DIY4U Second Open Call – Call for Use Cases for customer-centric production of personalised FMCG

Table of contents

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 870148

Open date

1st of February 2022

Close date

30th of April 2022

Abstract

The DIY4U Open Innovation Call is an opportunity to be involved in an innovative project to develop and promote decentralised customer-centric product design & production approaches for Fast Moving Consumer Goods (FMCGs). The DIY4U project enables consumers to collaborate with manufacturers to design and create personalised FMCGs, though the DIY4U digital platform and Fablabs (small scale manufacturing demonstration facilities).
The aim of the second Open Call is to find new Use Cases for the technologies for customer-centric customization of FMCG (Fast Moving Consumer Goods) developed during the project.
With this Open Call the consortium aims to find new usages for these technologies enlarging the customization and finding new possible exploitations for the digital platform and the fablabs after the end of the project.

Introduction

The DIY4U project launches its second Open Innovation Competition.

The aim of the second Open Call is to find new Use Cases for the technologies for customer-centric customization of FMCG (Fast Moving Consumer Goods) developed during the project. These technologies consist of a web platform to allow the customers, once connected, to choose the characteristics of the product and customize it according to their needs and tastes, and the fablabs (one for solid products and one for liquid products) that receive the production order from the connected platform and produce the customized product.

The actual application of the technologies, developed in the framework of the DIY4U project, is to produce customized powder and liquid laundry detergents. With this Open Call the consortium aims to find new usages for these technologies enlarging the customization to other products different from laundry detergents and finding new possible exploitations for the digital platform and the fablabs after the end of the project.

Why should you get involved?

The Open Innovation Call is open for SMEs who are working within the FMCG technology field or want to enter into the FMCG industry proposing the customisation of products and the on-demand production. Applying for this call you will have the opportunity to develop the proposal for your technology / product.

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The opportunity will provide the winner and runners up of the call, exposure for your organisation to be recognised within other EU consortia, digital companies and major FMCG companies.

Being part of the DIY4U call allows you to be part of this exciting innovative project exploring the capacity and competitiveness through decentralized customer-centric production approaches, by promoting the adoption of Open Innovation (OI) digital platform.

Who should apply?

The applicant organisation must comply with the Small and Medium-sized Enterprises (SME) criteria defined by European Commission (EC).

For further detail of SME Definitions of EC: https://ec.europa.eu/growth/smes/sme-definition_en

Applicants must be based in one of the EU Member States (MS), UK (MS for H2020), one of the Overseas Countries and Territories (OCT) linked to the MS of the EU, an H2020 Associated Country (AC) or one of the other countries listed in the General Annex A of the Horizon 2020 Work Programme 2018-2020.

Applications will not be accepted from persons or organisations that are partners in the DIY4U consortium or are formally linked in any way to the DIY4U consortium partners.

Description of the Call

Open Innovation Competition Challenge

The DIY4U consortium requests proposals for projects that will study the potential for the DIY4U concept to be applied to the customized production of other solid or liquid FMCG or similar products. We prefer that the projects proposed will provide an "end to end" market and technical study at a level appropriate to the challenge budget, although responses focusing on some of the elements described here will also be considered (see "Scope of Responses" below).

We expect that an end-to-end market and technical study to include all or most of these elements:

1. Description of product concept

Applicants are welcome to suggest either existing products or a completely new product. Existing products can be described as a specific brand or generically.

Examples of possible products (although this list is just suggestive not exclusive: respondents are welcome to propose any product that meets the criteria of being a solid or liquid FMCG or similar):-

- Food & beverage. Examples include sports/protein drinks customisable at a gym; customised chocolate bars; ready-made food sauces/spice/herb mixtures; dry food mixtures such as fruit & nut snacks, muesli. As an example, these could be adapted to avoid allergens.
- Personalised nutrient supplements (vitamins etc.)
- Personalised pet food
- Personal care products such as soaps, shower gels, shampoos, hair conditioners.
- Personalised skin care products (face creams etc.)

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- Personalised cosmetics (liquid lipsticks, liquid foundation, loose powder etc.)
- Household cleaning products (washing up liquid etc.)
- Customized fertilizer/compost for plants (liquid/powder)

2. Study of the potential market (market analysis, customer insights, etc.)

A description of the target consumer and potential market. A profile of the current (conventional, non-customised) market should be presented, together with identification of the characteristics of the typical target consumers within this market. Ideally a solid case will be compiled to justify why this target consumer would invest in the product proposition, the product characteristics that would need to be true to enable this, and what price-point they may be willing to accept. Landscaping of pertinent market trends (customisation or otherwise) can support this.

Respondents should include elements of conventional market analysis such as market size (current and future), potential profitability, cost structure, trends in distribution channels etc. It may be interesting to include elements such as a SWOT analysis or Value Proposition canvas.

Strong applications will include a consumer/market research proposal, with outline of research methodology and reference to any third parties that will be involved in delivery.

3. Proposed additions to the existing DIY4U digital platform to enable required consumer customization

. Respondents should document, at a low-level or high-level, what additional module(s) are required, according to their view, in the DIY4U platform, or if the existing module(s) might need any additional improvement(s) and, if so, describe the advancement(s) in question. Any proposed additional module(s) should be designed to be as compatible as possible with the initial Alpha version of the DIY4U platform, if not more. If that's not possible, any additional module(s) that are being put forward, must be architected to be built either open source or built with an additional application layer that follows common specifications, like the latest OpenAPI Specification. The architecture of the new module or set of modules proposed by the respondents should be sympathetic, as much as possible, to the principles of DLT platforms (distributed ledger technology platforms). In that respect, all the respondents should strive to clarify who is the owner / partial owner of certain data-sets in question plus how would they deal with private data-sets versus how would they deal with public data-sets.

