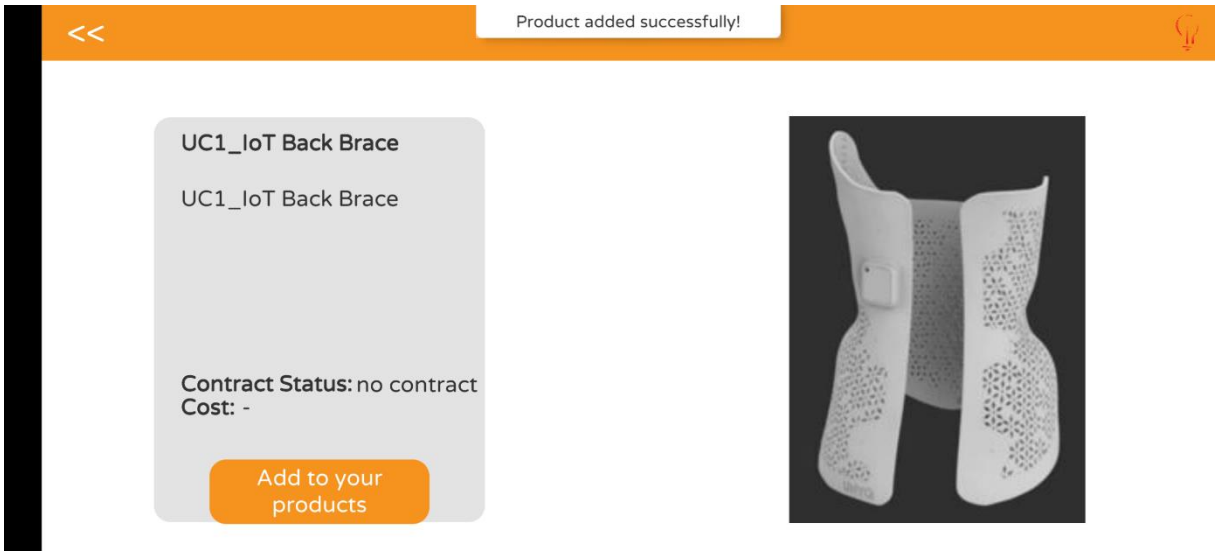

Figure 72 AR Client – Configurator Tab, Adding a Product

By selecting the **Configurator Tab**, the user is presented with his personal list of available products.

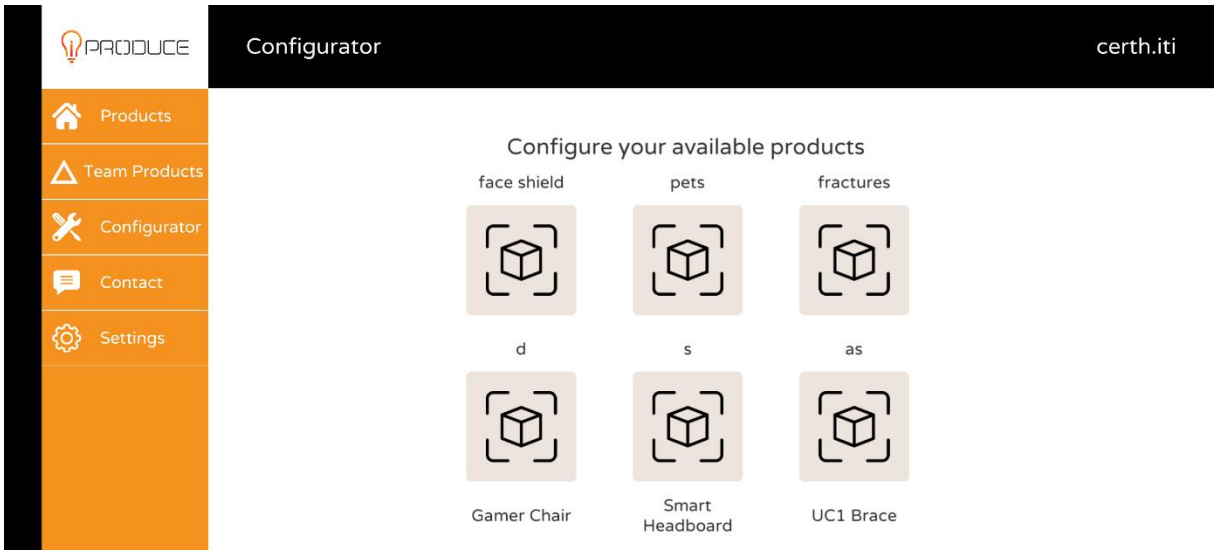

Figure 73 AR Client – Configurator Tab, Available Team Products

Once the thumbnail of a product in the **Configurator Tab** is selected, the loading process starts and the user is presented with the appropriate screen.

Figure 74 AR Client – Loading Product Page

The user then, sees the following message that guides him to tap on screen to begin the scanning process, along with the functionalities that were presented in the VR Tool's section.

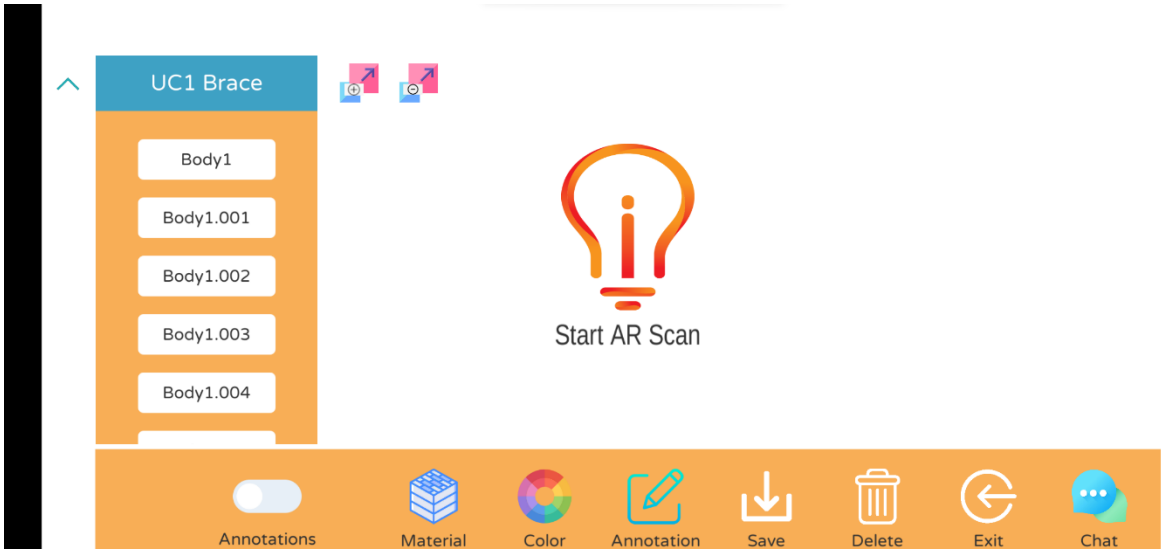

Figure 75 AR Client – Start AR Scan Message

After the **Start AR Scan button** is tapped, the user's camera opens. Users need to move their mobile devices while pointing their camera onto a surface such as a floor so the scanning process begins and the colored virtual planes appear.

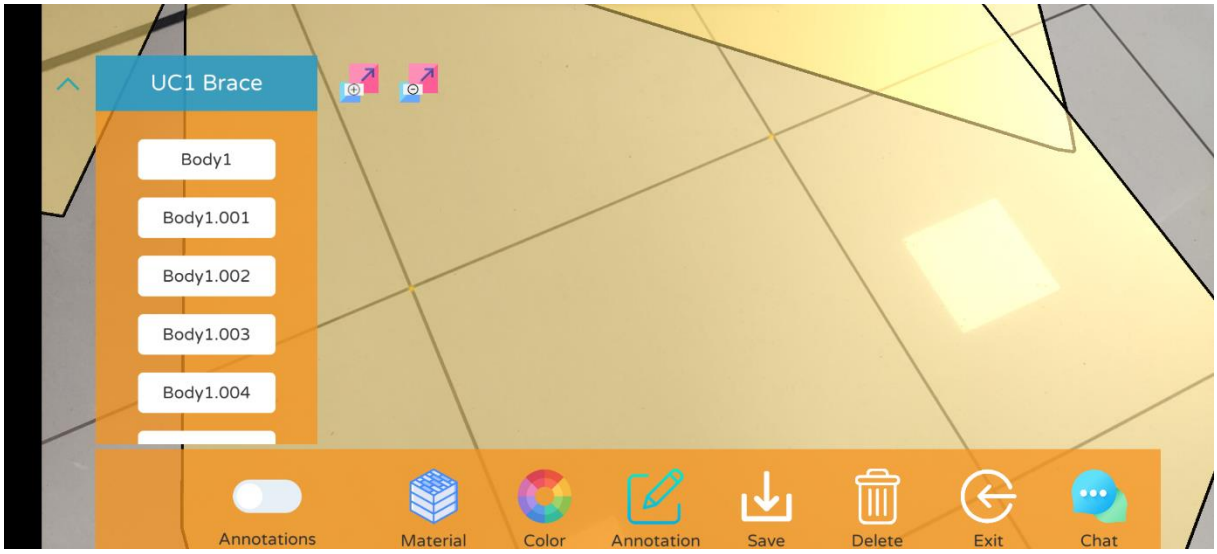

Figure 76 AR Client – Scanning Process in Action

Once the colored planes appear, users can tap on them to place the currently selected Product onto their physical surroundings.

Figure 77 AR Client – AR Placed Product

The AR Placed Product can be annotated using the **Annotation Tool.**

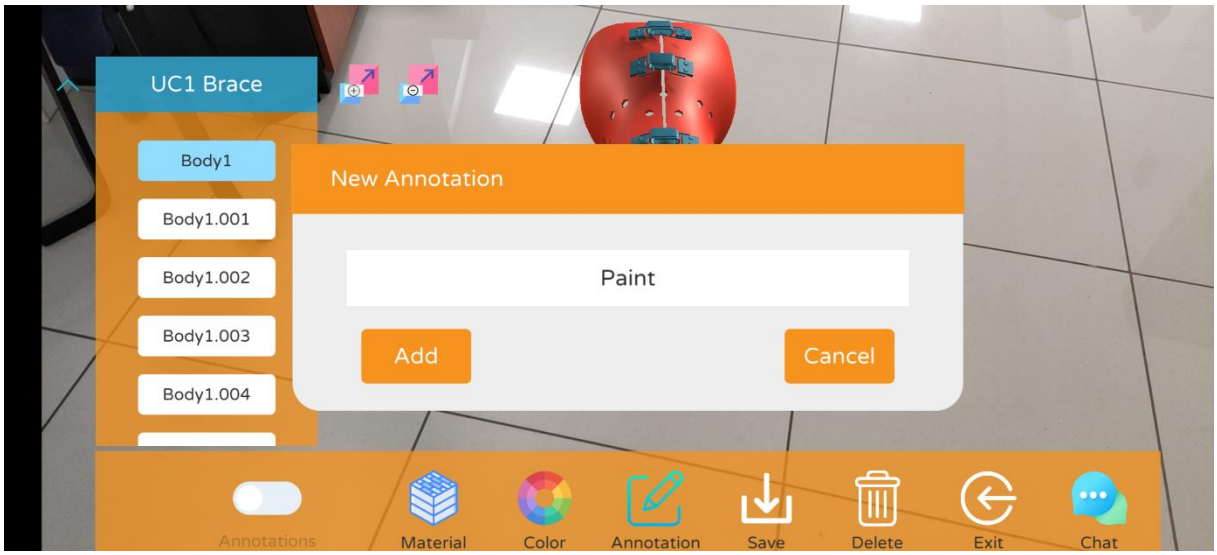

Figure 78 AR Client – Annotation Tool

Users can toggle the **Annotations** tool to enable the appearance of the annotations in the physical world.

Figure 79 AR Client – Annotation View

The **Color** tool can be tapped to change the color pattern of a placed product.

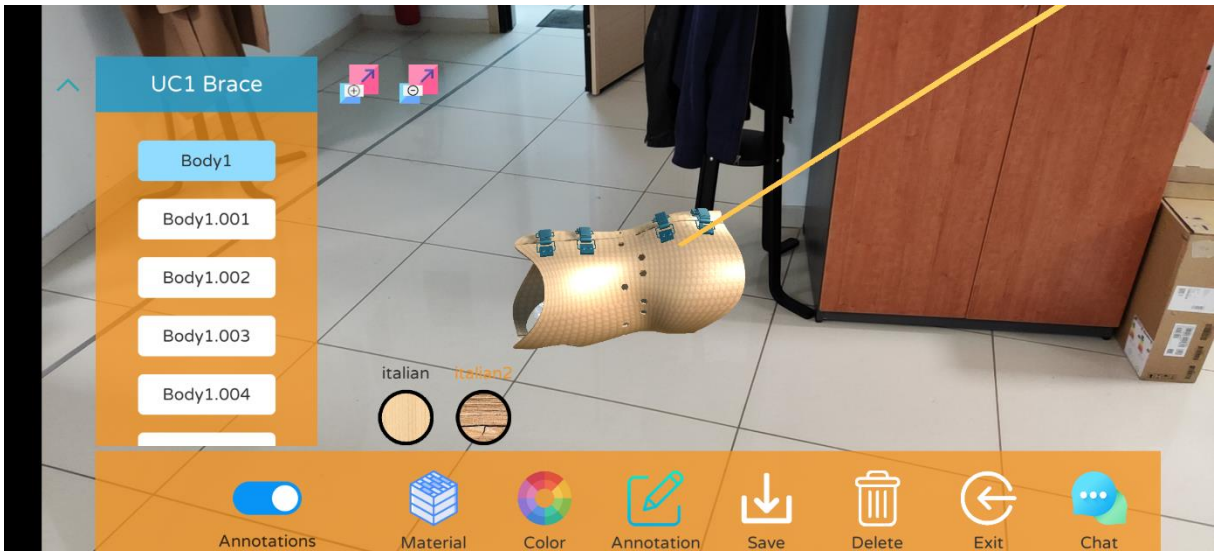

Figure 80 AR Client – Color Tool

Users can also tap on the **Chat** button to open the chat panel.

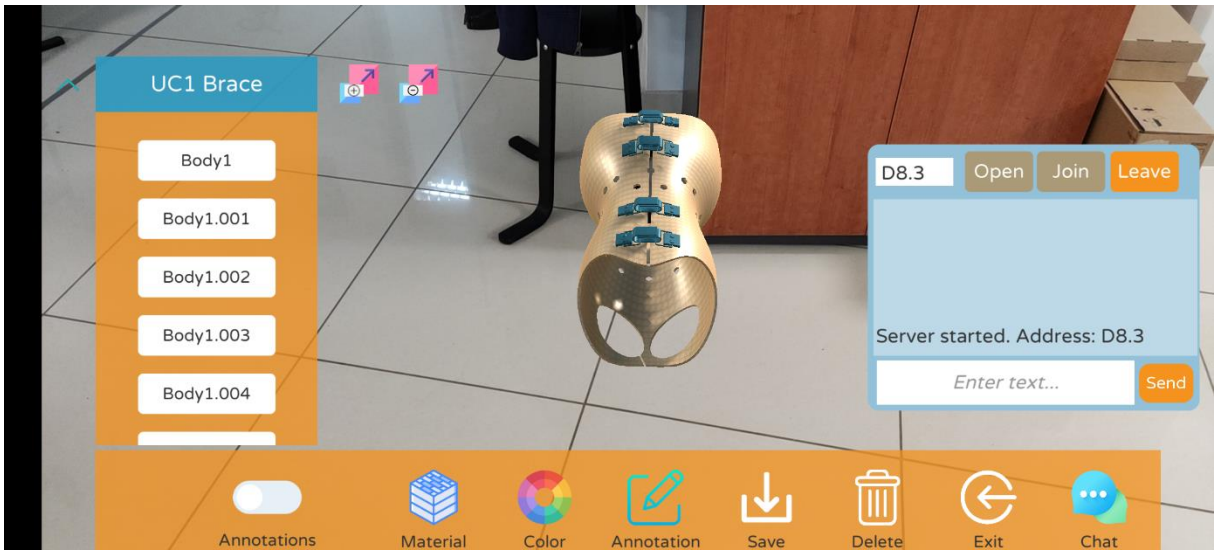

Figure 81 AR Client – Chat

Finally users can tap on the **Exit** button to go back to the AR Client's Central Hub.

3.6.3. Hololens AR Tool

The Hololens AR Client version of the toolkit is provided to the users as an **appx installation file** via the appropriate button in the AR/VR Tookit's page inside the OpIS Dashboard. By selecting the **Hololens AR Client** button from the entries in the central AR/VR Toolkit page bottom, users are prompt with a file download dialog.

The downloaded appx file can be installed to the user's **Microsoft Hololens Device** using the official installation guidelines which are provided from *Microsoft's Documentation Portal*.

Once the application is installed, users can open it through the central Application Hub which lives inside the Hololens' user interface.

Figure 82 Hololens AR Client – Central Application Hub

Users wait for the application to load while seeing the Unity Engine logo.

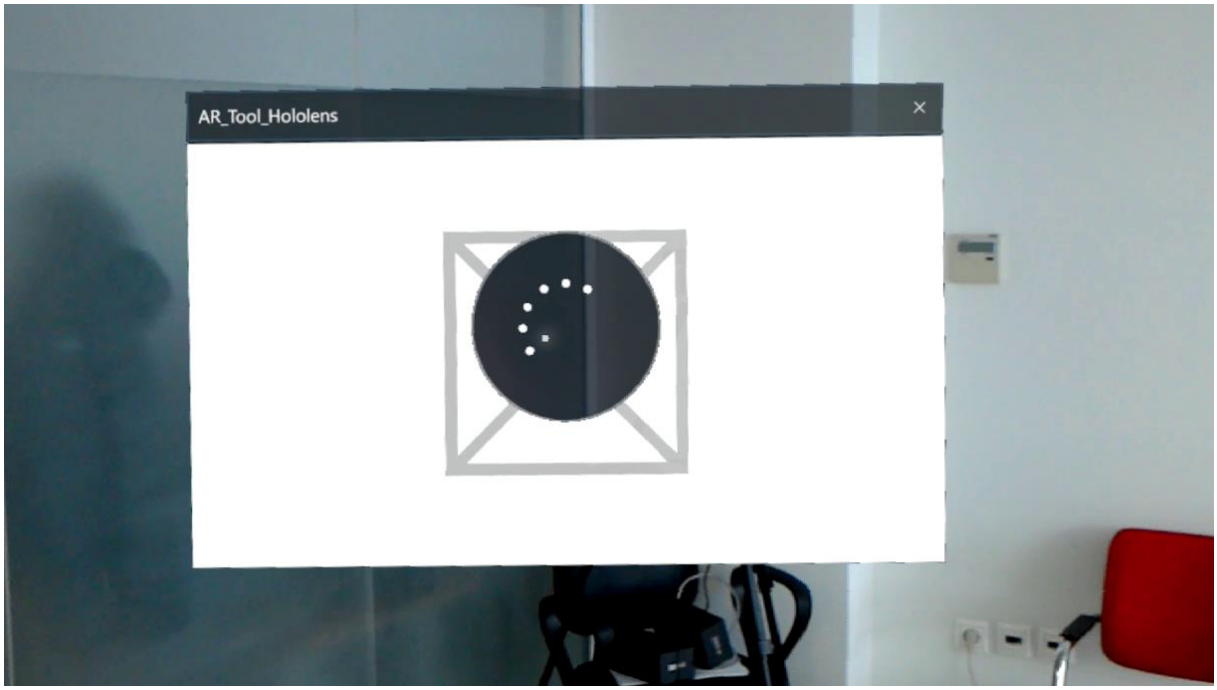

Figure 83 Hololens AR Client – Application Load Process

Figure 84 Hololens AR Client – Unity Loading Logo

Users can immediately see the login panel which is available for entering their credentials.