4. Proposed modifications / additions to the existing small-scale manufacturing platforms (“fablabs”) or propose alternative completely new design. (Alternatively, describe how you expect the existing fablab technology will be able to successfully manufacture the proposed product).

Proposed projects should aim to describe modifications to the existing fablabs. These could be modifications at the unit operation modular level, or whole new sections of the fablab, or if required a completely new fablab concept.

Proposed new modules could, for example, be required to dose in feedstocks for the new proposed FMCG, or new modules might be required to mix those feedstocks.

Examples of possible modifications (again this list is just suggestive not exclusive: respondents are welcome to propose other modifications / additions).

- New material dosing
- Alternative mixing module (non-invasive mixing techniques are strongly preferred by the consortium)
- Tabletting

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- New PAT sensors
- Methods for final testing of the new proposed FMCG product (for example optical measurements or other type of tests)

5. Description of the production process including required feedstocks and formulations

Projects should include a description of the feedstocks required and how these are processed to manufacture the proposed FMCG. As the emphasis here is on customized FMCG, respondents should aim in the projects to describe a range of formulation compositions and a description of the customization possibilities these imply. The DIY4U consortium recognises that formulation IP can be sensitive so generic examples can be given.

6. Additional elements

Applicants may wish to include additional elements in their response outside of the five areas noted above. Additional elements highlighting positive sustainability impacts are particularly welcome. As examples, this could be a description of how more sustainable or reusable packaging is incorporated, an outline Life Cycle Analysis, descriptions of how proposed FMCG modifies consumer behaviour to be more sustainable, etc.

Scope of Responses

The Evaluation Committee prefers that respondents should aim to address all of the elements 1-5 described above, with element 6 addressed optionally. Proposals that only address some of the elements will be accepted, however preference will be given to those addressing all.

Background Information – the DIY4U EU project

The ambition of DIY4U is to address the blockers of product customisation and small-scale manufacturing and capitalise on the business opportunity by developing an Open Innovation (OI) Digital B2B/B2C Platform and Fablabs for collaborative design and small-scale production of personalised or customized soft matter FMCG. The OI B2B/B2C digital platform will allow the FMCG supply chain, including manufacturers, innovation stakeholders and consumers, to seamlessly collaborate on the digital design and digital testing of new personalised or customised powdered/liquid FMCG. The Fablabs (developed and hosted at manufacturing demonstration facilities at SINTEF and CPI) will be used for on-demand production of new personalised or customised soft matter FMCG designed using the DIY4U digital platform.

DIY4U consortium partners

The Project is performed by the following companies:

- SINTEF AS (SINTEF), established in STRINDVEGEN 4, TRONDHEIM 7034, Norway, VAT number: NO919303808MVA, (the "Coordinator").
- PROCTER & GAMBLE TECHNICAL CENTRES LIMITED (PGUK), established in THE HEIGHTS, WEYBRIDGE KT13 0XP, United Kingdom,
- CENTRE FOR PROCESS INNOVATION LIMITED LBG (CPI), established in WILTON CENTRE WILTON, REDCAR CLEVELAND TS10 4RF, United Kingdom, VAT number: GB888933743,
- Teknologian tutkimuskeskus VTT Oy (VTT), established in VUORIMIEHENTIE 3, Espoo 02150, Finland, VAT number: FI26473754,

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- FUNDACION CENTRO TECNOLOGICO METALMECANICA Y DEL TRANSPORTE (CETEMET) (CETEMET), established in AVENIDA PRIMERO DE MAYO S/N, LINARES 23700, Spain, VAT number: ESG23596240,
- IRIS TECHNOLOGY SOLUTIONS, SOCIEDAD LIMITADA (IRIS), established in CALLE VELAZQUEZ, NO 94 PRIMERA PLANTA, MADRID 28006, Spain, VAT number: ESB64446123,
- DIGITAL CATAPULT (DCC), established in LEVEL 9 101 EUSTON ROAD, LONDON NW1 2RA, United Kingdom, VAT number: GB172793185,
- CAP DIGITAL, established in 16 RUE ALEXANDRE PARODI, 75010 PARIS, France, N° Siret : 489 749 291 00030
- CODY AS (Cody AS), established in RODMYRJORDET 7, SKIEN 3735, Norway, VAT number: NO996658163MVA,
- RDIUP (RDI'UP), established in 2 RUE LOUIS BLERIOT, LES MUREAUX 78130, France, VAT number: FR45832813299,
- STELAR SECURITY TECHNOLOGY LAW RESEARCH UG (STELAR), established in FANNY-LEWALD-RING 110, HAMBURG 21035, Germany,
- EFFECTIVE DECISIONS SRL (EFF), established in STR. PROF. DR. IOAN MOGA NR.2A AP.12, SIBIU 550077, Romania, VAT number: RO16844901,
- DYNAMIC & SECURITY COMPUTATIONS SL (ANALISIS-DSC), established in CALLE NUESTRA SENORA DE LA LUZ 21 LOCAL IZQ, MADRID 28025, Spain, VAT number: ESB83446633,
- Wiz Development and Services SRL (WIZ), Address: Str Poiana Nr 5 / 24, Sibiu, 550151, Romania Fiscal and VAT number: 43703977

Digital Platform

The DIY4U Ecosystem has the following components:

- **DIY4U Platform** – This represents the core set of functionalities that are available for the end user via a single and secure entry point. The platform is being built using a micro-service-oriented framework and incorporates basic e-commerce functions, customized processes, dashboards and specific actions for all user types.

- **DIY4U Data-Transfer layer** - A critical component that acts as a data router between the services available to the user and an enterprise blockchain infrastructure. This layer is composed of a multiple of oracle type entry points that are connected to the decentralized infrastructure but are open to receive requests for data transfer from and towards the platform. In order to match the scalability requirements of the overall ecosystem, this layer can be seen as a network of dynamic smart agents.

- **DIY4U Decentralized Infrastructure** - Blockchain based infrastructure to deal with the decision-making process, information storage, file storage, traceability, protected intellectual property. Each of the components is served by a dedicated network of nodes that are controlled and managed by the DIY4U consortium etc.

- **DIY4U Extensions** - Simulations, carbon footprint calculator, price calculation, analytics, connectors for external service providers, etc. Due to the modular design of the ecosystem, the possibilities to develop extensions are endless.

This SaaS is designed under a web platform that uses fairly common technologies in the digital industry. For the possible incorporation of new functionalities in the case in which it is necessary, it will be necessary to

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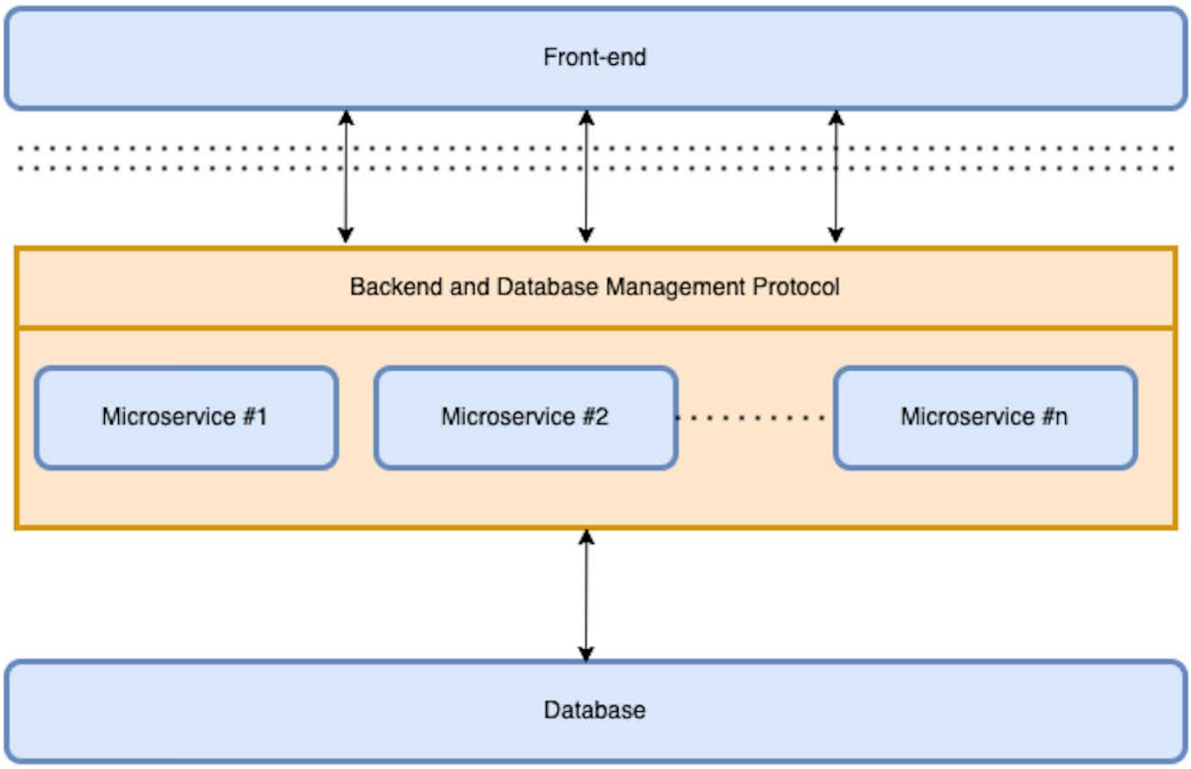
carry out modifications in the structure of the application. The impact on this structure will depend on the characteristics of the functionality to be implemented, therefore, we will now detail the architecture of the application, for a better understanding with a view to a possible update.

Technical challenge (technical description, mandatory elements)

The general structure of the architecture, without going into details, is the one presented into this image, showing the layered model abstraction of the DIY4U platform's architecture, any new implementation should follow the same structure:



Architecture schema.

Front-end

This layer deals with the interaction with the end-user and hosts the presentation layer. An important part of this component is the Graphical User Interface (GUI) that allows the user to interact with the underlying architecture in a simplified and user-friendly way.

Designing and building a GUI, especially for complex software platforms, offering different functionalities and hosting different types of end-users, requires an accurate study of the user behaviour in order to result in a user interaction as simplest and seamless as possible. Such a study comes with the name of User Experience (UX).

The user experience is about creating an enjoyable experience for the users while they navigate and interact through a product or service. In parallel the user interface is how the device's interface looks, its looks and feel in terms of buttons, colours, images, labels, typographies, etc, in order to create an engaging interface that fits the purpose in the best way possible.