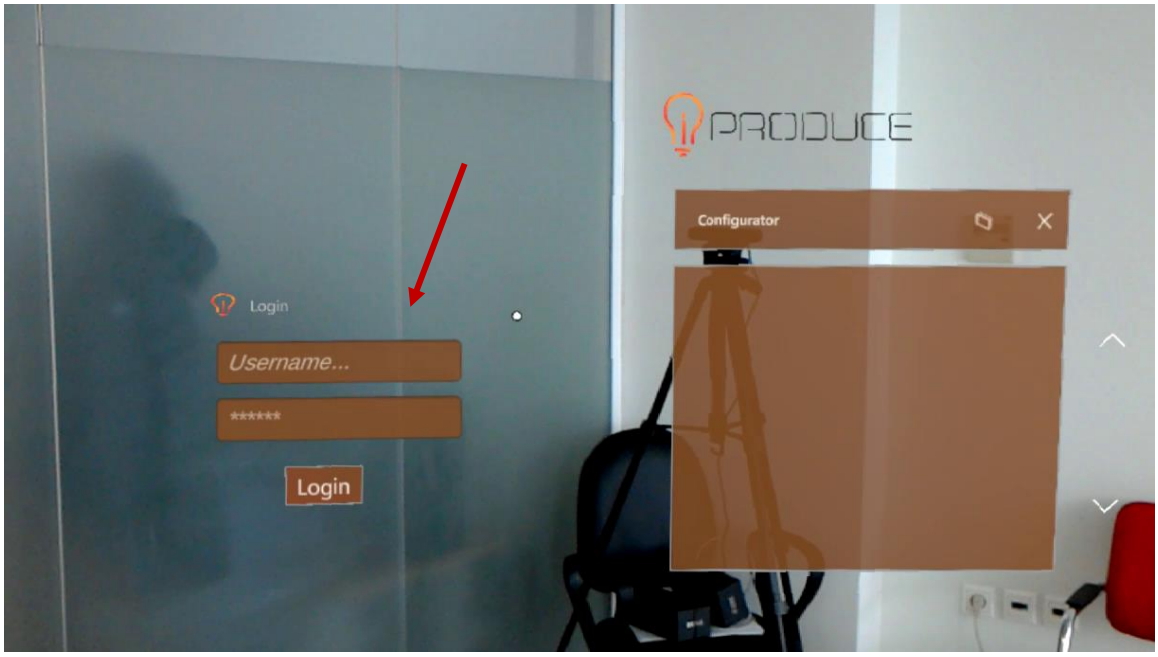

Figure 85 Hololens AR Client – First Screen

The user's gaze is pointed by the circle crosshair indicator. Gazing on an element inside the tool enables the users to interact with it using the available gestures the Hololens platform provides. The collection of the supported gestures can be found in the official *Microsoft Learn Platform*.

Users can **air finger tap** on the input fields inside the login panel to enter their credentials via the **interactive virtual keyboard** which pops up in their viewpoint.

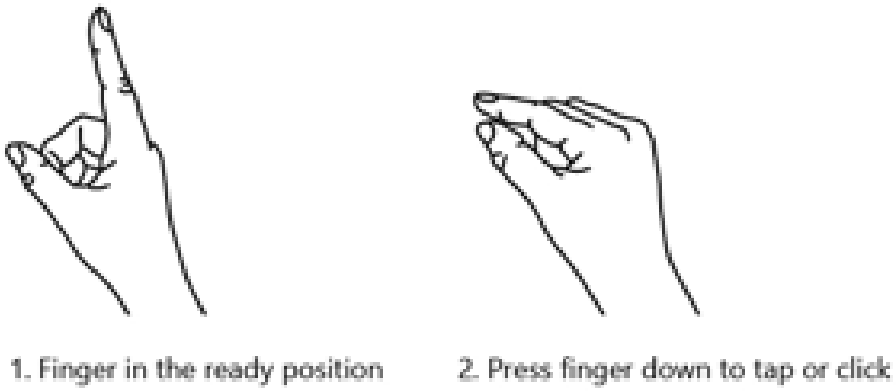

Figure 86 Hololens AR Client – Air Finger Tap Gesture for Element Interaction

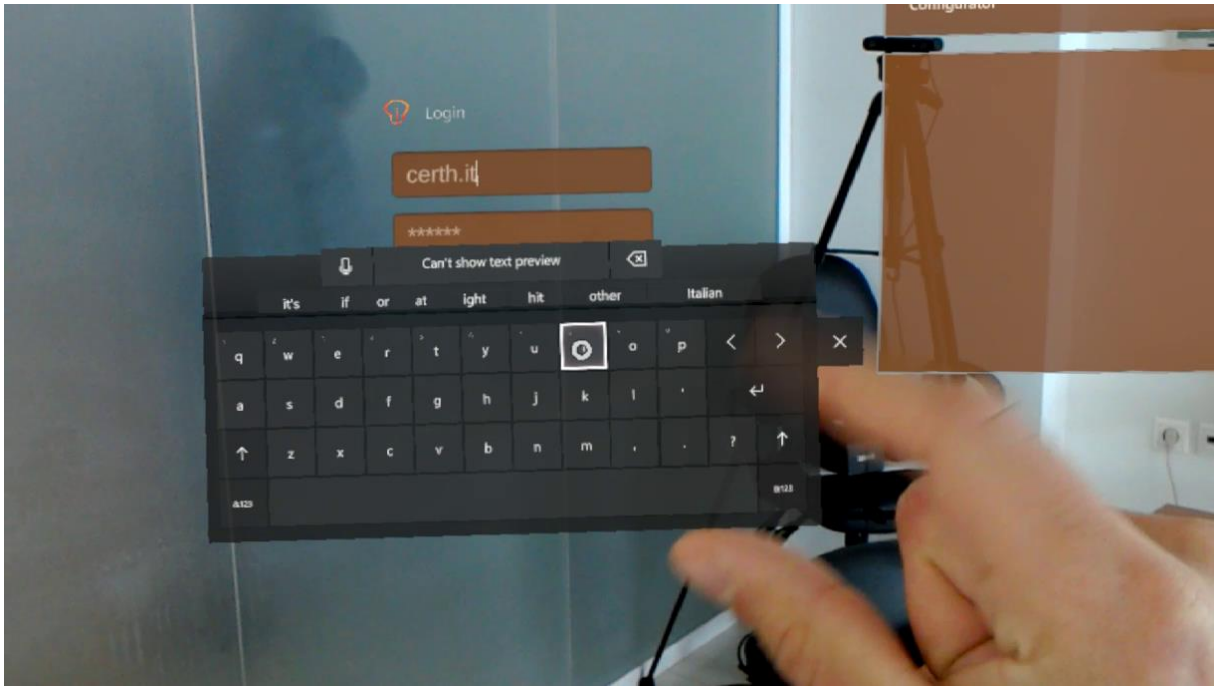

Figure 87 Hololens AR Client – Interactive Virtual Keyboard

Moving on, users can air finger tap on the **Login** button to finalize the credential authentication procedures. Once the authentication is finished the **Configurator** mixed reality panel will provide a preview of the available products inside the user's personal collection of products respectively.

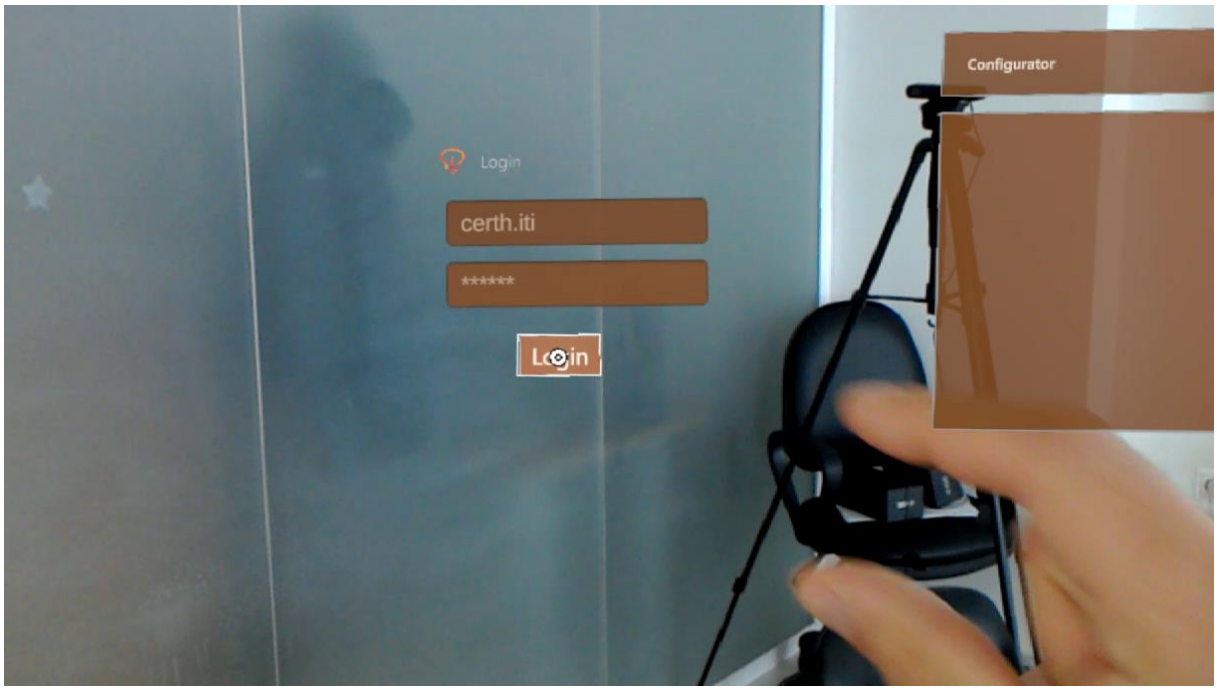

Figure 88 Hololens AR Client – Login

Users have the ability to gaze and air finger tap on the available **up** and **down** buttons next to each panel and browse through the collection of available products.

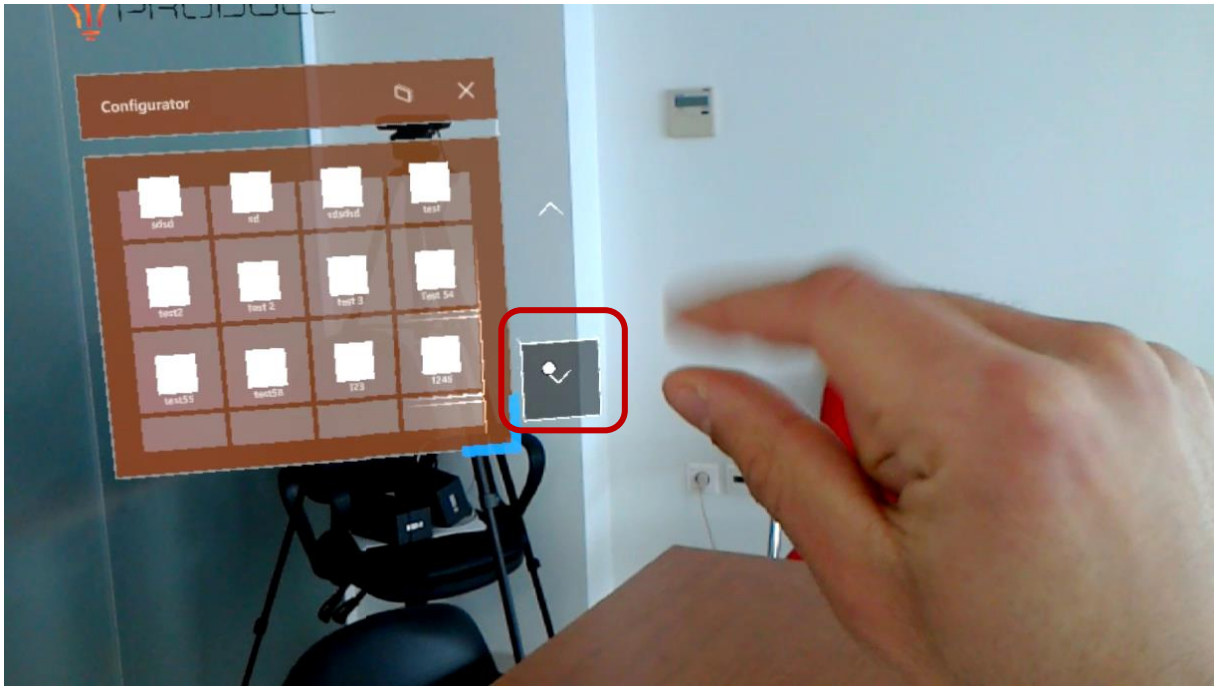

Figure 89 Hololens AR Client – Marketplace View

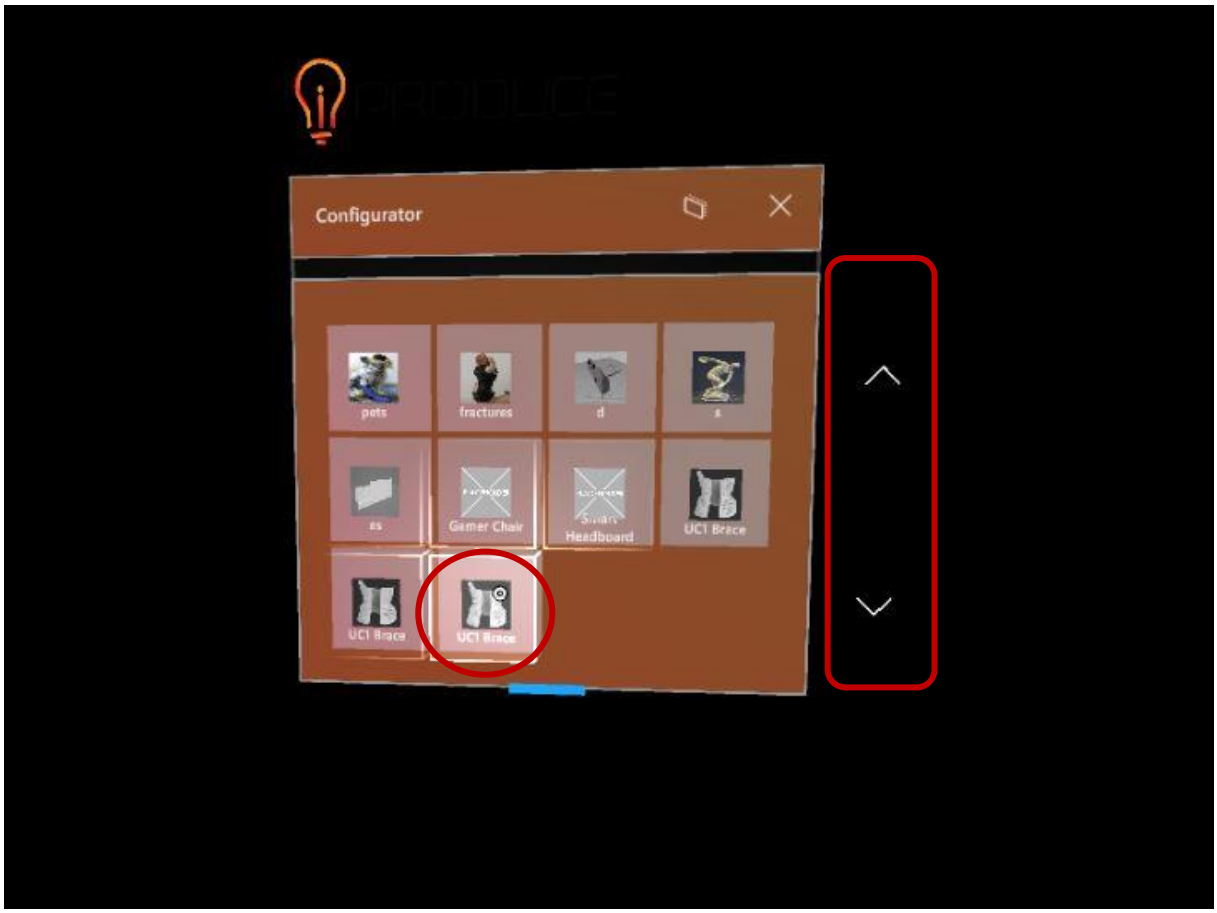

Figure 90 Hololens AR Client – Configurator View

In the Configurator View users can air finger tap on a selected product to kickstart the loading process. Once the loading process is finished, the product is placed in the environment.

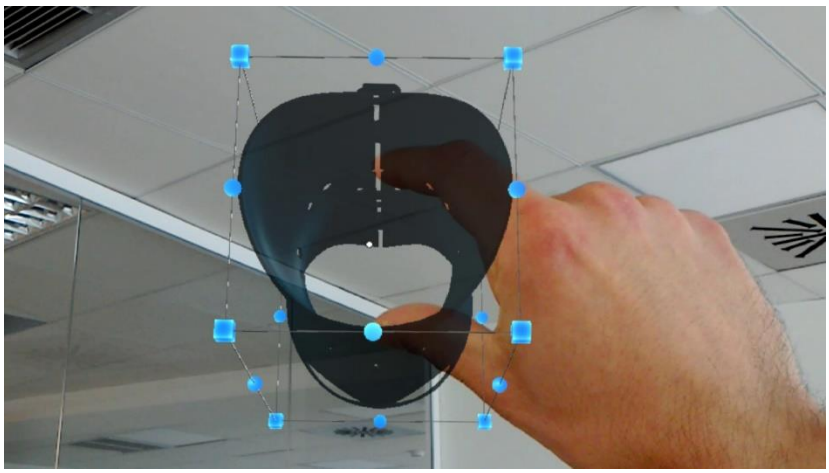

Figure 91 Hololens AR Client – Model Loading and Placement

The loaded and placed products provide **interactive handles** which if air finger tapped can **move**, **rotate** and **scale** the visualized product.