Backend and Database Management Protocol

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This layer is composed of microservices which receive the frontend information, process the data and interact with the database. The back-end layer is also called the “data access layer” where the business logic runs. This layer is responsible for performing all the actions necessary for the data retrievement, data administration, and data transformation. It is the layer that interacts with the databases where all the information is stored. For that reason, the back-end layer also implements all the security protocols to access the databases and collect (or store) the data in a secure manner.
The microservices receives the user request from the front-end layer and the corresponding microservice or microservices involved in the user requests, return the requested information. It is on this layer that the raw data are transformed and the actual service is provided. Each microservice is designed to perform a specific function reacting to a specific request coming from the user (through the front-end layer). The raw data (or pre-processed data in some cases) is retrieved from the back-end layer. The communication between the microservices and the front-end/back-end layer is possible thanks to specific Application Programming Interfaces (APIs). The API works as a computing interface defining the communication protocol that has to be used in the inter-layer communication. It defines which type of request can be made and how to make it, it drives the communication by defining the data format and the operational flow. In a very simplified manner, it is possible to think at the API as a translator who put into communication two different worlds. This could seem to be an extra level of complexity, but on the contrary working with APIs allows to add a degree of freedom.
The presence of the APIs allows the developer to write the code with the best programming language that fits the purpose, so that the front-end can be built using some of the programming languages specifically designed for that, while each microservice can be developed using the programming language that ensure the best performance or reliability, or fast prototyping, or whichever metric is the most important to be matched.

Database
This is the lowest layer of the architecture and it is mainly concerned with the storage and retrieval of the application data. The data is stored in a database server that supports data access logic and provides the necessary steps to ensure that only the data is exposed without providing any access to the data storage and retrieval mechanisms.
Both layers Backend and Database are virtualized using docker, it means they are running in a virtual machine, offering all the capabilities that docker provides. Docker is an open platform
for developing, shipping, and running applications. It enables you to separate your applications from your infrastructure so you can deliver software quickly.

Architecture details
There are three differentiated layers: the client platform, the Backend and Database Management Protocol layer and the database. The first, the client platform, is developed with Angular, giving the ability to create the web platform with the option of creating a mobile application in the future. The second one, the Backend and Database Management Protocol layer, works with microservices and is developed with Node.js. The connection between the microservices and the database is also included in this layer, where each microservice is responsible for distributing the actions to be performed and any flow of data between them and the database. The last one, the database, is based in PostgreSQL and will store each microservice data in a different database instance.

Here you can see the main Architecture schema:

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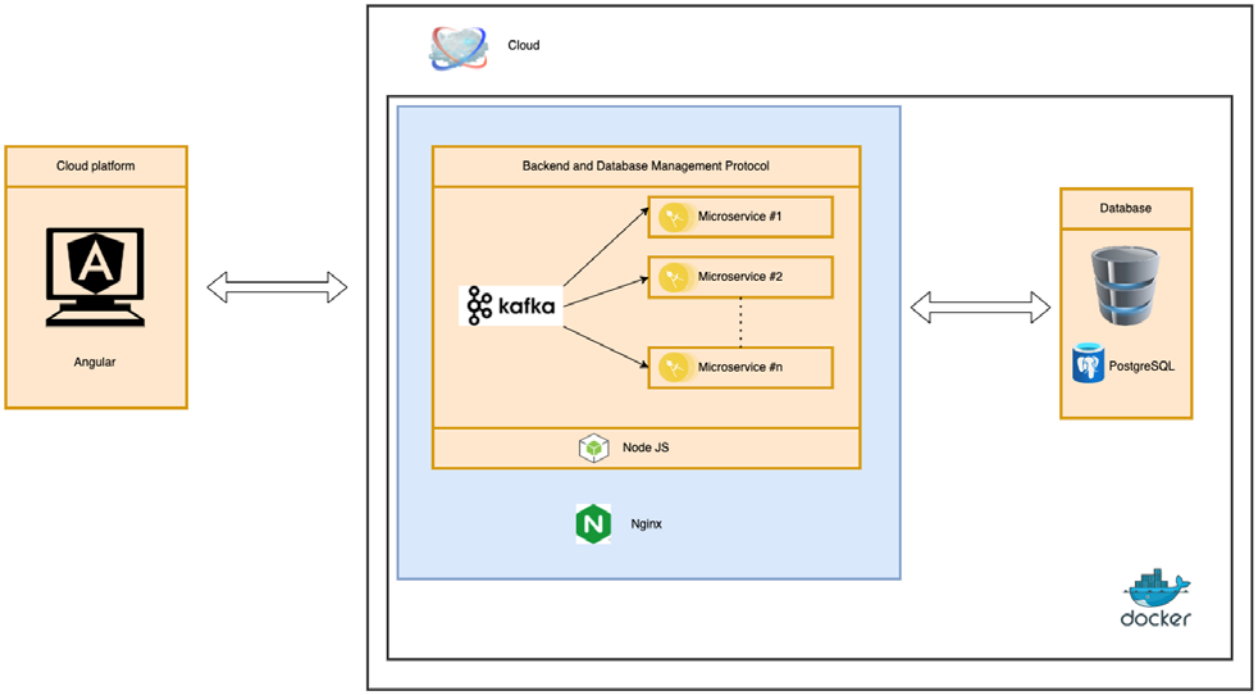

Detailed architecture schema.

All the architecture is hosted in cloud and works under Docker images.

We have several docker's instances, these are:
- Zookeeper -> Offers a highly reliable, distributed process coordination service that provides solutions to various coordination problems for large distributed systems. - Kafka -> Its a command management framework with the responsibility of keeping the requests between the different microservices orchestrated.
- Ingress -> Contains a Nginx to link the request with the microservices. - Database -> Contains the database.
- Auth -> Microservice responsible for logging into the platform.
- Queries -> Microservice responsible of receive las GET requests (request data). - Commands -> Microservice responsible of receive POST requests (save data). - Reactor-mail -> Microservice responsible for email sends.

Main modifications to adapt the project's platform

Based on the previous information about the digital platform's infrastructure, bellow this paragraph you can see the main modifications necessary to transform the project to work with other products.

General schema:

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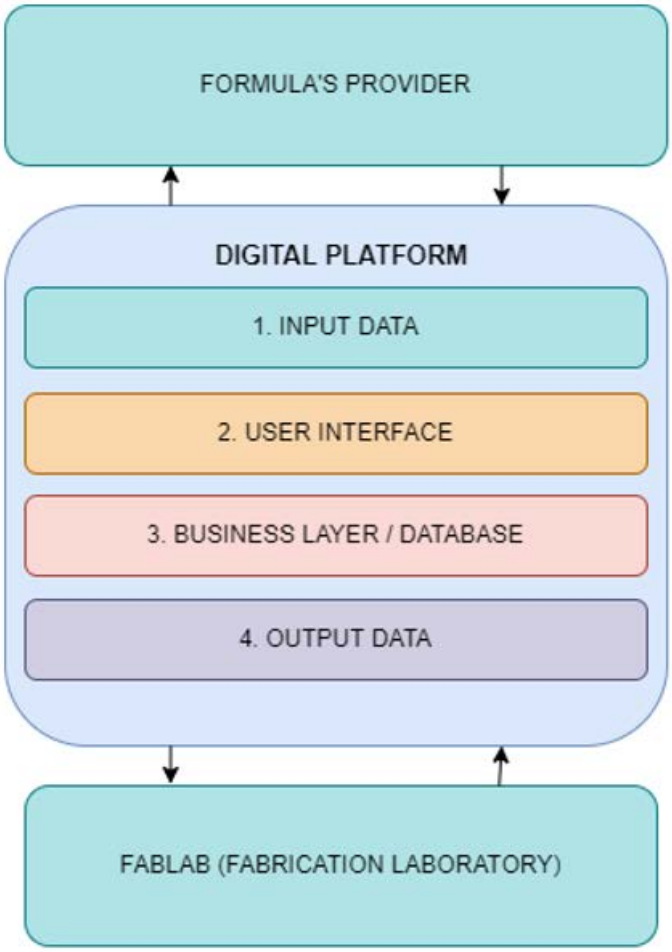

The following modifications are going to be needed:

INPUT DATA
The digital platform needs to be connected to a new data source, specific for the products that are going to be offered. It's going to be the formula's provider.

USER INTERFACE
Currently the user interface is oriented to a specific product. The look and feel and texts need to be adapted to the new product needs.

BUSINESS LAYER
Modify endpoints routes will be necessary and the integrity from the input data should be maintained to avoid strong modifications.

OUTPUT DATA
It will be necessary to provide a new calculation method for the new product ingredients, to transform the formulas into the fablab's instructions.

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Fablabs

Overview

Two Fablabs (digitally enabled small-scale manufacturing machines/factories) are being designed and built as part of the DIY4U project. These machines will take chemical feedstocks and process them into customised laundry detergents under the direction of the DIY4U Digital Platform, based on a user's customisation requests into the Platform. The Fablabs will take typically five feedstocks and use them to manufacture a customised detergent at a 0.5 – 1 Litre scale. SINTEF and CPI will host the developed Fablabs in their innovation laboratories and act as open access Manufacturing Demonstration Facilities (MDF), offering Fablab manufacturing services to individuals and companies (especially SMEs) using the DIY4U Digital Platform to design new customised/personalised products. There will be a Fablab for producing powder laundry detergents to be based at SINTEF and a Fablab for liquid laundry detergents based at CPI. The MDFs will also offer training to companies and individuals looking to adopt the new DIY formulation design and manufacturing approach.

The Fablabs will accept the designed recipe from the Digital Platform, dose in the required powders / liquids, mix components in the appropriate conditions, check composition using specialised measurement techniques (Process Analytic Technology, PAT) and dispense into a final package for the consumer. This package will be labelled as required. Production data as required will be fed back to the Digital Platform.

Fablab manufacturing will be in accordance with the relevant EC machinery and EMC directives, and operated according to EC and national safety, health and environmental (SHE) requirements. The physical design is highly modular and extendable as described further in the next section.
Overall, the project aims to achieve demonstration of the DIY4U Digital Platform and Fablabs at Technology Readiness Level (TRL) 6 – "technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)".

Machine Design

The FabLab is made modular and can be equipped with various modules to perform different tasks. The modules developed for these FabLabs are presented in the following sections.

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Figure 1 displays the CAD-model of the FabLab with all the different modules for liquids installed.

Physical module interface

Each FabLab consist of three sections. And each section has 6 slots. A module can occupy more than one slot.