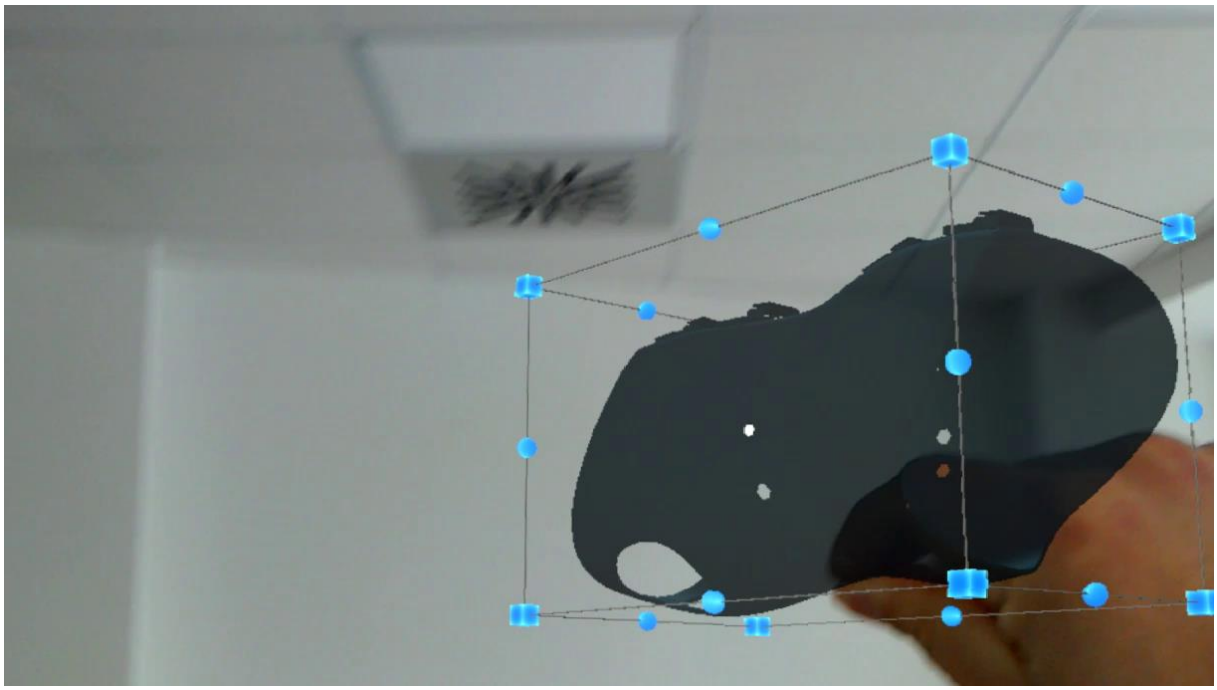

Figure 92 Hololens AR Client – Product Movement

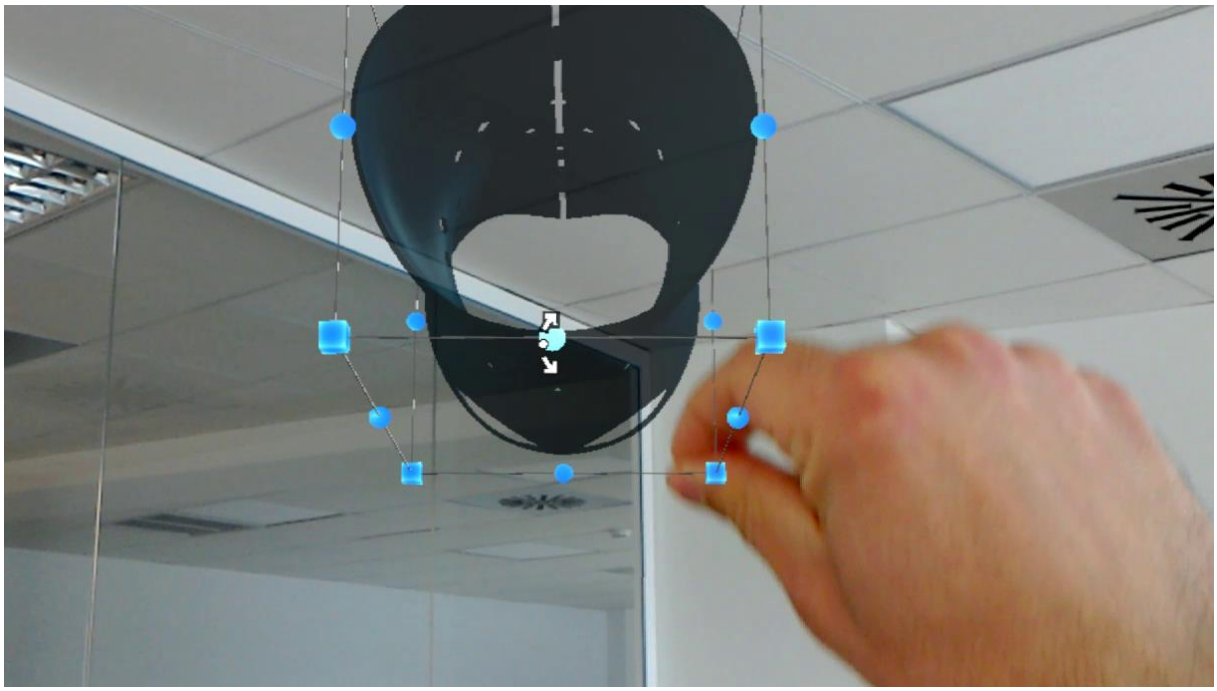

Figure 93 Hololens AR Client – Product Rotate

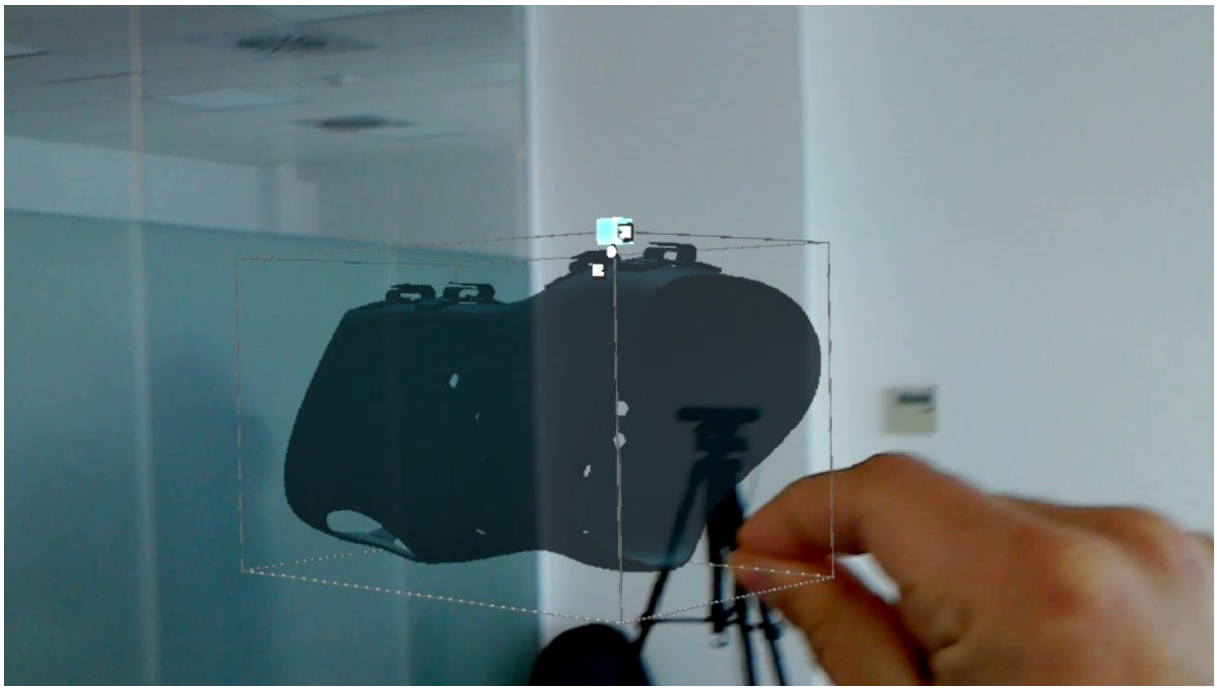

Figure 94 Hololens AR Client – Product Scale

Users can exit the Hololens AR Client application using the **Bloom Gesture** to go back to the Hololens Central Hub of Applications.

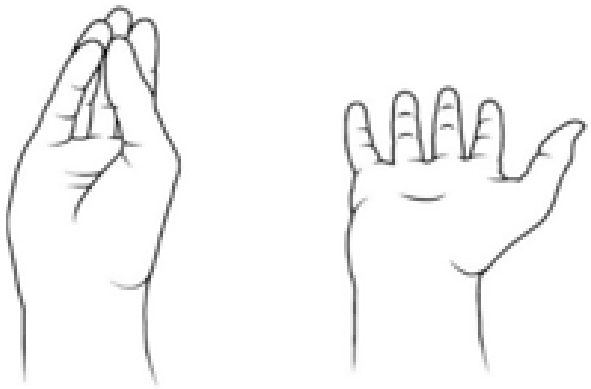

Figure 95 Hololens AR Client – Bloom Gesture

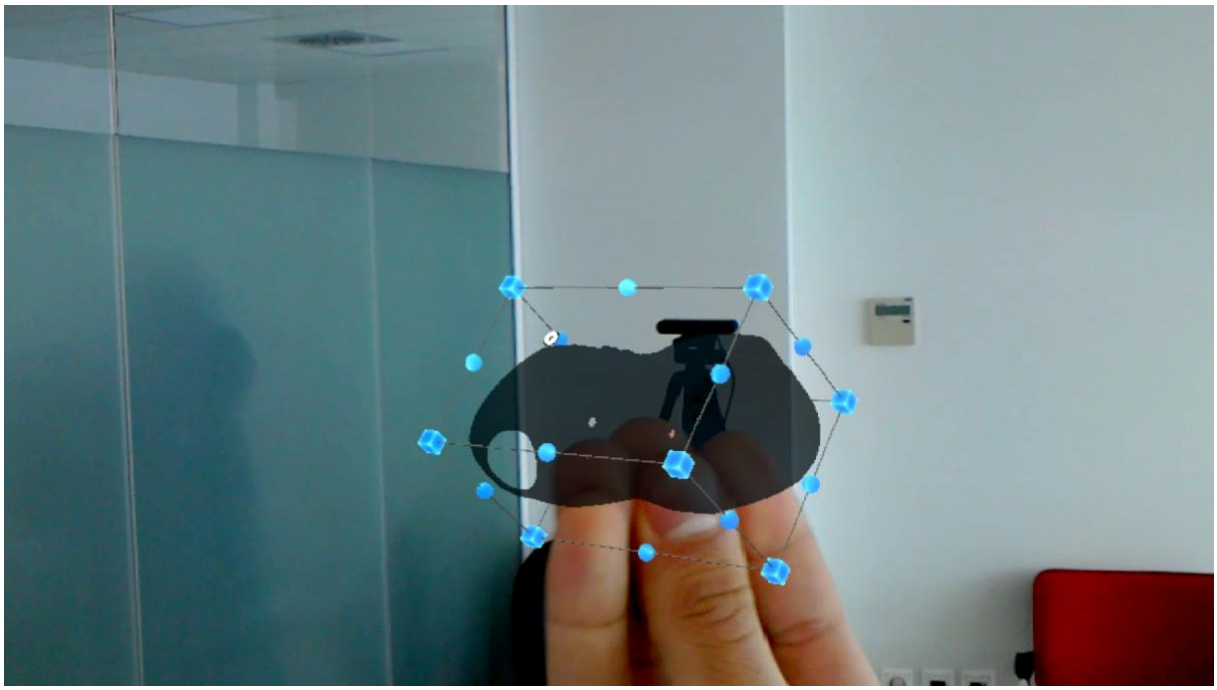

Figure 96 Hololens AR Client – Bloom Gesture

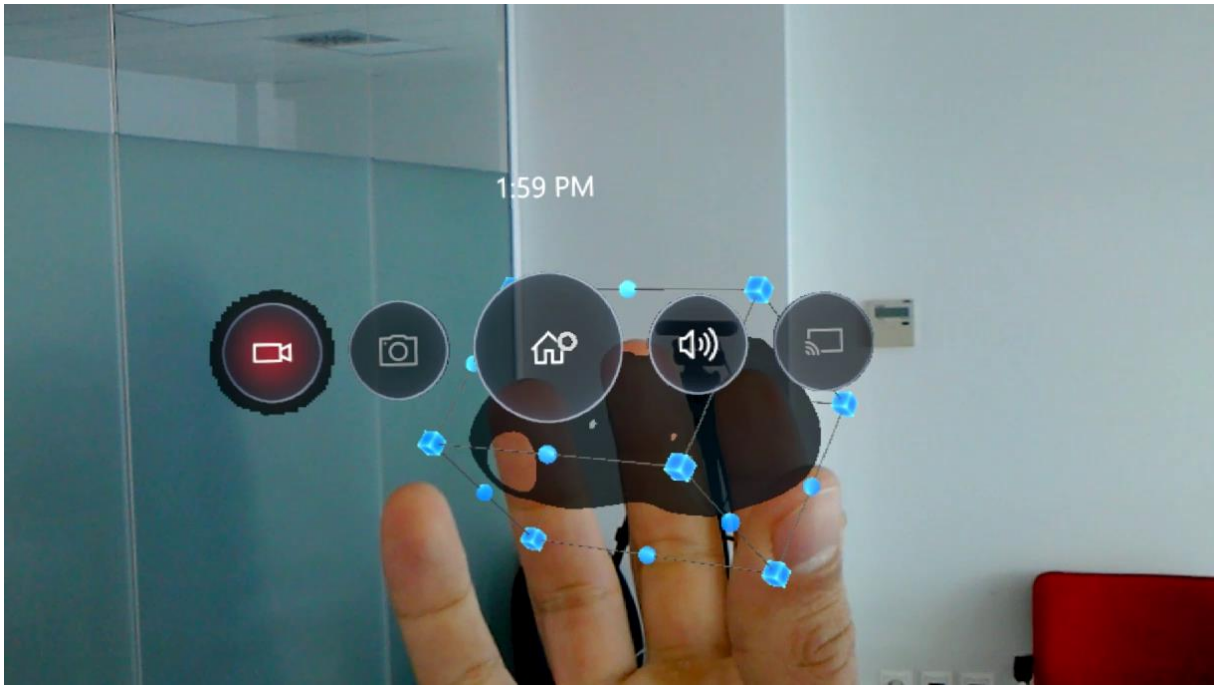

Figure 97 Hololens AR Client – Bloom Gesture Menu

3.7. Generative Design Platform

The Generative Design Platform is a component of the OpIS Data Repository (iproduce-tools.iti.gr), available under the **iProduce Tools** tab (1) in the **Generative Design Platform** (GDP) section (2).

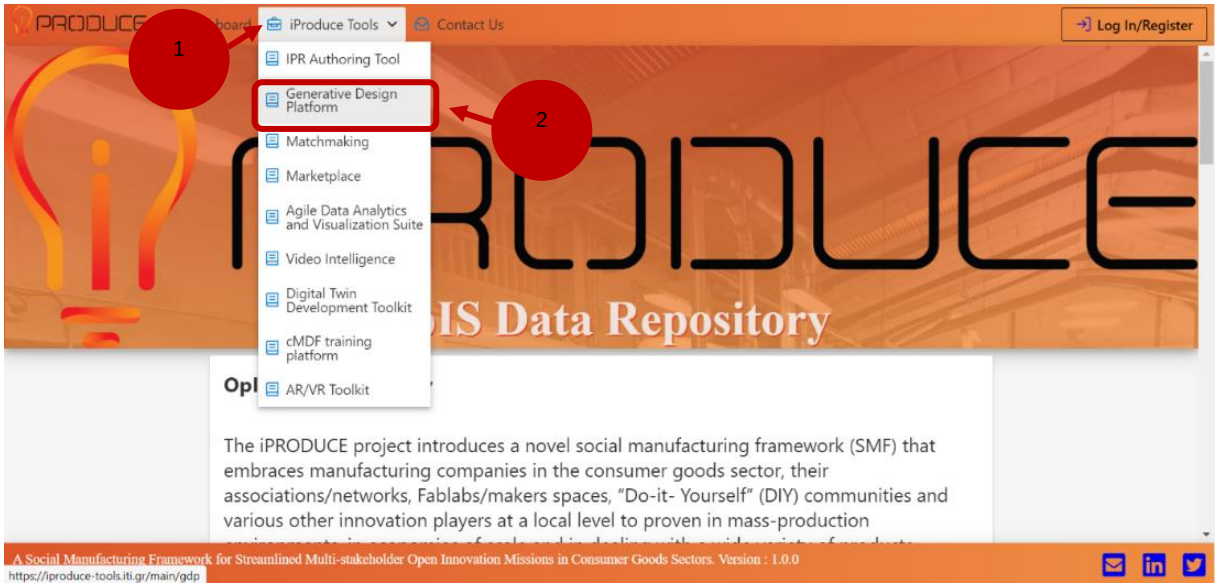

Figure 98 OpIS Dashboard – Generative Design Platform Page

By clicking on Generative Design Platform section (2) on the landing page, the user will be transferred to the **introductory page** of the GDP (3), where it is possible to enter the GDP tool directly by pushing the green button **Generative Design Platform** (4).

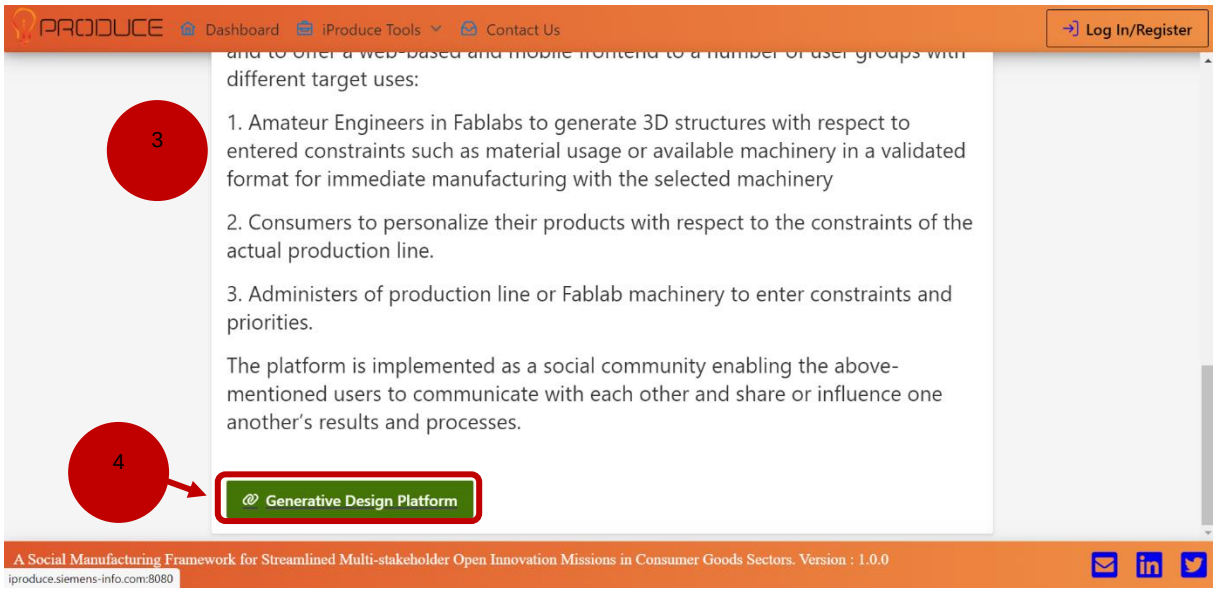

Figure 99 OpIS Dashboard – Introduction to the Generative Design Platform

By pushing the Generative Design Platform button, users are redirected to the corresponding web page **https://iproduce.siemens-info.com:8080/**, where it is necessary to authorize access by entering the general **log in** (5) and **password** (6). Please, use the general credentials as specified in the document on the Google Drive:

https://docs.google.com/document/d/1bGTs48xRwkhUJ2bXafFNGxg8cGRTfZ-fC-4vRvXQIeU/edit

(Username: test; Password: test). This restriction keeps our tool confidential and accessible for the project partners only.

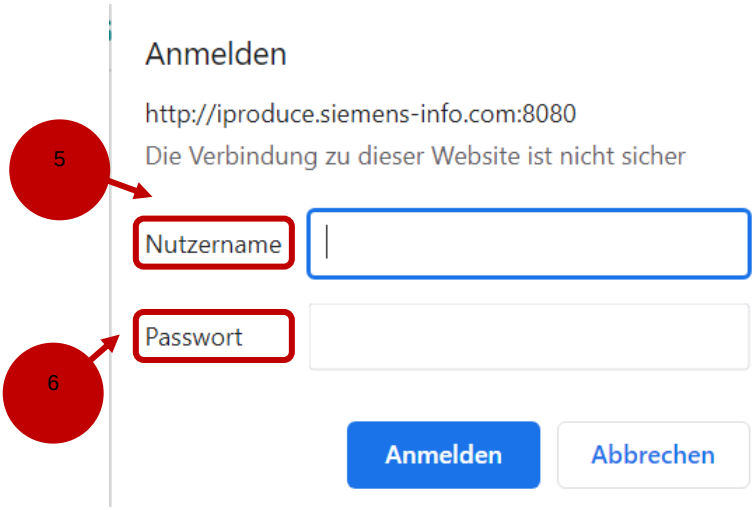

Figure 100 Generative Design Platform – Initial Authorization Process

By entering the authorization data, users are redirected to the **OpIS log in page** (7), where it is possible to access the tool by entering personal credentials and pushing **Sign In** button (8). By clicking the **Register** link (9), users can create a new account with essential profile information (username, password, email, fist and last name).

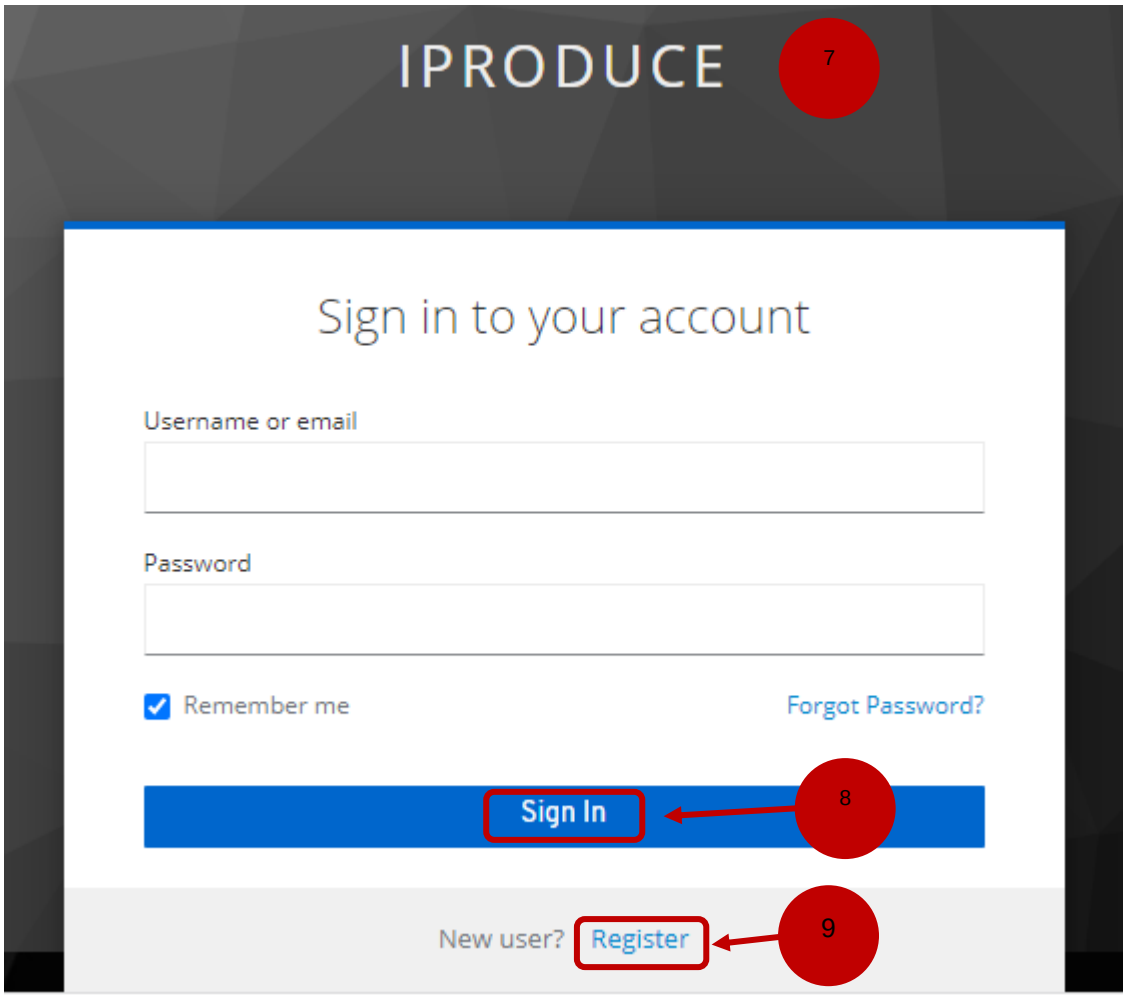

Figure 101 Generative Design Platform – Log-In Page

By clicking the **Sign in** button, users can enter the homepage of the GDP tool (10).

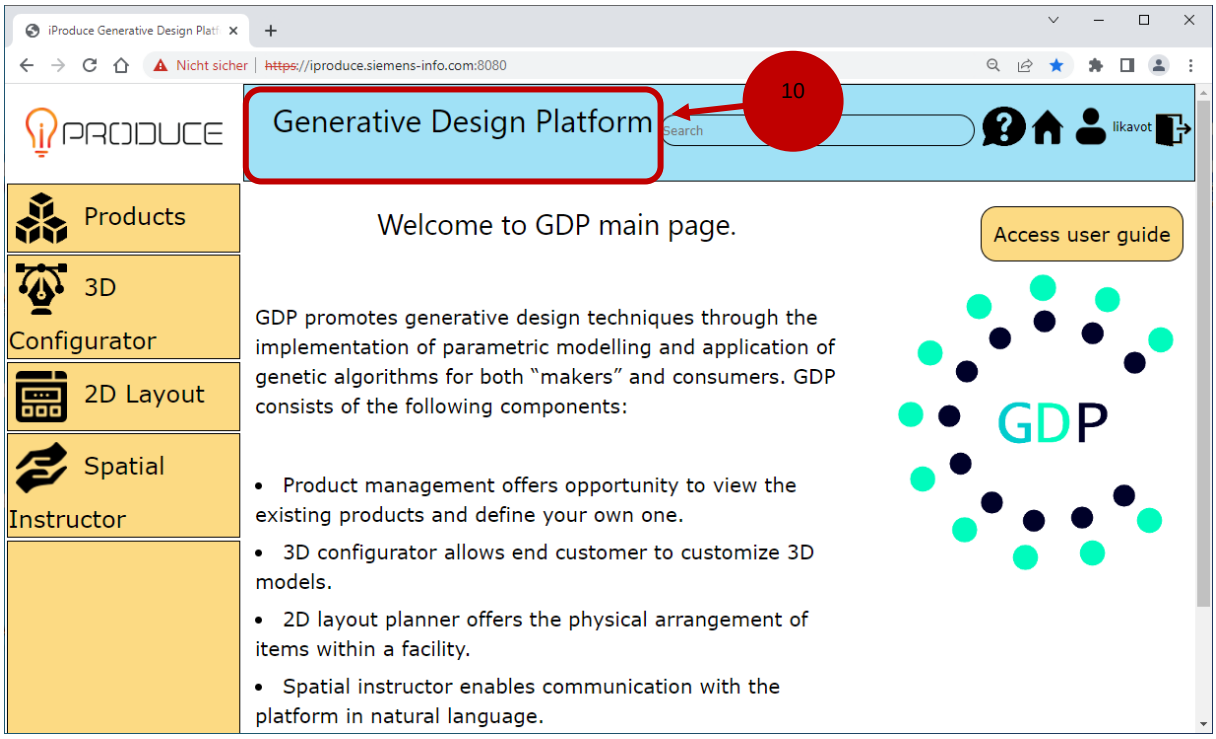

Figure 102 Generative Design Platform – Homepage

Here users can select a component from the GDP by clicking the corresponding button on the left side. For example, users can open the **3D configurator** section (11). In the 3D configurator there are several models introduced, among them the **Back Brace** (12). This model can be opened for the further configuration by clicking the image (12).

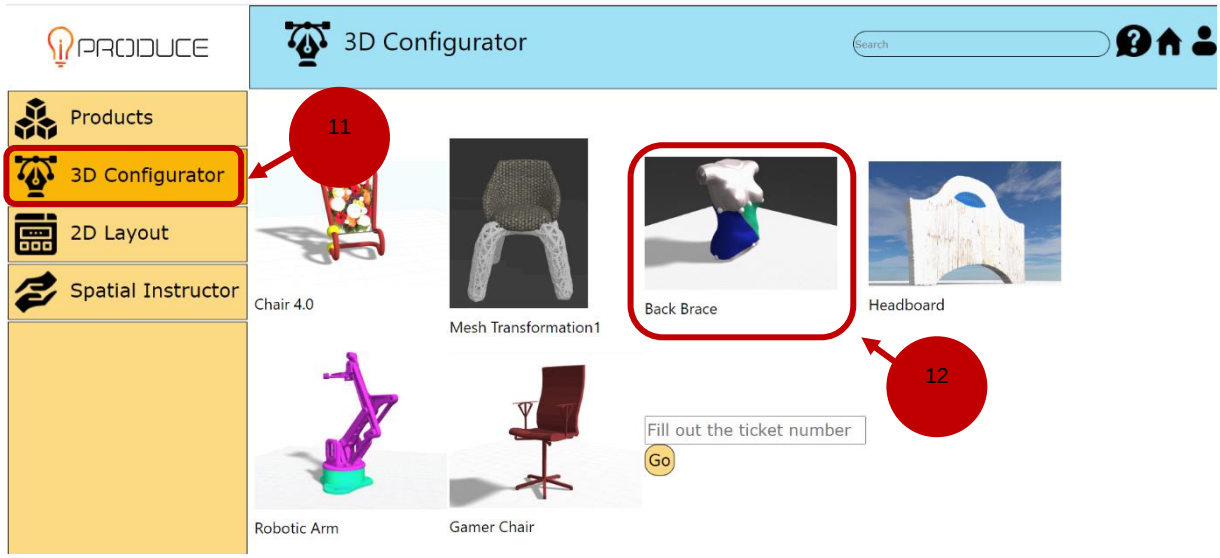

Figure 103 Generative Design Platform – Back Brace Model in the 3D Configurator

3.7.1. Generative Design Application in the Back Brace Parametric Model

When the back brace model is opened, the list of input model parameters (13), model outputs (14), a file upload button (15), several check boxes (16), a real-time model preview (17) are available for model personalization. The **Model Parameters** (13) can be changed manually to get a new 3D model with a

real-time visualization. Together with the outputs that are used for the definition of a **fitness function** (14) and the **model preview** (17), they create a corpus for the generative design process. The **Information** button (18) is mainly used to find out more about features linked to a particular model. Whereas the **User Guide** (19) is mainly used to find out more about the overall functionality within the GDP.

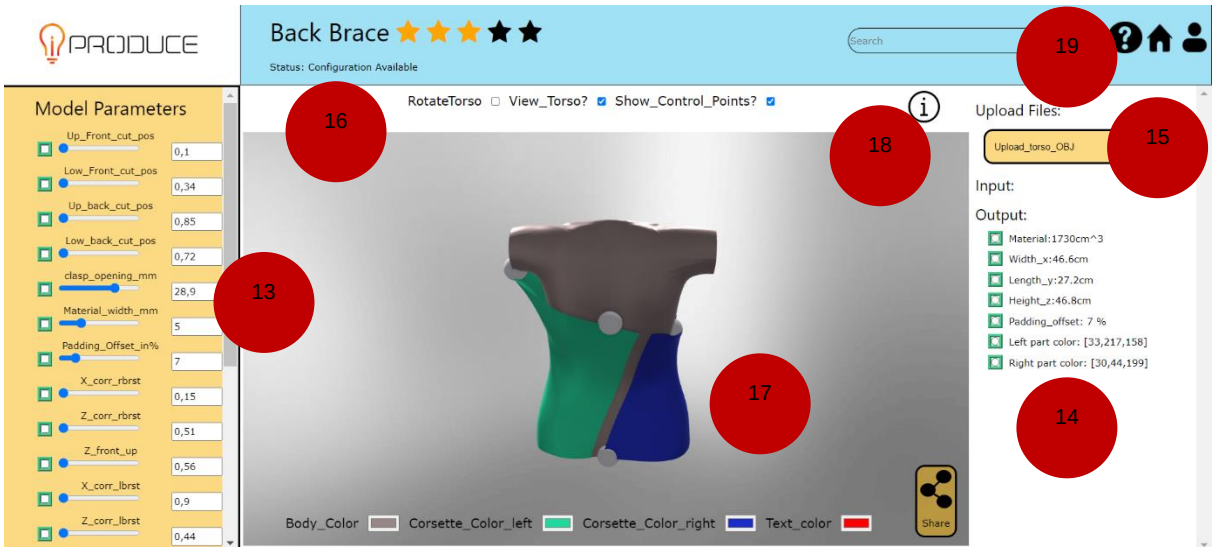

Figure 104 Generative Design Platform – Back Brace Model Functionality

The user can upload another 3D **Torso** model in .OBJ format (15). Note, that the generator can only generate a back brace for vertically positioned 3D models. In case the uploaded torso model is placed horizontally, the user can enable **Rotate torso** check box (16) to rotate torso. The result can be **previewed** in the real-time (17).

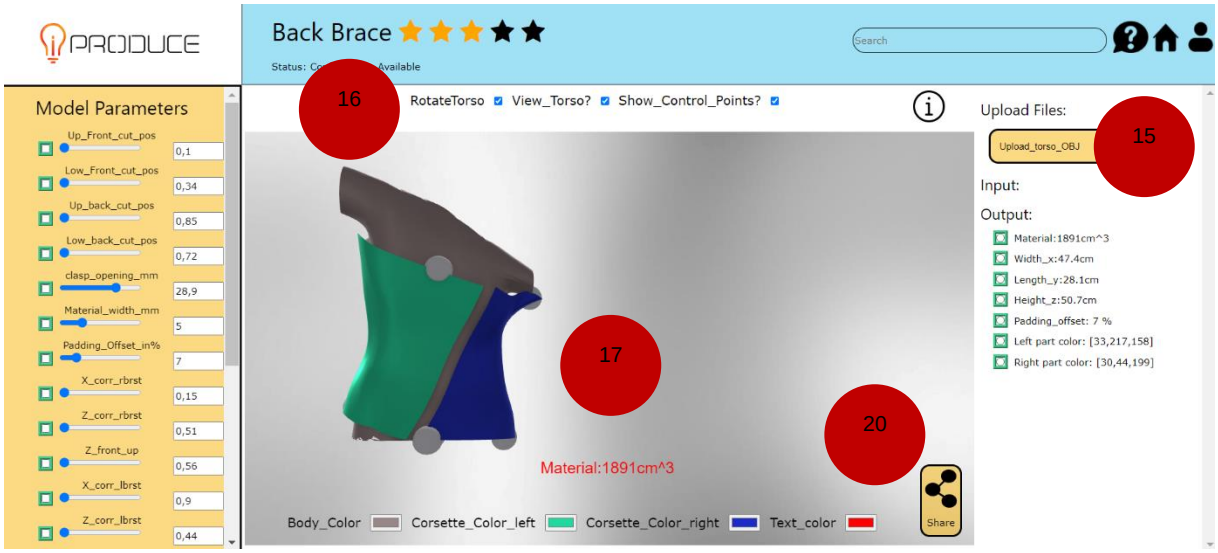

Figure 105 Generative Design Platform – Uploaded and Rotated Torso

The resulting 3D model of a back brace can be stored on the user machine by clicking the **Share** button (20) and providing the name for the OBJ file that will be downloaded.

In case a user strives to optimize the back brace by means of generative design to reach maximal width, he can choose an open clasp and precision **Model Parameters** (23) together with a width as a **fitness function** (21). After pushing **Generative Design** button (22), he is transferred to the next step.

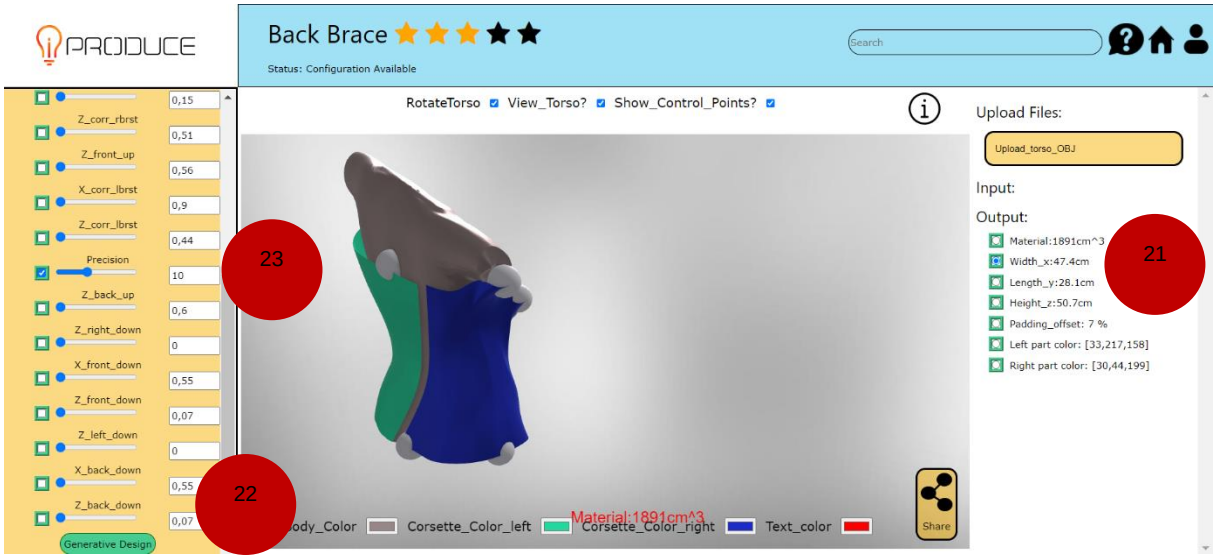

Figure 106 Generative Design Platform – Model Parameters and Fitness Function

After the input parameters and the fitness function are defined, a short summary appears under the **Genetic Algorithm Parameters** (25). The fitness target defines the **Optimization** goal (24), whether the chosen output value should be minimized or maximized. The **Generate** button (26) starts model generation. Alternatively, a user could return to the back brace model by pushing **Back** button (27).

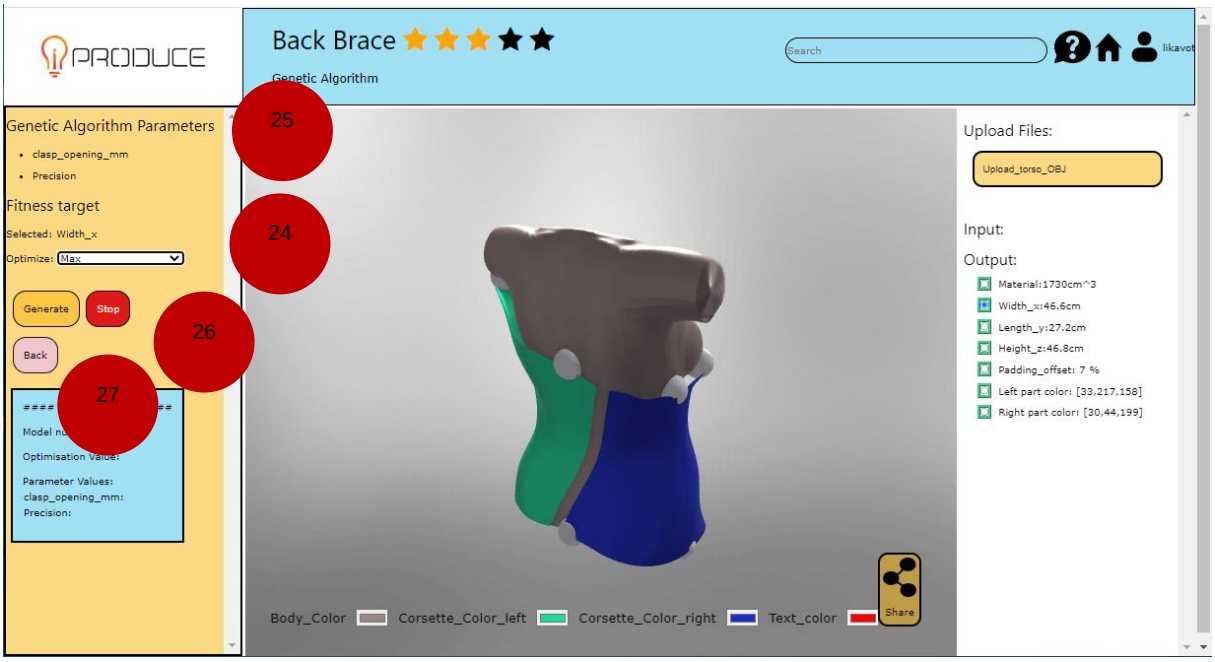

Figure 107 Generative Design Platform – Genetic Algorithm Parameters

For example, it takes several seconds to generate first generation with **10 models** (28) and expose the values of the outputs corresponding to those models. By clicking on a button with the output value, the preview of the corresponding generated model is enabled. The generation runs automatically several

iterations until it converges to optimal values. The full generation may take few minutes and can be aborted by clicking **Stop** (26) button.

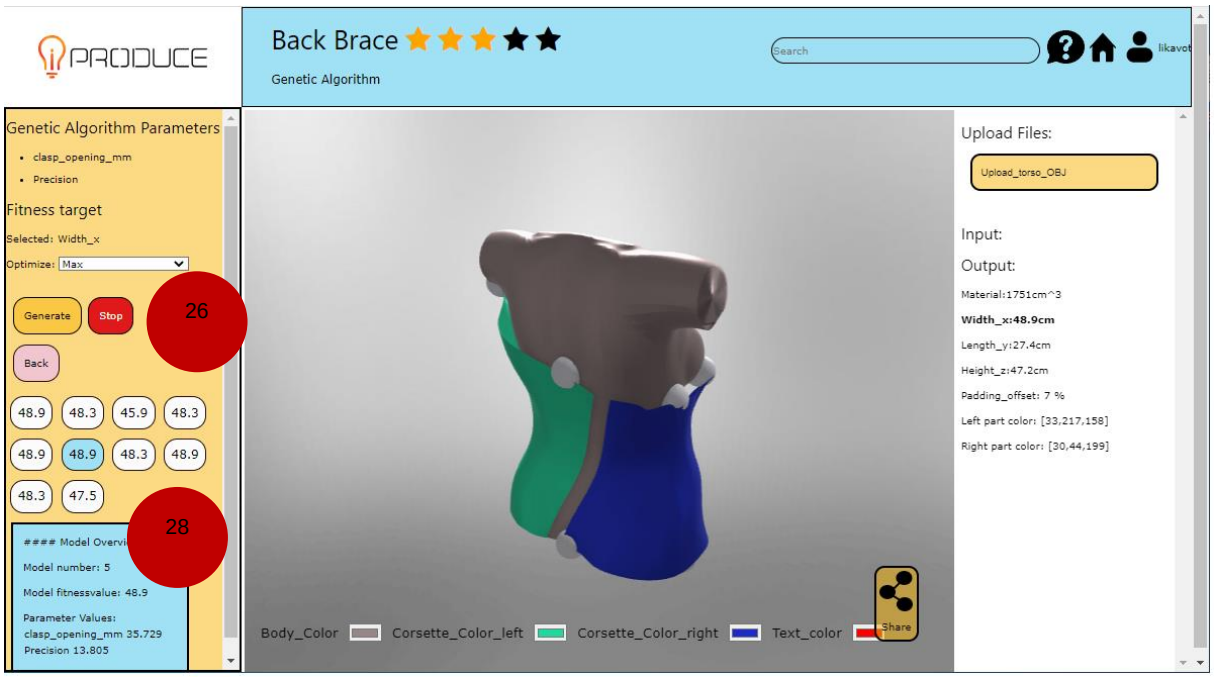

Figure 108 Generative Design Platform – Preview of the Generated Models

3.7.2. Generative Design Application in the Mesh Transformation Model

The **Mesh Transformation1** model shows an alternative way for the application of generative design. The default geometry previews a chair transformation, but it can be changed. The model of the back brace created by the user at the previous step can be uploaded under the **upload geometry** button (29). The left back brace represents the original uploaded geometry (but decorated with a default texture that can be changed by the user), the right back brace represents the transformation which is steered by the user by changing the model parameters and selecting the way how the model shall be scaled, or which parts of the model shall be transformed.