One slot consists of:

1. Mounting rods. CC Distance 122 mm
2. Attachment magnets
3. Hole in backplate for pulling a wire for special equipment. 230 VAC available in socket behind plate.
4. Another set where mounting rods can be attached.
5. Connection interface
    a. 24 VDC
    b. Pneumatic supply (5 bar)
    c. Network

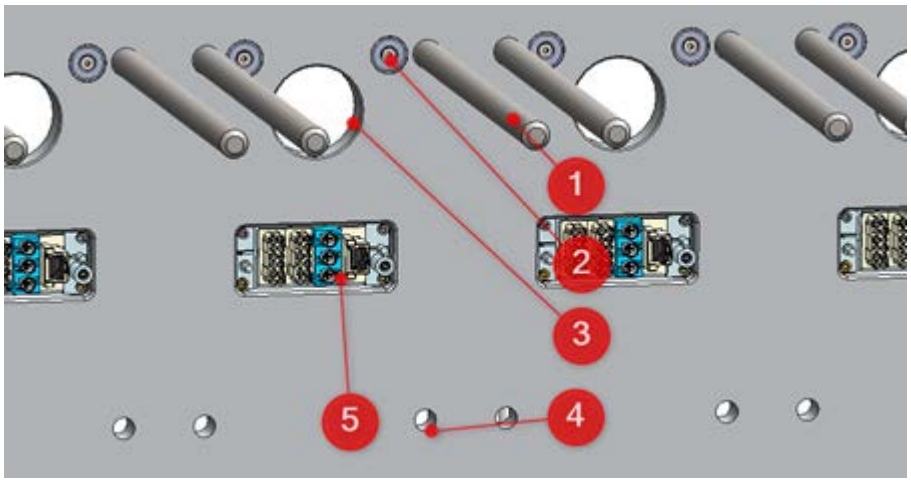

Figure 2 shows the physical interface for connection a module.

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Gripper and cup

The design is based on a gripped that holds a cup of about 500 ml (DECA TP118-565). The cup can be moved sideways as well as up and down. This enables the cup to be filled with different ingredients and mounted/demounted in different modules. Figure 3 shows that the cup can be moved along the length of the FabLab.

Figure 3 displays the space a cup can be moved in.

Figure 4 shows the possible vertical movement of the cup. The mid-section of the beam is supposed to be free area from all modules so the cup can move horizontally without obstacles. The upper and lower bar is space that can be utilized by the modules.

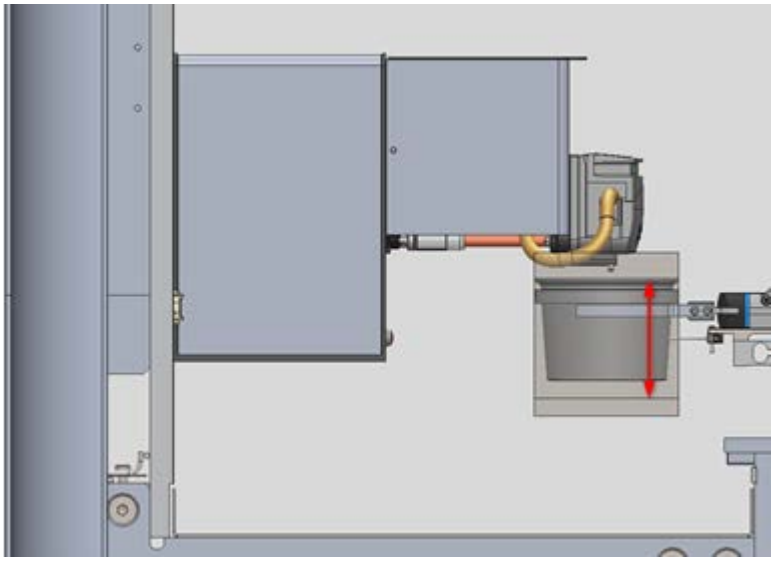

Figure 4 displays gripper holding a cup. The cup can be moved up and down as the arrows shows. The box around the cup shows the limits for translatory movement.

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Modules

All tasks in the FabLab are performed by *modules*. These are specialized units designed to do specific operations. The modules are compatible with the slot interface. They use the rods to be mounted, and the sockets for communication and power.

Each module has a Raspberry Pi computer installed where the script for this certain module is programmed. It controls the actuators, reads the sensors an communicates with the fablab.

In each FabLab there are support modules that are not performing a task on their own, they support the other modules. These are:

- Gripper: This module brings the cup back and forth to the module that are to do a task
- Admin: Admin module works as an intermediator module between all the operating modules and the Digital Platform.
    - Keeps the overview over the FabLab and communicates statuses and hardware configurations to the Digital Platform.
    - It receives detailed instructions from the Digital Platform and distributes this to the modules.

Mount a module

The modules are mounted to the steel bars on the frame.

Each module is mounted by sliding them unto the *mounting-rods*. See Figure 5.

If there is a feeding module, the front module is slid onto the back module. Figure 6.

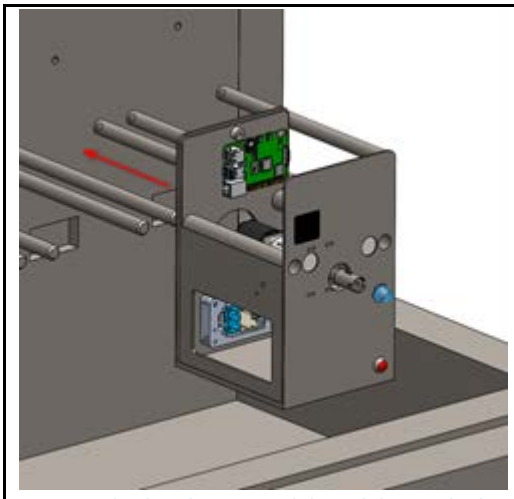

Figure 5 displays how a module is slid unto the bars

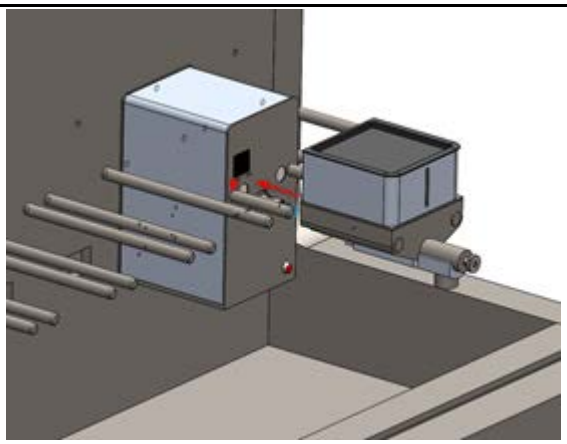

Figure 6 displays how a front module is mounted unto a back module

Module: Back module for feeders

For each feeding module, there is a back module. The feeding unit is designed in two parts to make refilling and cleaning easier.

Figure 7 shows the back module with cover installed. The cover can be lifted off vertically to make access easier.

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Figure 7 displays the Back module for feeders with cover installed

Module: Screw feeder

Powder is fed with a screw in the powder feeding module. It is connected to the back module. The two parts has a mechanical interface that makes this possible.

The screw feeder has the tank on its top. Figure 8 displays:

1. Tank volume
2. Lid with gasket seal
3. Magnets that attach the screw feeder to the back module
4. RFID Tag to be identified by back module
5. Slits for rods

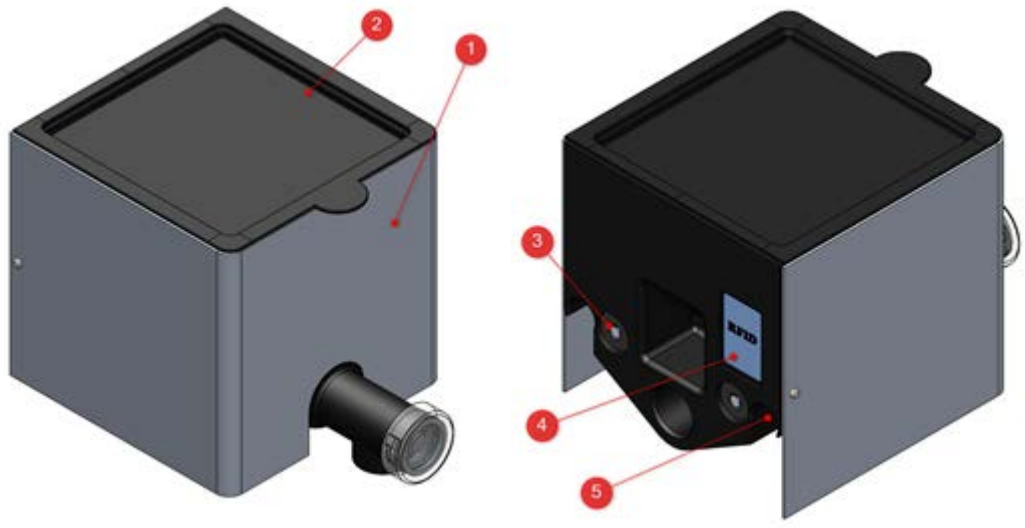

Figure 8 displays powder feeding module

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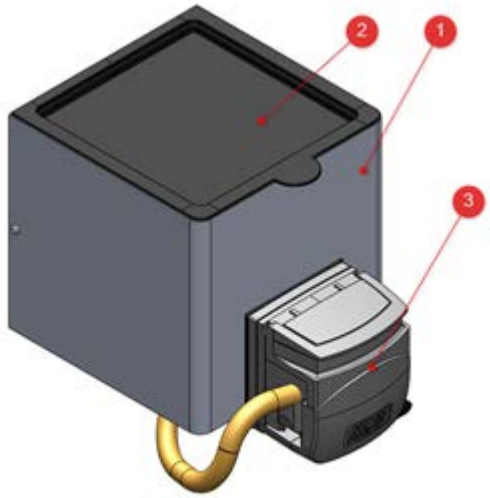
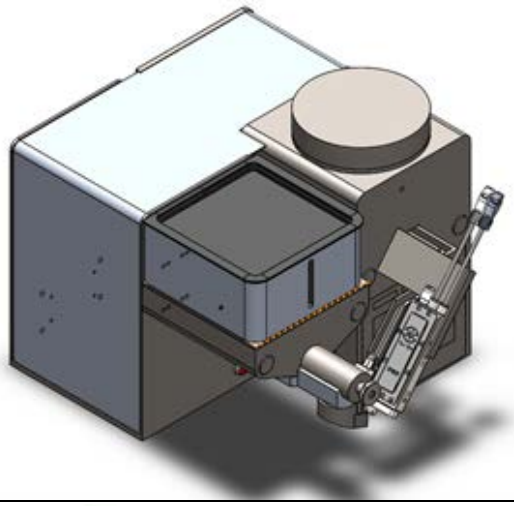
Other modules

Pump feeder: Liquids are fed with a peristaltic hose pump in the liquid feeding module. The liquid feeder has the tank on its top. 1. Tank volume 2. Lid with gasket seal 3. Hose pump	
Liquid jetting: In the powder FabLab it was required to dispend a liquid material into the powder too. To prevent clogs being created by all the liquid is injected one place and forming clusters, a jetting module was designed. The jetting module features the same mechanical interface for a feeding module. This enables the machine to use a standard powder feeding module together with the jetting module.	
Spectral engines NIR sensor: There is designed a module for the Spectral Engine NIR Sensor developed by consortium partner VTT. The module holds the sensor at a fixed position and angle for product analysis.	