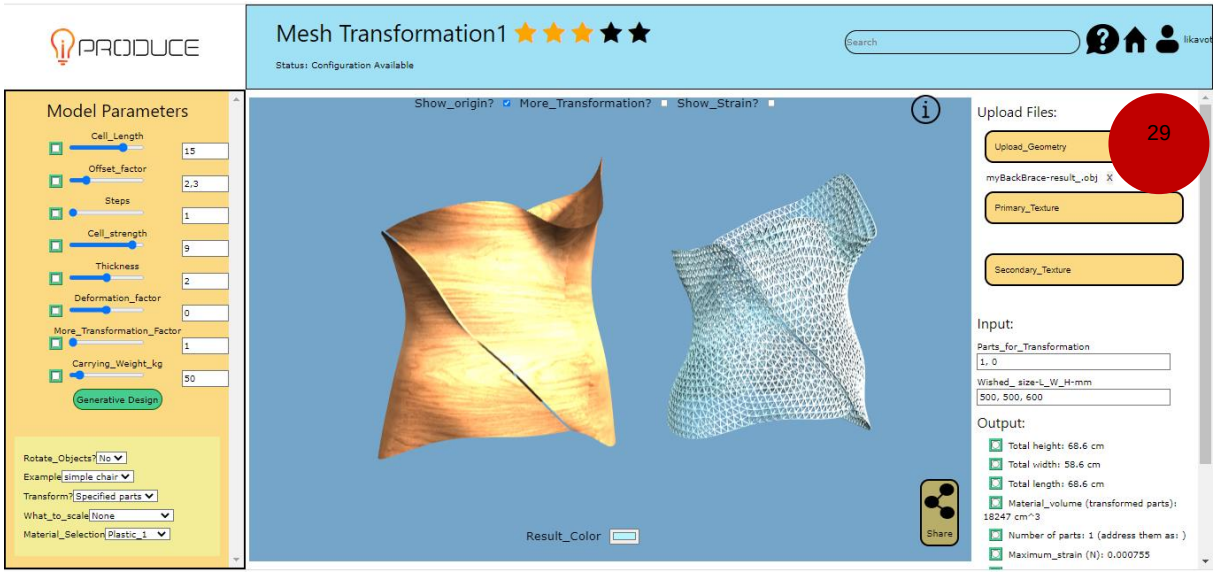

Figure 109 Generative Design Platform – Uploaded Back Brace into the Mesh Transformation Model

After the back brace model is uploaded, the **primary** (and also **secondary**) **texture** (30) can be personalized by an image upload in the .png or .jpeg format. In the example given below, the textures of the back brace parts are changed to new patterns.

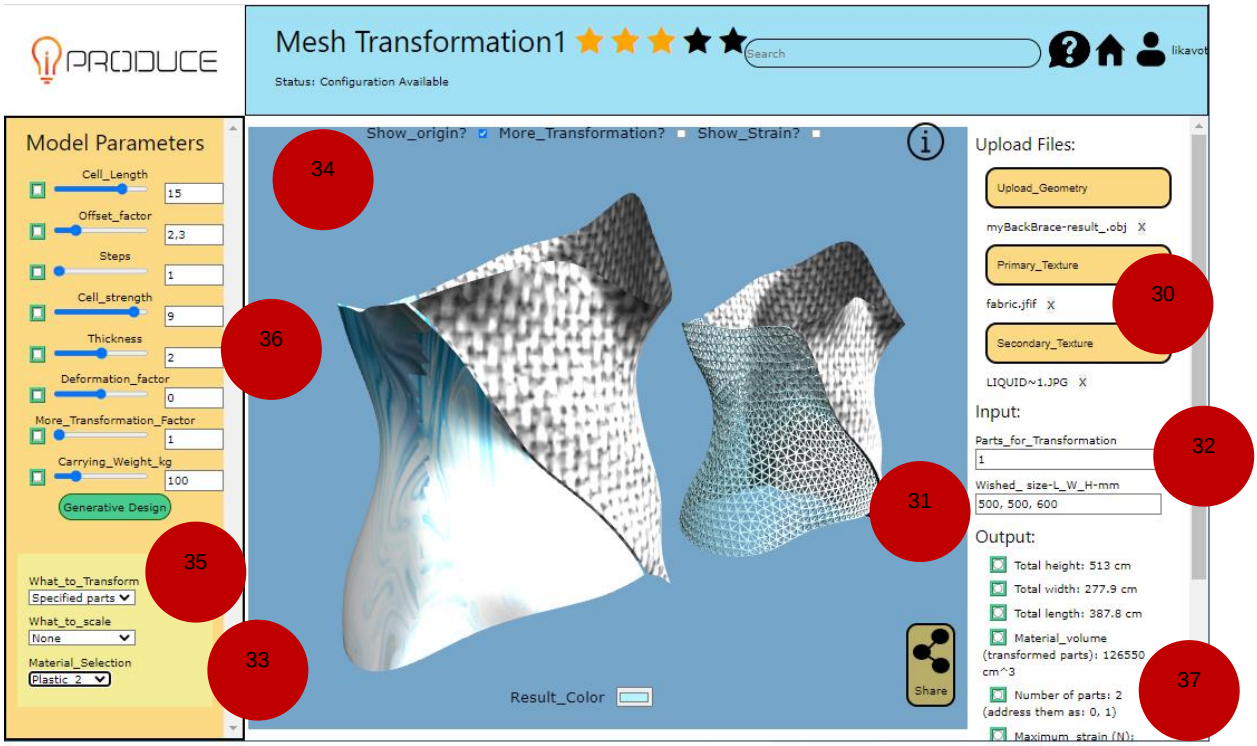

Figure 110 Generative Design Platform – Personalized Texture

This transformation shows the additional type of the **input parameters** (31, 32) listed on the right side. They are specified not via sliders with limited values, but as text inputs with no limitations on the values. The resulting geometry is scaled to the sizes (length, width, height) defined by the user in the **Wished size** text field (31) in mm. The **Parts for Transformation** text field (32) allows user to specify which parts of the entire geometry should be transformed, which are comma separated indices. The example

of the back brace consists of 2 parts (with index 0 or 1). Depending on the 3D model uploaded (OBJ input file), the number of parts can vary.

The **What to scale** drop-down-list (33) shows possibilities related to the size modifications. Here the entire model, the specified parts (specified in the text field “Parts for Transformation"), or the other parts (not mentioned in the right side’s text field) can be scaled to the wished size specified in (31). The **What to Transform** drop-down-list (35) defines the areas for transformation: whether the specified parts should be transformed or no transformation is needed. The **Show origin** check box (34) allows user to show or hide the original uploaded geometry (e.g., for the comparison purpose). The input **Model Parameters** on the left side (36) steers the transformation of the selected geometry parts. They can change the size of the holes, strengths of the cells in different direction, precision of the transformation. The user is invited to play with these parameters and see different design effects resulting in different output values on the right side (37).

Instead of manual change of the model parameters, the generative design can be applied for automatic selection of the input parameters depending on the wish for a selected output. The principle is the same as illustrated in the previous back brace use case. Firstly, after model parameters (e.g. cell strength) and the fitness function (e.g. material volume) are selected, the green **Generative Design** button (38) activates the next step.

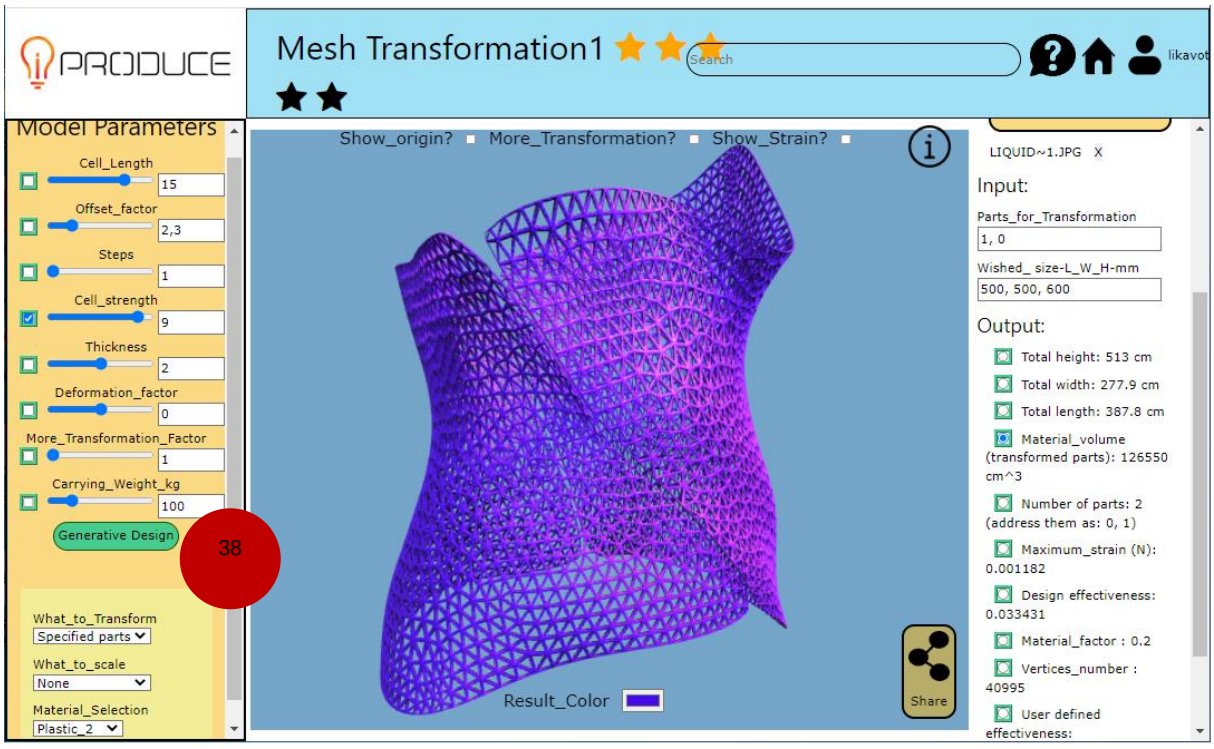

Figure 111 Generative Design Platform – Generative Design, Step 1: Selection of the Model Parameters and Fitness Function

Secondly, when the optimization goal is defined as minimization of the genetic algorithm parameters, the generation takes place as soon as the **Generate** button (39) is activated. A user can wait a couple of minutes, when the generative design will converge to the optimal value of the fitness function, or he/she can stop the generation by activating **Stop** (40) button. In this case, the algorithm finishes the current iteration to present the complete generation of individual models as the results of the current iteration.

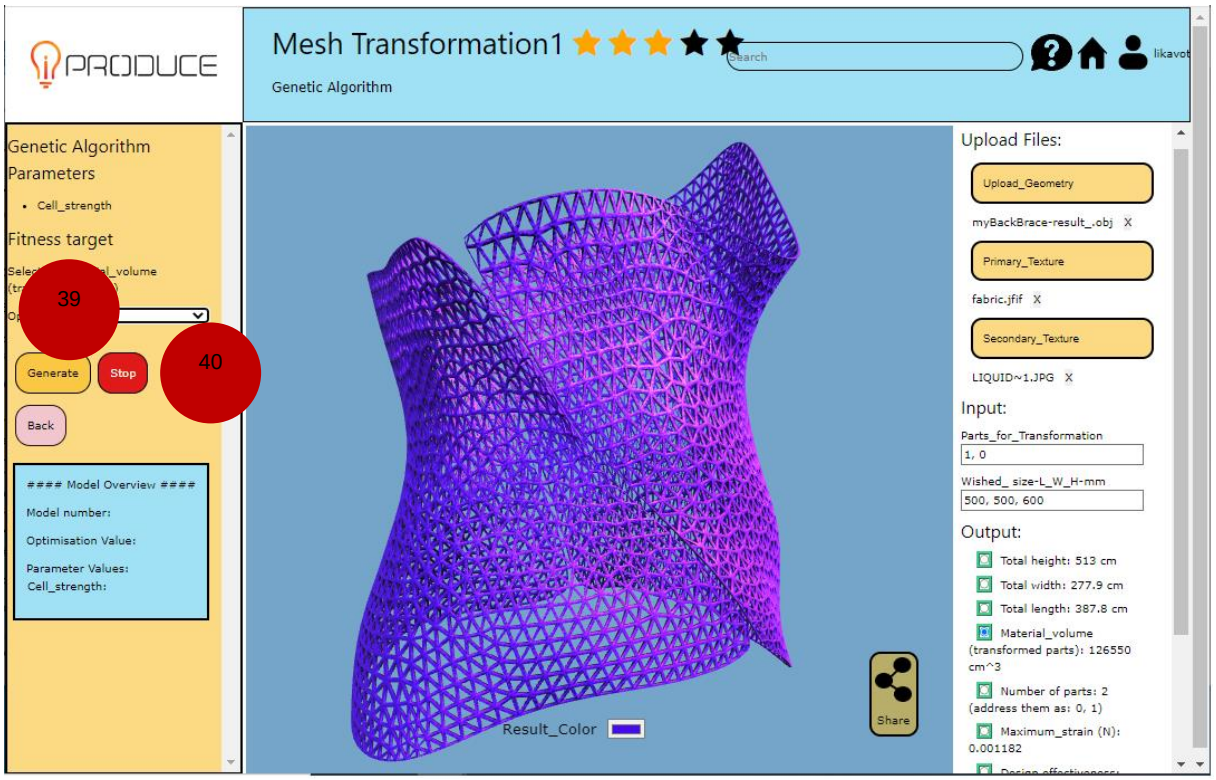

Figure 112 Generative Design Platform – Generative Design, Step 2: Definition of the Optimization Target

Thirdly, the **generated models** (41) can be previewed by selecting the corresponding values of the fitness function from the list. In this example the amount of the material was minimized.

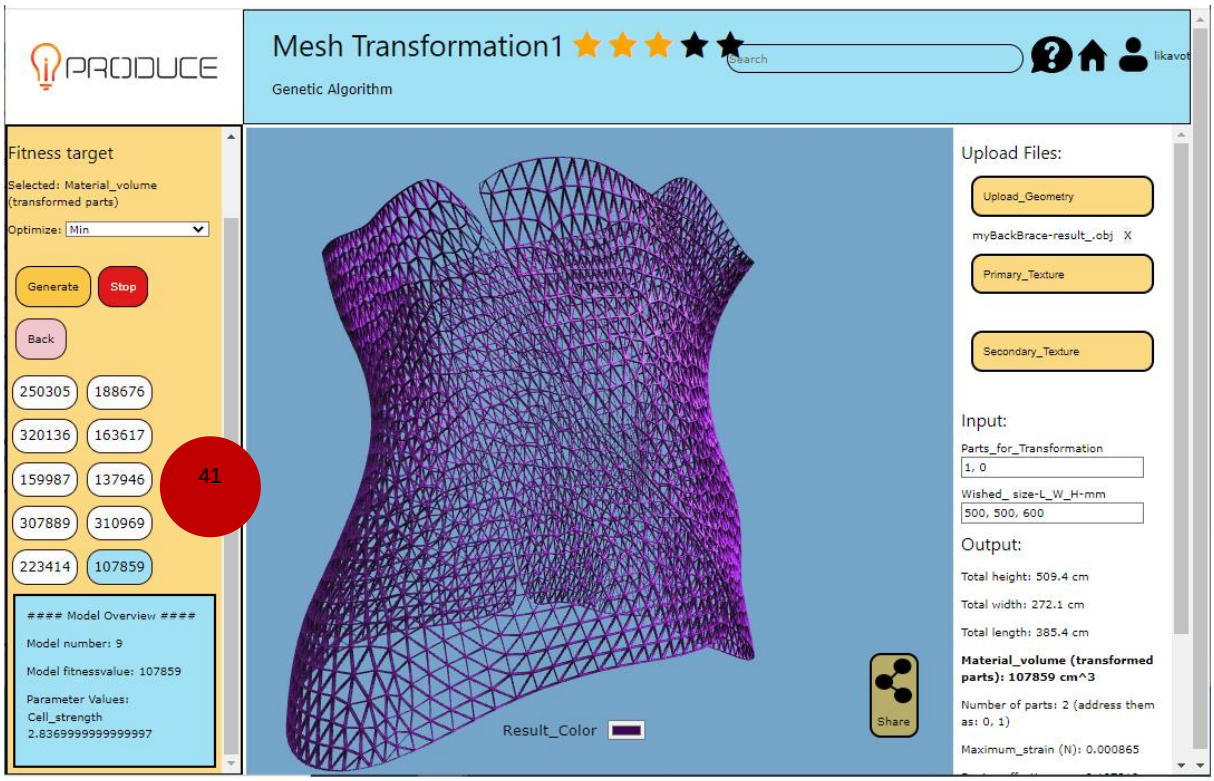

Figure 113 Generative Design Platform – Generative Design, Step 3: Generation Results

A typical example process for the usage of the GDP for the social manufacturing is illustrated below. Here users with different roles participate at different stages, use different GDP components, and exchange their results, requirements, and constraints over the GDP, which will be synchronized with Marketplace and AR/VR Toolkit. The list of the available products within OpIS platform with the complete definition and description will be obtained from the Marketplace. The results of the 3D model generations and transformations will be exchanged with AR/VR Toolkit for the further visualisation and configuration within the user's facilities.

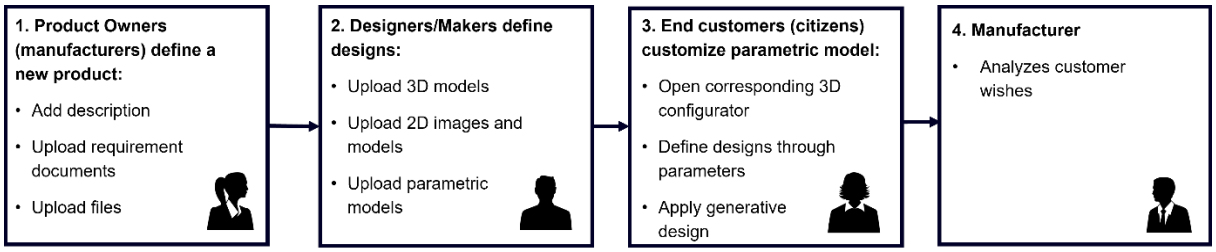

Figure 114 Generative Design Platform – Workflow

3.8. Agile Data Analytics and Visualization Suite

Our tool is accessible by selecting the **Agile Data Analytics and Visualization Suite** option in the iProduce Tools menu from the iproduce-tools.iti.gr/main/dashboard page:

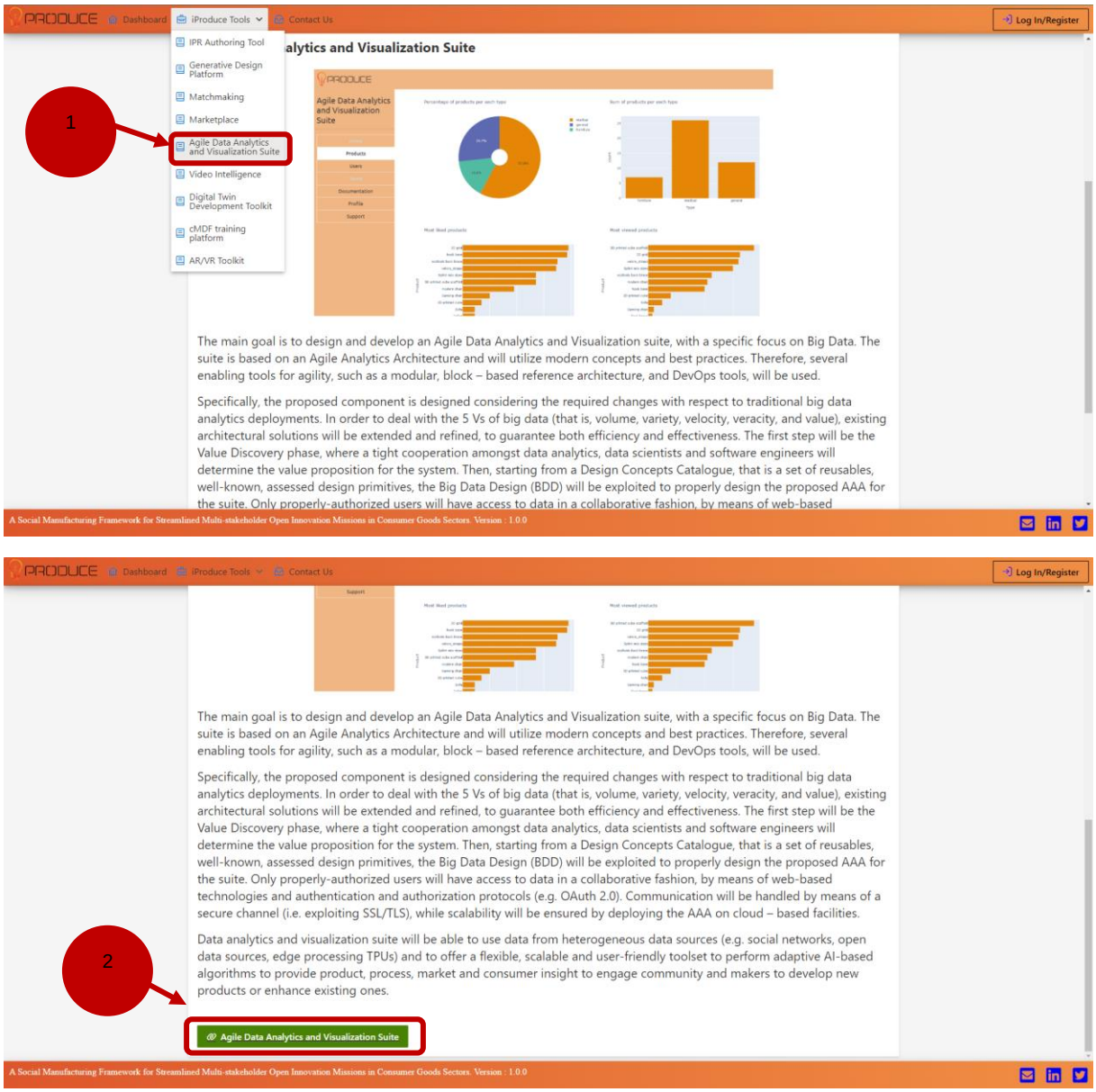

Figure 115 OpIS Dashboard Agile Data Analytics and Visualization Suite Page

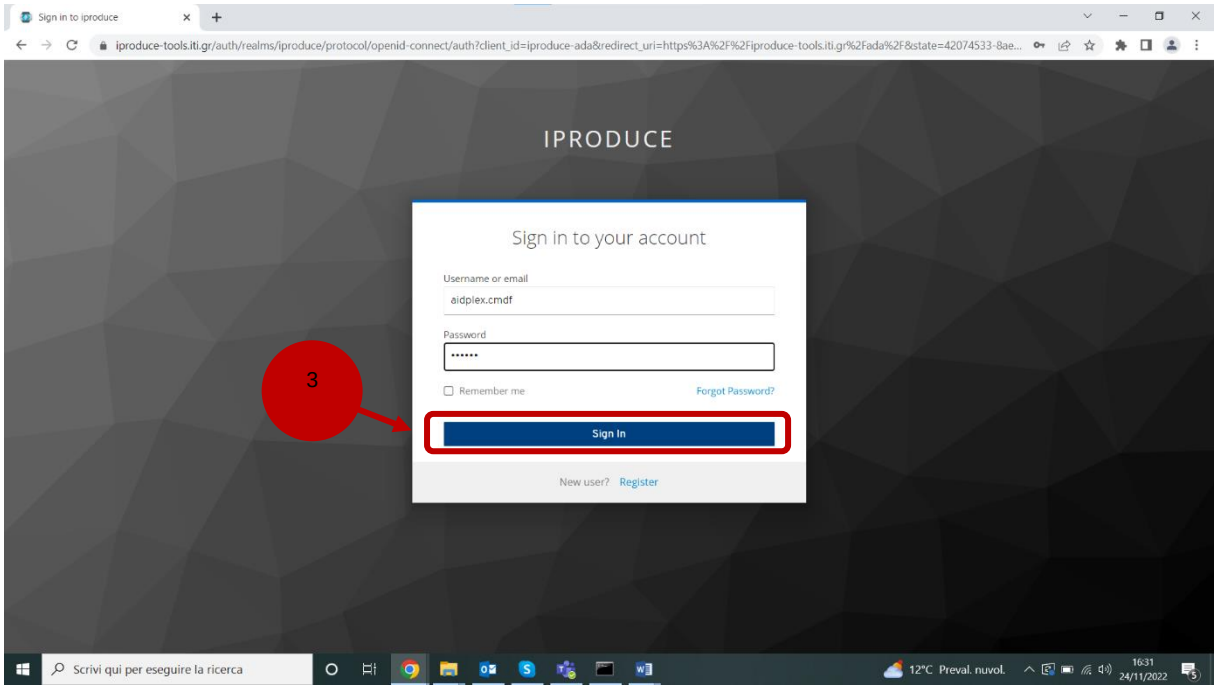

Figure 116 Agile Data Analytics and Visualization Suite – Log-In page

Once the user is successfully logged, he is automatically redirected to the welcome page of the tool. By clicking on the **Go to dashboard** button, the user can access the first and main page.

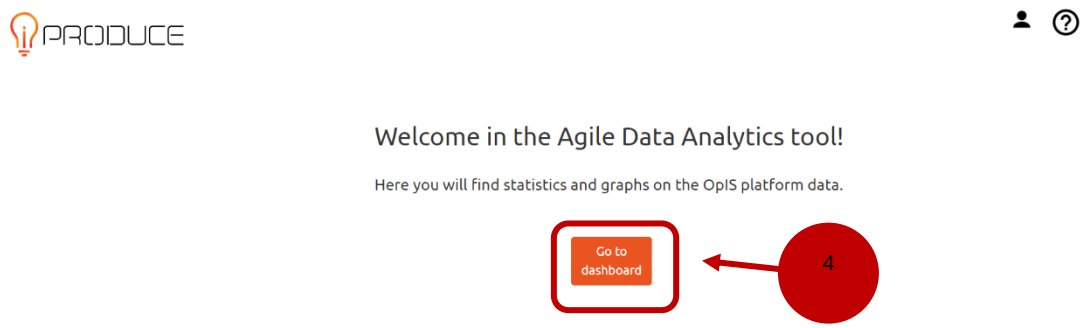

Figure 117 Agile Data Analytics and Visualization Suite – Welcome Page

In the main page, by clicking on the **Users**, **Teams** or **Products** buttons, the user can navigate between the related pages of the tool. The default page visualized refers to the Products on the OpIS platform.

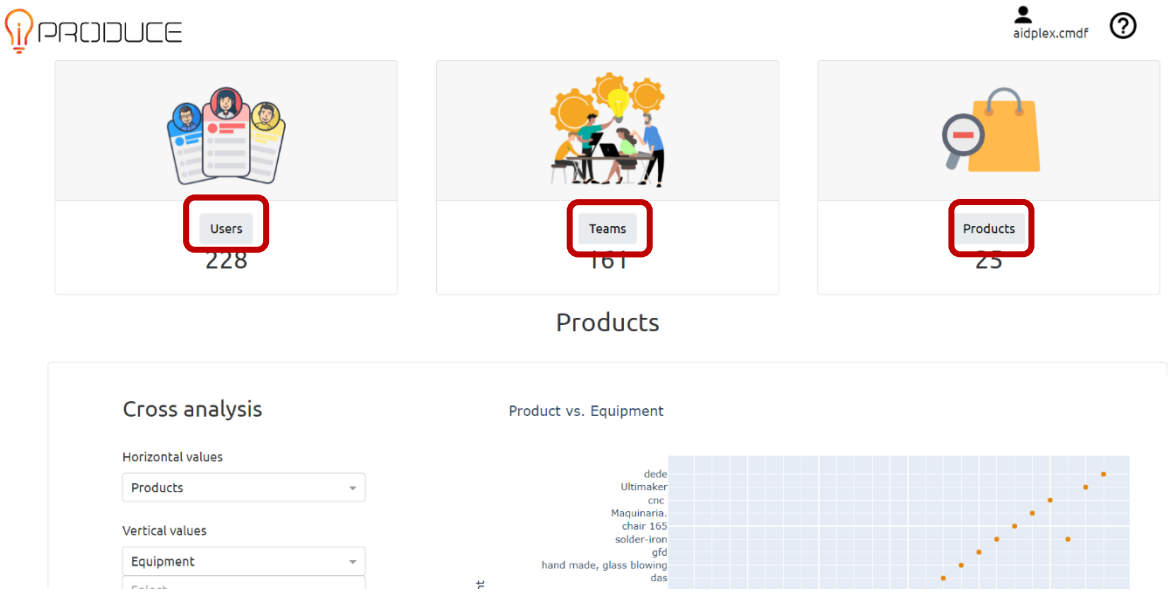

Figure 118 Agile Data Analytics and Visualization Suite – Main Page with Products

The first chart shown is the Cross analysis. By selecting a pair of fields in the two drop-down menus, it is possible to visualize a scatter plot (5). It is also possible to filter the results by Materials (on the x axis) or Equipment (on the y axis) (6) and to visualize a summary of the relative information for each product by passing the cursor over the points on the graph (7).

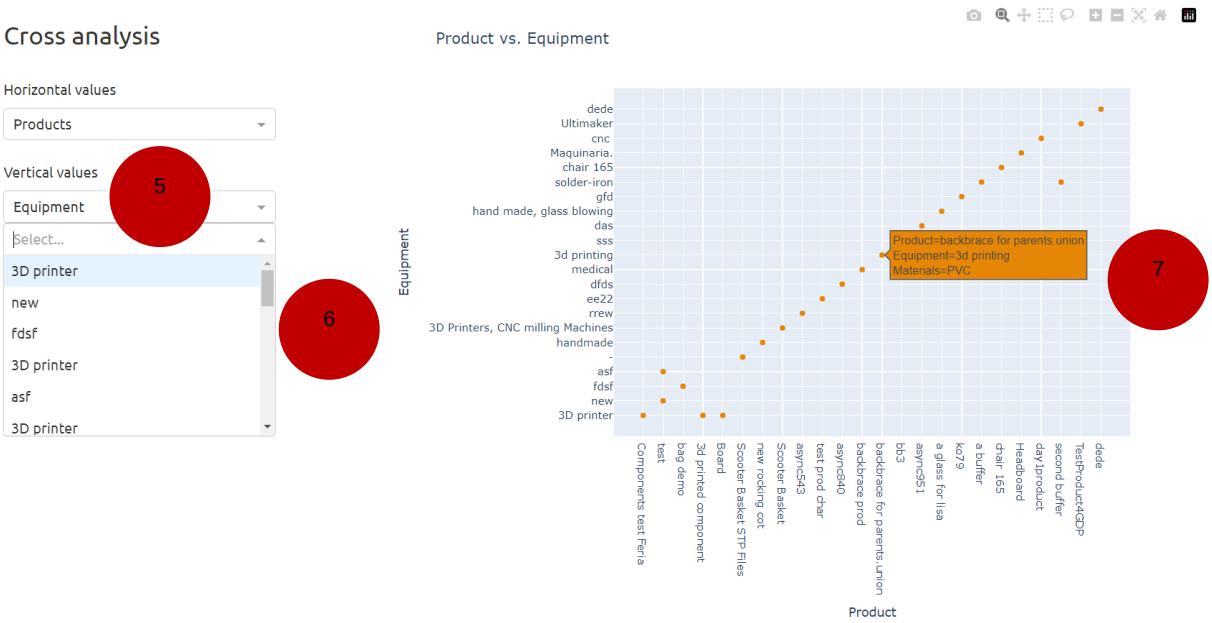

Figure 119 Agile Data Analytics and Visualization Suite – Cross Analysis Graph

Below, there are a pie chart and a histogram that report statistics about a specific products' feature. The user can choose the feature to be considered in the analyses by selecting the option in the top menu (8). Depending of the feature selected, both the charts will update accordingly with the data available on the OpIS repository.

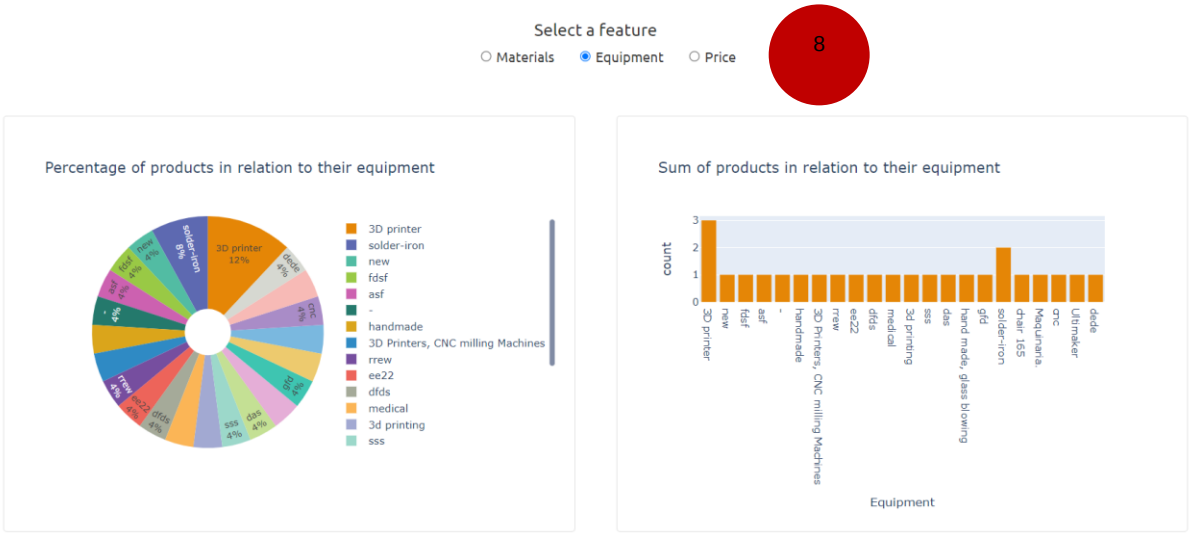

Figure 120 Agile Data Analytics and Visualization Suite – Pie Chart and Histogram on the Selected Feature

Below, there are two histograms that show the number of likes and views for all the products available on the platform (sorted in descending top-down order) (9).

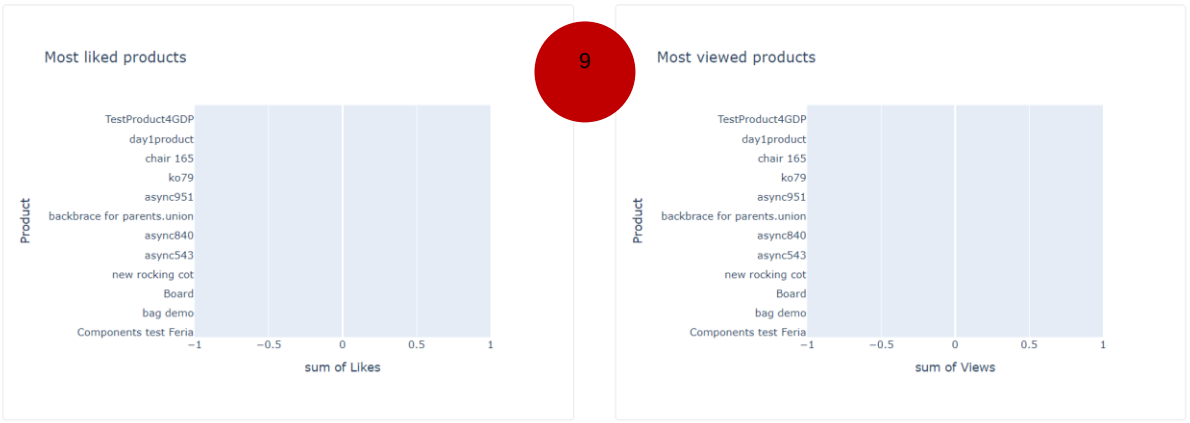

Figure 121 Agile Data Analytics and Visualization Suite – Most Liked and Most Viewed Products Graphs

The last graph of the page shows the history of new products created on the marketplace over time (10).

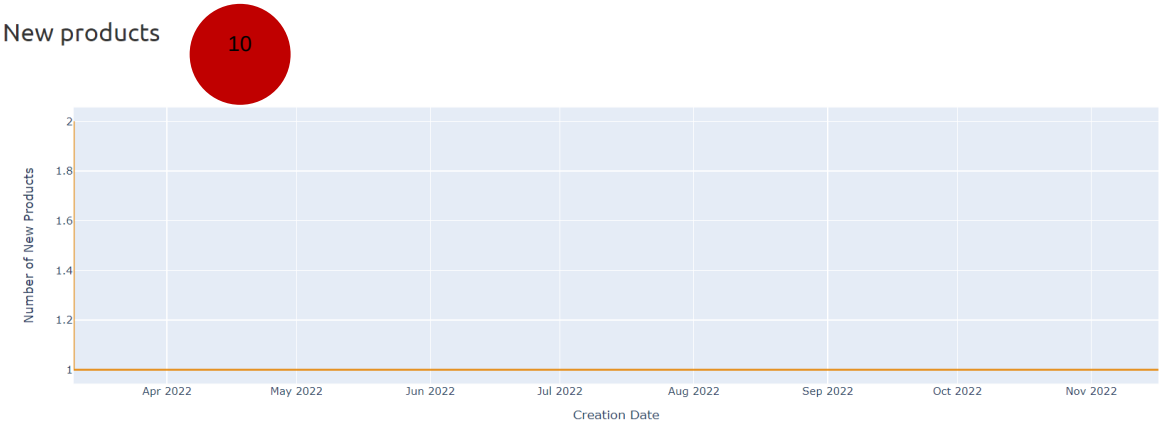

Figure 122 Agile Data Analytics and Visualization Suite – New Products Graph

If the user clicks on the **Teams** button, the related graphs are displayed.

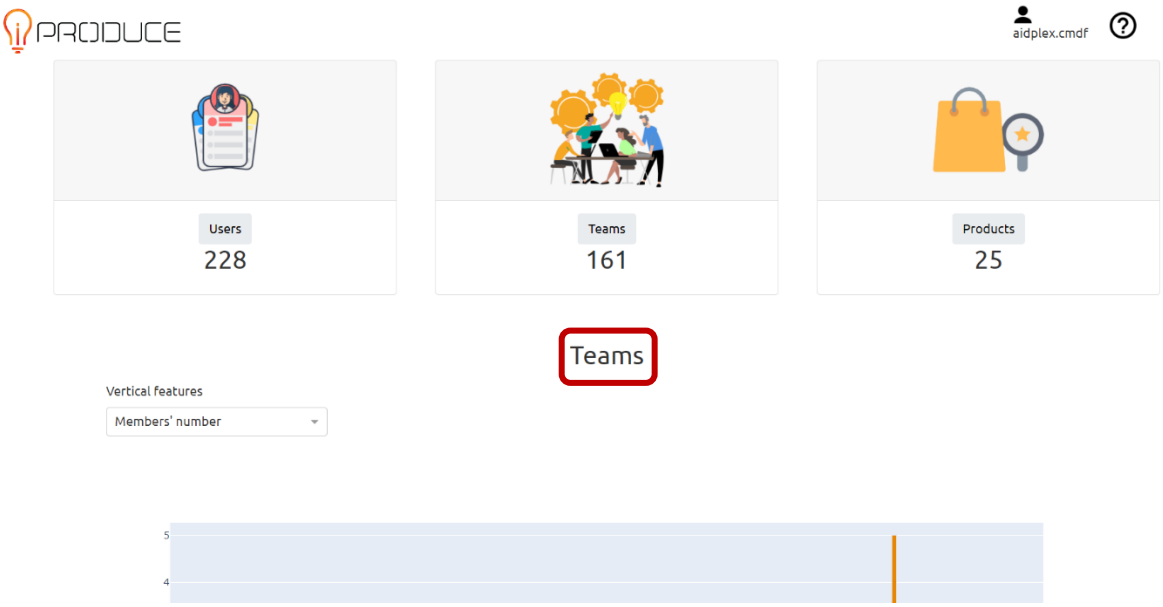

Figure 123 Agile Data Analytics and Visualization Suite – Teams Page

By choosing a value via the dropdown menu (11), the graph displays a histogram on the Teams in relation to the feature selected (12). Changing the feature chosen in the menu will update the graph accordingly, and it is possible to read more details of a single team by moving the cursor over the related bar in the chart (13).

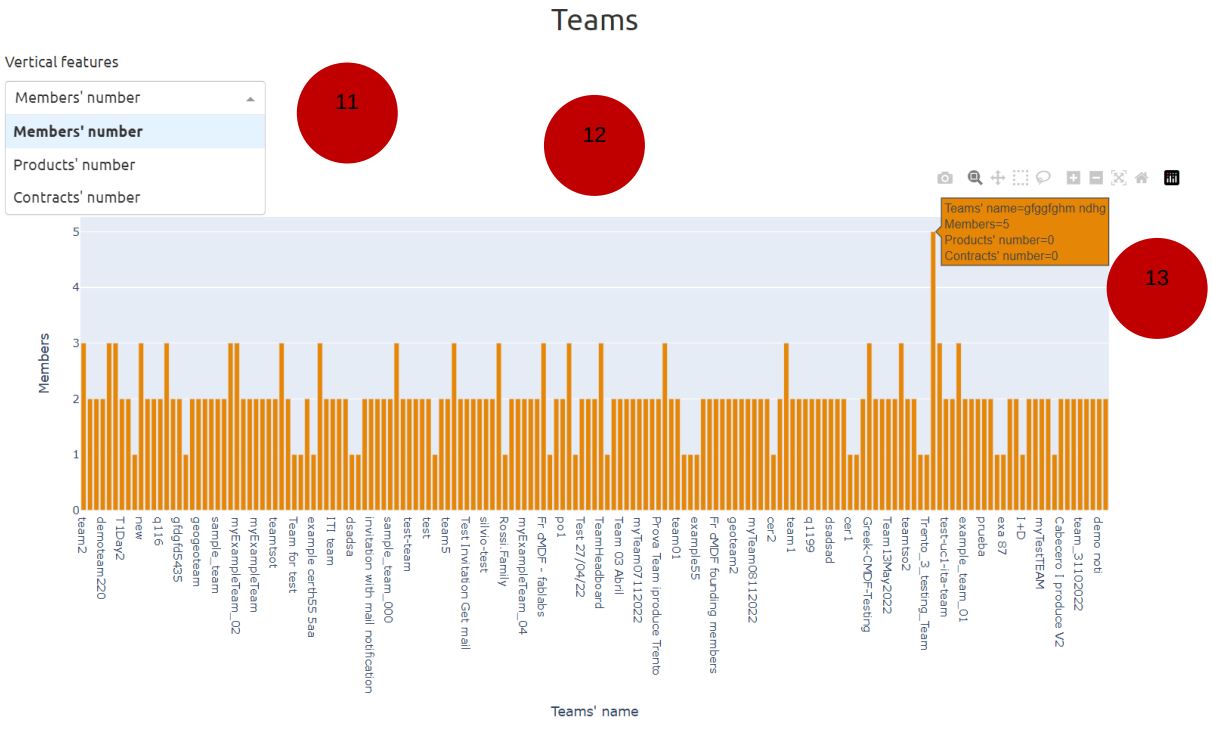

Figure 124 Agile Data Analytics and Visualization Suite – Teams Bar Chart

At the bottom of the page, there are the links to the description pages of each cMDFs on the Marketplace (14).

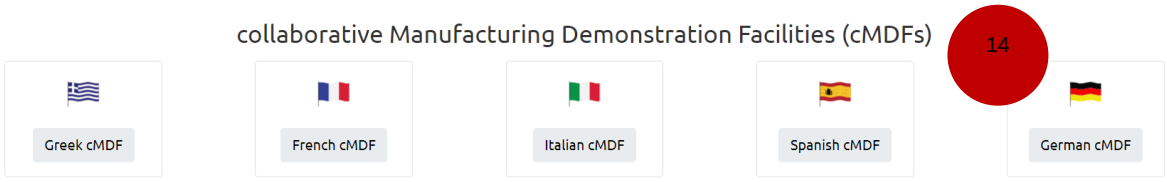

Figure 125 Agile Data Analytics and Visualization Suite – References to cMDFs Pages on the Marketplace

In the “Users” page, the first graph is a world cloud. The bigger a world, the more users have added that skill as one of theirs in their profile (15).

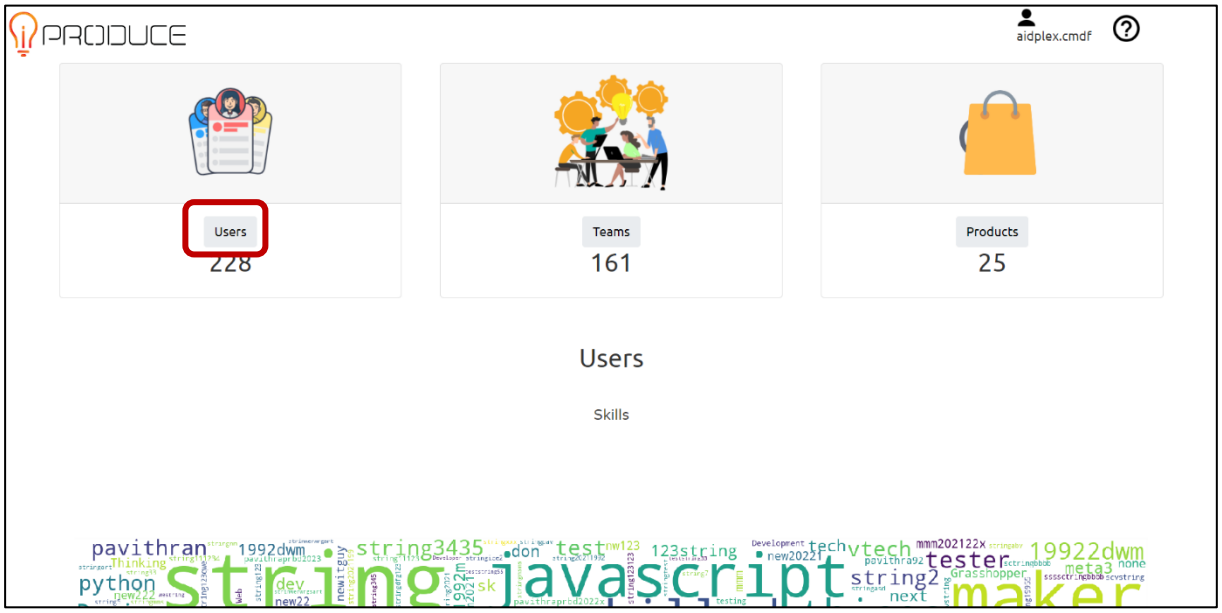

Figure 126 Agile Data Analytics and Visualization Suite – Users Page

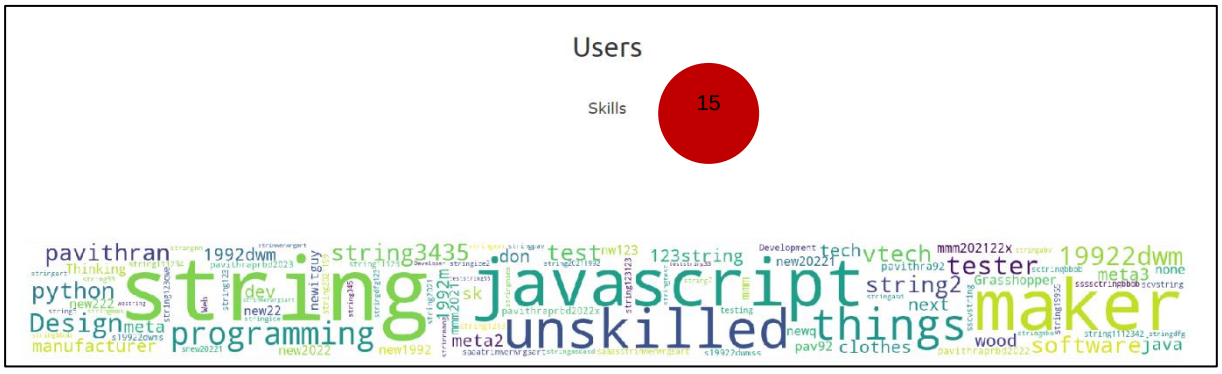

Figure 127 Agile Data Analytics and Visualization Suite – Skills Word Cloud

Below, the user can see other users on a navigable world map based on their location. Initially the map is centered on the location of the logged user, then in this case it is centered on Greece (16).

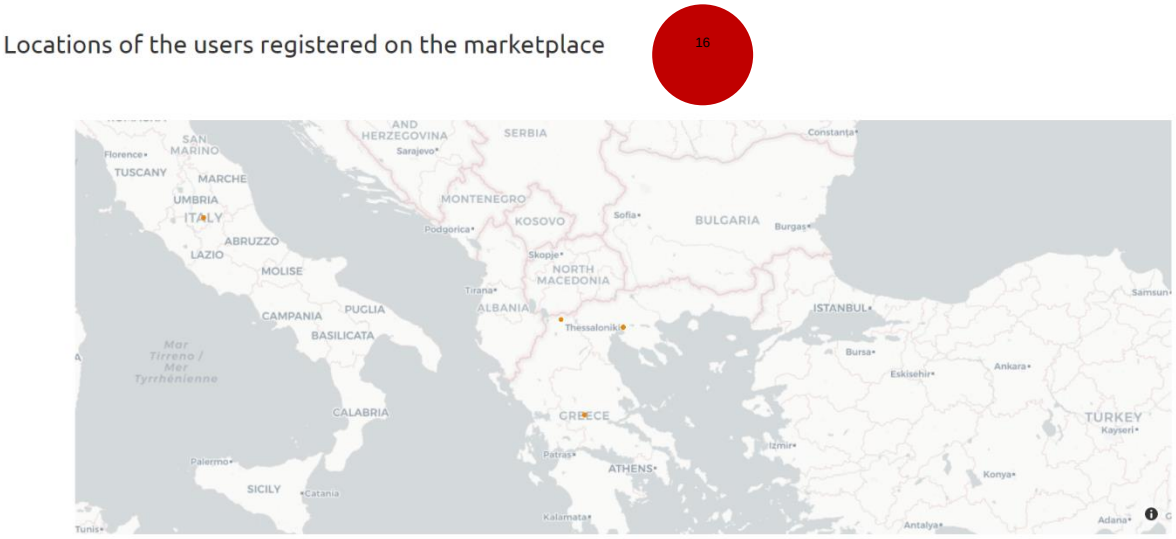

Figure 128 Agile Data Analytics and Visualization Suite – Locations of Users on the Marketplace

Finally, the last graph represents new users joining the OpIS platform over time (17).

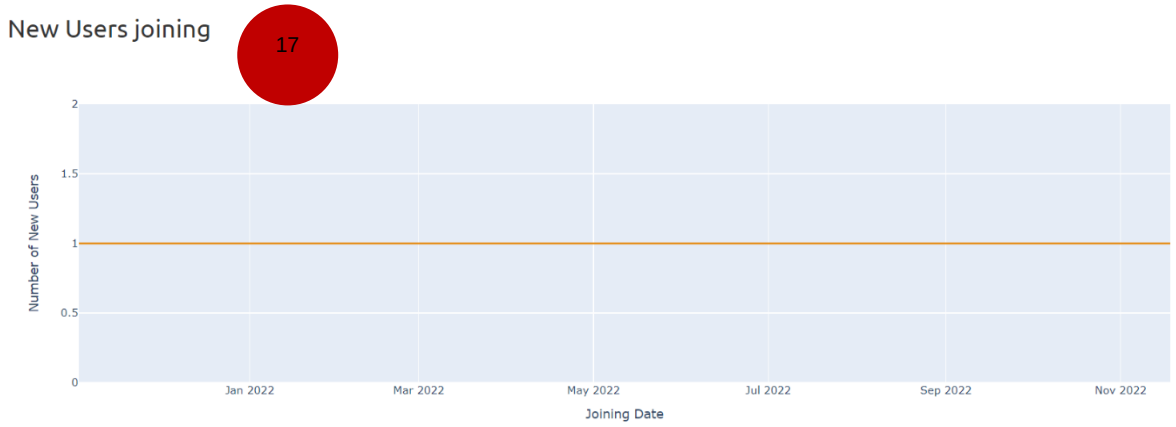

Figure 129 Agile Data Analytics and Visualization Suite – New Users Graph

By clicking on the user icon on the top right corner, the user can visualize his profile, with some personal information (18) and a summary of his products and teams, if any (19).

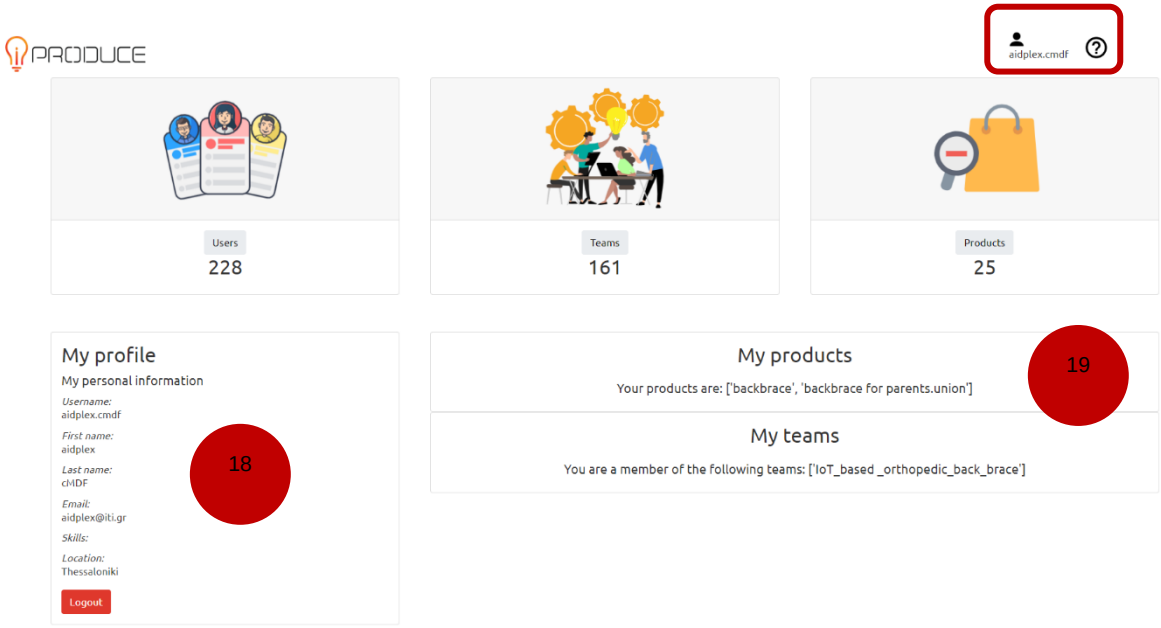

Figure 130 Agile Data Analytics and Visualization Suite – Profile Page

At the bottom of the profile page, the user can find the links to the project's social media pages and a "Contact us" link (20).

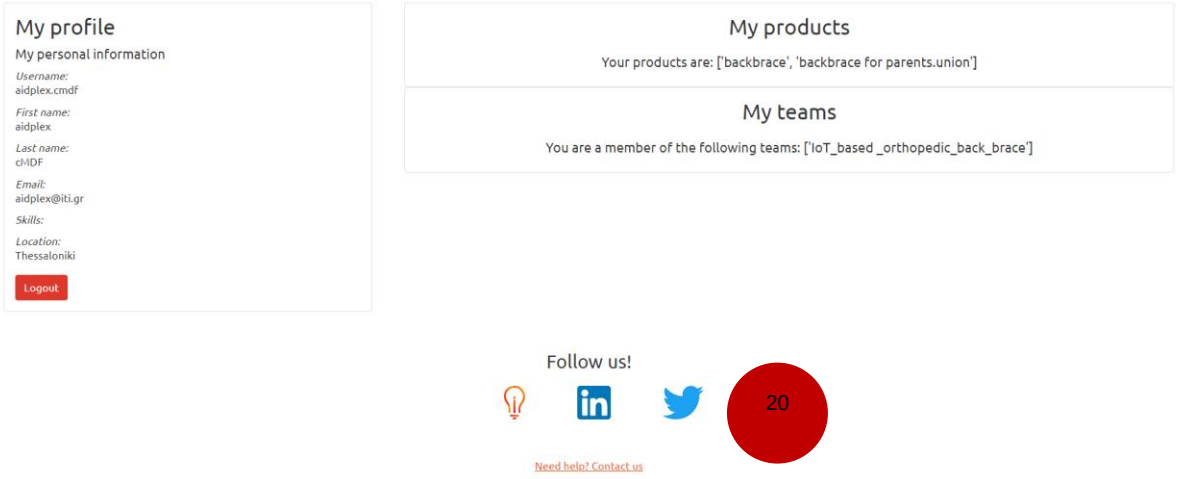

Figure 131 Agile Data Analytics and Visualization Suite – Social Media and Support Links

For further support, the Documentation page is accessible via the question mark icon in the top right corner and provides guidelines and explanations on the meaning and the interpretation of the graphs displayed in the tool (21).

Documentation

Welcome in the Agile Data Analytics tool.

Here you can find useful insight and statistics on the data available in the iProduce Platform.

In particular, in our tool there are 3 sections, related to Users, Teams and Products of the platform.

In the Users section, the first graph you can see is a word could based on the skills of the users registered on the platform. The bigger a word is, the more users have added that skill to theirs in their profile.

Then, you can find a map with the locations of the users registered of the platform. The map is initially centered on your location, if you have provided it when registering to the platform. If you pass with the cursor over one of the points, you will be able to visualize the location and the users registered in that position.

The last graph of the tab refers to the number of users joining the platform over time.

In the Teams tab, the first graph you see is an histogram about the teams created on the platform. Thanks to the dropdown menu on top left of the chart, you can change the data visualized in the graph. The available options are Members' number, Products' number and Contracts' number of each team. If you pass over a column of the graph, you will visualize some details of the related team.

At the bottom of the page, you can find the links to our collaborative Manufacturing Demonstration Facilities (cMDFs) pages on the Marketplace. By clicking on one button, you will be redirected to the description page of the related cMDF on the Marketplace.

In the last tab, the Products tab, you can visualize graphs and statictics related to the products available on the platform.

The first graph displayed is the Cross analysis: depending of the values chosen via the two dropdown menus on the left side, the graph will plot a crossed analysis on the right. If you select "Materials" for the horizontal values, or "Equipments" for the vertical ones, you can filter the values plotted on the axes. If you pass over a point of the chart with the cursor, you will visualize a summary and more information for that specific product.

The following two graphs below are a pie chart and a histogram that use as the main variable the option chosen in the menu just above the graphs. If you switch to another feature, the graphs will update accordingly. Generally speaking, the pie chart visualizes the percentage of usage of the selected feature in the products of the platform, while the histogram counts the products having the same feature as the one previously selected.

Then, you can visualize a graph showing the most liked and viewed products on the Marketplace. The list is sorted from top to bottom, that means that the upper products are the ones with

Figure 132 Agile Data Analytics and Visualization Suite – Documentation Page

3.9. cMDF Training Platform

The cMDF Training Platform collection of applications is available from the OpIS Dashboard through the user's web browser. From the **iProduce Tools** top menu users can select the cMDF Training Platform option and access the appropriate page.

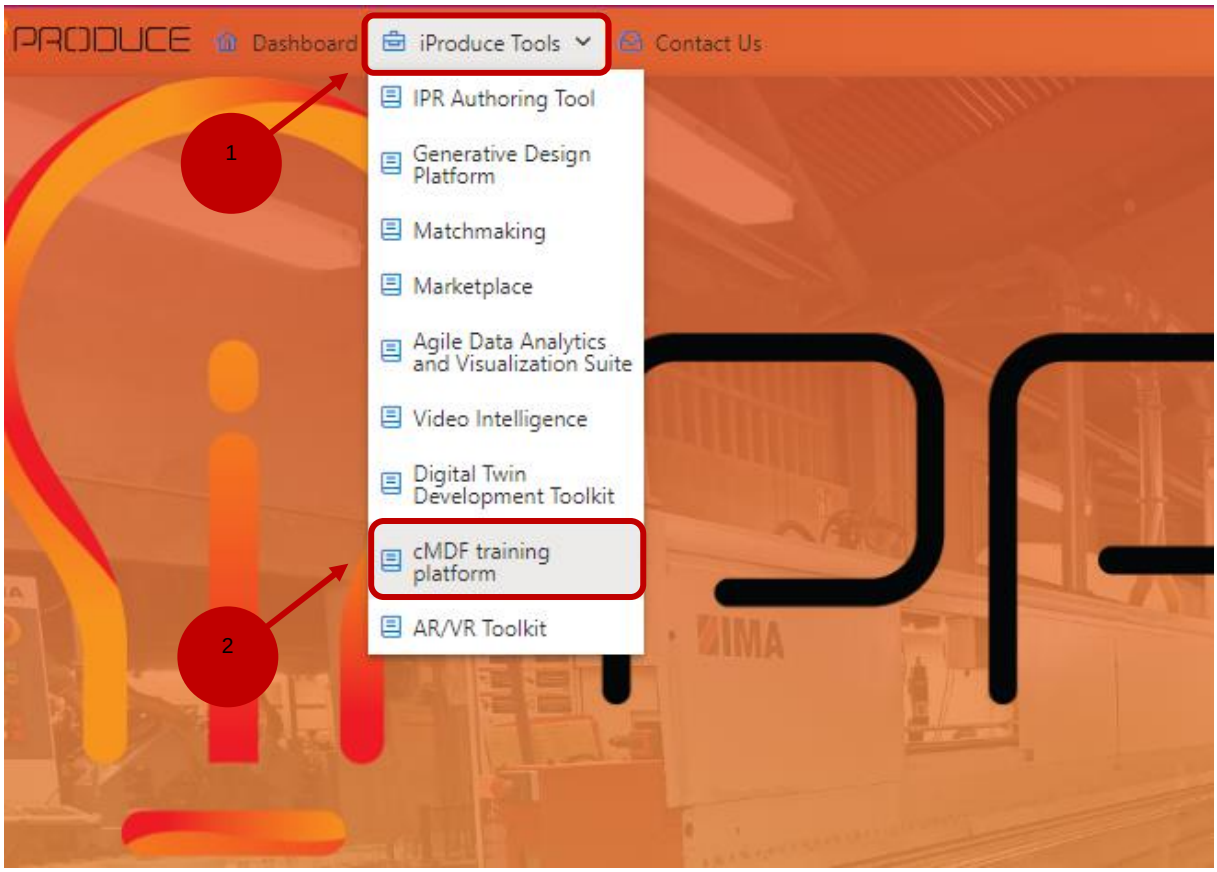

Figure 133 OpIS Dashboard cMDF Training Platform Page

Users are presented with the central page of the cMDF Training Platform. A brief overview and description of the available tools and their functionalities is provided in the same page.

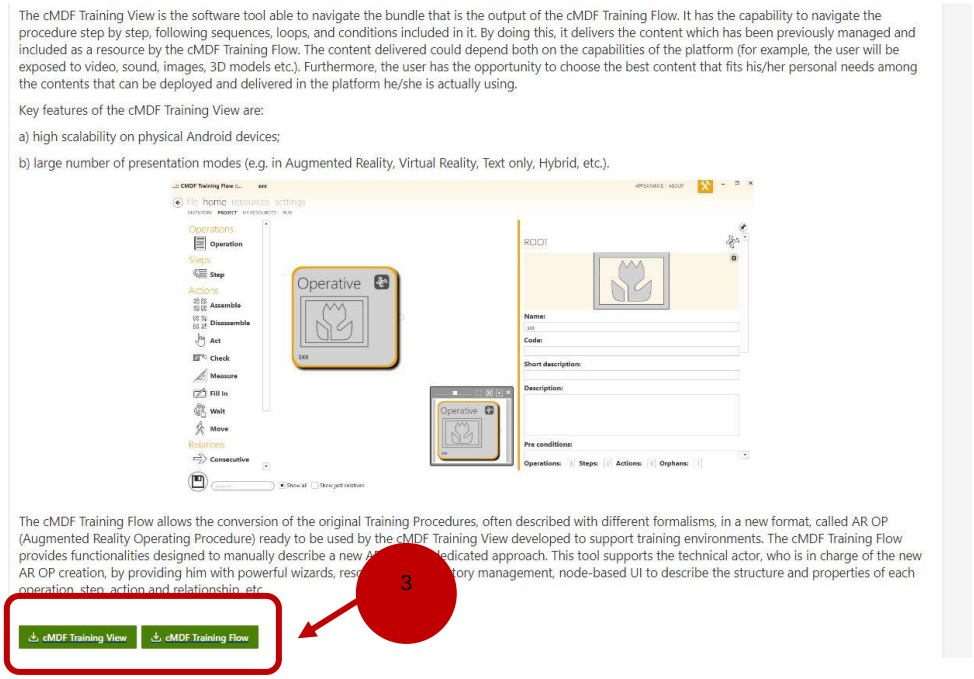

Figure 134 OpIS Dashboard cMDF Platform Page

In addition, at the bottom of the page users can find appropriate buttons that serve as an access point leading endpoints with install files for each version included in the cMDF Training Platform.

The cMDF Training Platform is a combination of the **cMDF Training Flow** windows desktop application and the **cMDF Training View** android mobile application.

3.9.1. cMDF Training Flow:

The cMDF Training Flow is a desktop application used by stakeholders to create assembly and training procedures for their tools and products. The tool is available as a window's executable file (.exe).

Once the application is loaded, by selecting the **file** option in the top menu bar, the user can view the currently created procedures. Users can **edit** and **delete** procedures or **create** new ones from the **plus sign (+)** which appears on the bottom left corner of the screen.

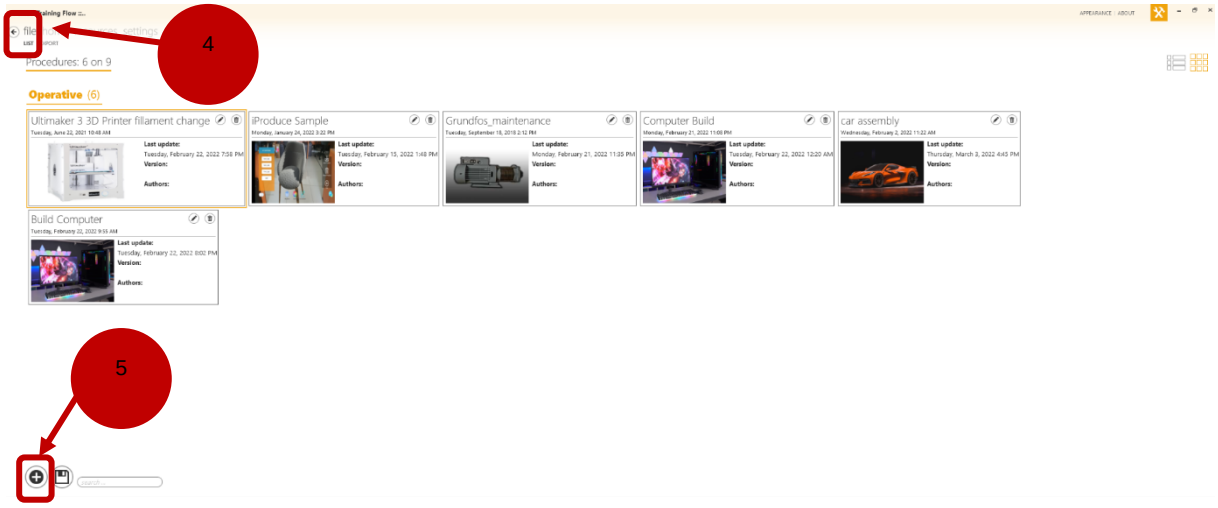

Figure 135 cMDF Training Flow – Home Page

A new empty procedure is illustrated in the following image.

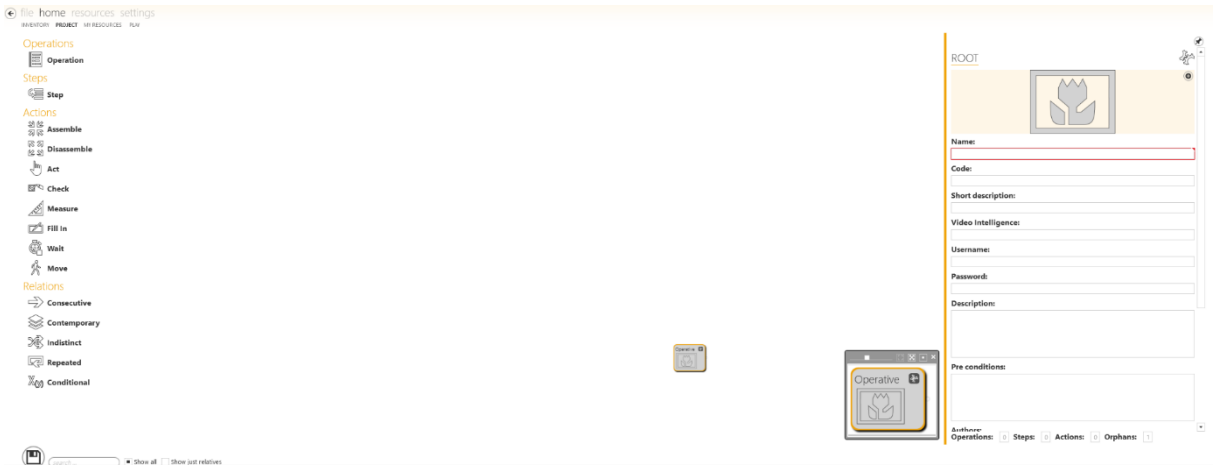

Figure 136 cMDF Training Flow – Home Page, New Procedure Page

The user can create a tree graph, which will depict all the steps for a training procedure, including: e.g. operations, steps, actions, relations etc. All these features are for demonstration purposes, in order to better visualize the holistic scheme/ tree diagram of a training procedure. Additionally, the user can upload a video, or an image.

Based on the above comments, a correct design procedure must have the following components:

- **(1) Operative** (6) (the root) -> **(7) Operation** (the main purpose of the procedure) -> **(8) Steps** (each step represents a different process) -> **Actions**.

- In the following image the procedure ***"Ultimaker 3 3D Printer"*** is presented. The username and the password are required for connection in the Video Intelligence. In the Video Intelligence field a video can be specified as an attribute (URL).

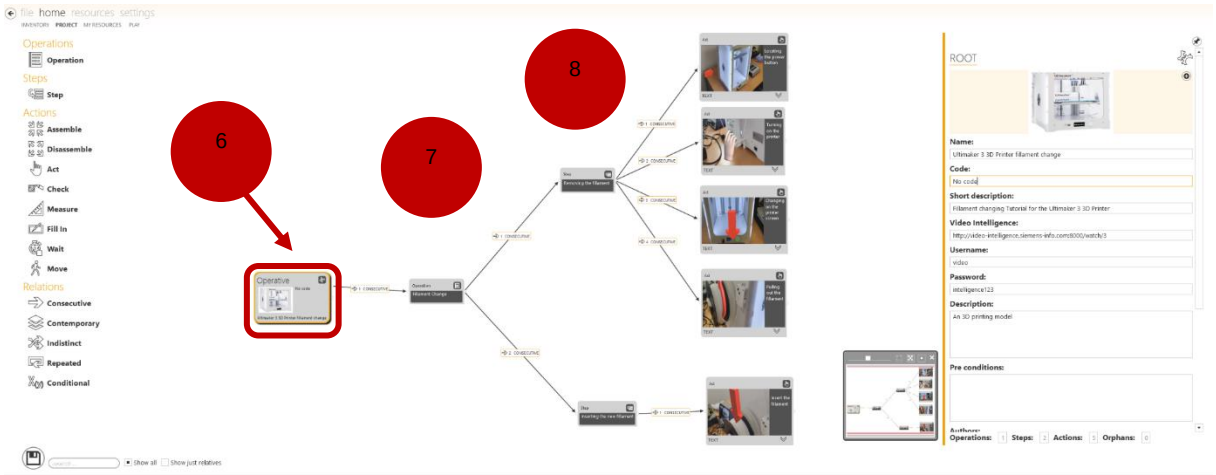

Figure 137 cMDF Training Flow – Example of Ultimaker 3 3D Printer

- Finally, from the export tab the user can upload the procedure to CERTH's iProduce OpIS Platform server, by pressing the export button on the right.

Figure 138 cMDF Training Flow – Export Button

3.9.2. cMDF Training View:

The cMDF Training View is the mobile app where the users can access the procedures. In order to access the tool, the user must install the **cMDF Training View.apk** for android systems.

Once the application is loaded, the previously exported procedures appear on the screen.

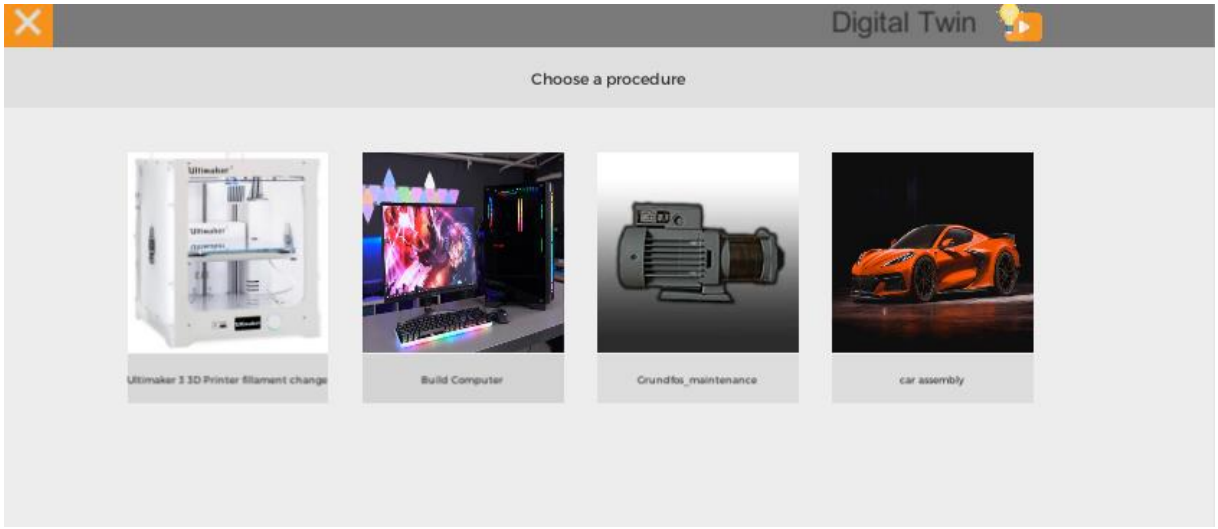

Figure 139 cMDF Training Flow – Available Procedures

- By selecting a procedure, the user is redirected to the selected procedure tab. In the bottom of the page, several available options are presented. Options are enabled (colored) or disabled (grey) based on the availability of procedure training materials.

Figure 140 cMDF Training Flow – Selecting to showcase Ultimaker 3 3D Printer

From the left to right the options are:

- **Video Intelligence** button: The user is redirected to a video url which is provided in the video intelligence field in the cMDF Training Flow. The primary purpose of the video is to display the construction procedure of the corresponding item. Every time the Video Intelligence button is pressed the credentials (username and password) are checked internally. If the credentials are wrong the user can not access the video.
- **Tools** button: By pressing this button the user can preview all the necessary equipment and tools that are required in order to complete the current procedure.
- **Actions** button: The actions menu includes detailed information about each action the customer should do.
- **Images** button: The images tab contains all the available images attached to this procedure.
- **Video** button: The video tab contains all the available videos that are attached to this procedure.
- **Headset** button: The headset tab contains all the available audio files attached to this procedure.
- **3D animation** button: By pressing this button the user can see the required actions demonstrated as 3D animations. The user can rotate the objects and zoom in specific parts of the objects.
- **AR (Augmented reality)** button: The user can project the building process of the item in real world situations.

4. Report on Collaborative Testing and Training Tutorials

Based on the D5.11 Collaborative Testing and Training Sessions (M18), the following table presents the Collaborative Testing and Training Sessions, as reported in the aforementioned deliverable. The updated version of these sessions will be reported thoroughly in D5.11 Collaborative Testing and Training Sessions (M38).

Table 1 Report on Collaborative Testing and Training Sessions of the OpIS Paltform

cMDF	Session Date	Collaborative Testing and Training Sessions of the OpIS Platform
Spanish	June 2022	Workshop with Pupils from Superior School of Art and Design
Spanish	November 2022	Workshop with Polytechnic University
Spanish	November 2022	Collaborative Testing Activities in the Spanish CMDF
German	April 2020	Workshop 1: Methods and Digital Tools from the Maker-Community
German	May 2020	Workshop 2: Advantages and Disadvantages of Collaborative Online Tools
German	June 2020	Workshop 3: Rapid-Innovation, -Production and -Distribution & Funding Opportunities in Germany
German	August 2020	Workshop 4: Design Thinking to Foster Innovation & Interactive Production Design
German	November 2021	Nerd Testing Service
German	July 2021	Live Prototyping Service - V2.0
French	January 2021	Workshop - Introduction iPRODUCE cMDF Use-Cases and Setup the French Communities
French	November 2021	Workshop 1: Importance of Collaboration in Fablabs for Consumer Product Developments
French	May 2022	Workshop 2: General Public Collaboration Workshop for a “DIY Wood Bike” Development
Italian	July – October 2021	Collaborative Workshop – Kick-Off with External Interested Partners
Italian	April- July 2022	Collaborative Session: Test OpIS Platform
Italian	January July 2022	Collaborative Testing and Training Session: Lifecycle Management
Greek	May 2022	Training Workshop 1: “3D Collaborative Manufacturing in Education & Culture” with Students, Co-Creation of UC6: 3D Printed Smart Luminous Artifact
Greek	November 2022	Consultation & Training Workshop 2: “Co-Creation of UC2 Splint for Fractures” with Ambassador
Greek	November 2022	Consultation & Training Workshop 3: “Co-Creation of UC3 Splint for Fractures” with Ambassador II

5. Conclusions

In the current deliverable a detailed plan and methodology for testing the iPRODUCE framework at local communities' level was presented. In particular, all the services and functionalities provided by iPRODUCE, which are tested according to the developed methodology were taken into consideration. Furthermore, T8.3 provided all the necessary training services for local ecosystems and communities, in order to test all the use-cases of iPRODUCE to the local communities. To that end, interactive tutorials were utilized by enabling customers, engineers and non-specialized designers from the local communities to be trained at the iPRODUCE services and facilities. iPRODUCE creates a knowledge base from training scenarios to be exploited for the training of local communities on real conditions, linking in this way education and real-life production.

Additionally, some of the developed tools (described more analytically in D4.2 OpIS Architecture & Design for Social Manufacturing II), namely the Matchmaking and the Agile Network Creation Tool are –under a user point of view – integrated in the Marketplace. For that reason, the provided user manual, does not include a separate subsection for their utilization. Finally, the Digital Fablab Kit is intended for cMDF staff and does not belong to the scope of this deliverable. For this purpose, it was not included in this deliverable.

Finally, it is of fundamental importance to highlight that as the tools of the project come to their final stages of the development process, all relevant endpoints and information will be updated to better reflect their complete integration, during the upcoming weeks, in a user-transparent way.

PRODUCE

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