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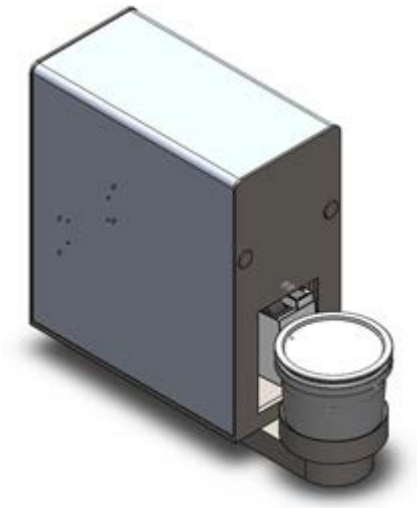
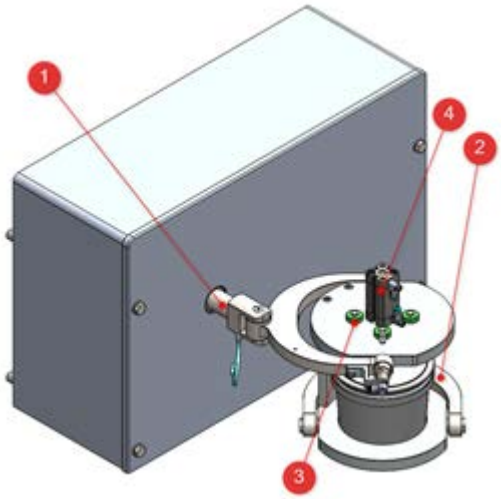
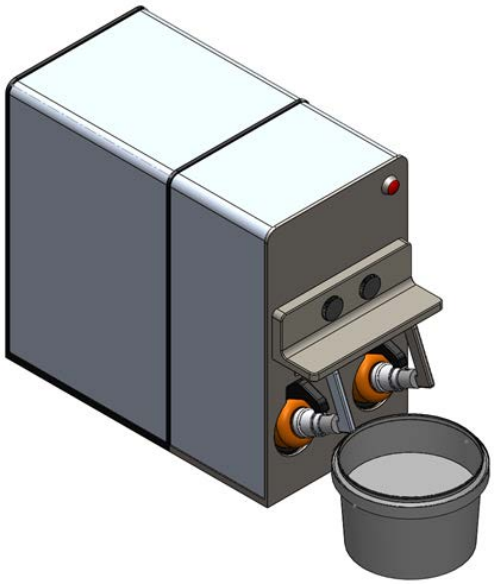
Printer: To make a label on the cup with logo and ingredient list a printer module is designed.	
Turbular mixer: A mixer module is designed to be used both powder- and liquid FabLabs. Before the cup can be mixed it need to have a lid mounted. The mixing module uses three slots. 1. Motor driven arm 2. Arm that follows movement 3. Springs that exerts a force on the lid 4. Pneumatic cylinder that lifts the clamp when cup is to be inserted or removed	
Perfume: To dispense small amounts of liquid perfume a multi material module has been designed to fit 2 pc of perfume atomizers and actuators.	

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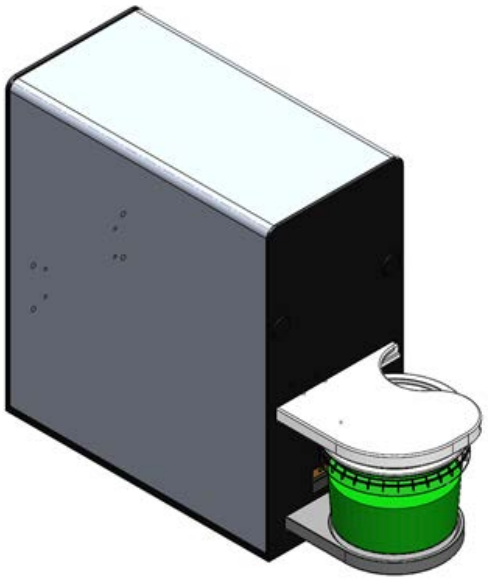
Cup and lid: The FabLab is designed to operate one cup at the time. There is a module that is designed for the user to set in one cup and lid before the batch production starts. This module has no actuators but has a Raspberry Pi to tell the FabLab in what slot this module is positioned.	

Refill feedstock tank and registration

To refill content and register Digital Platform an operator must do a manual task.
This could be done by a dedicated filling station equipped with an NFC scanner. The serial number for the tank is registered together with the content volume and material. This information must be registered in a user interface on the Digital Platform.

Change modules

All modules in the FabLab have a Raspberry Pi computer installed. This is connected to a local network with cables. The admin module knows which modules are placed in the FabLab and this configuration is communicated to the digital platform. The current configuration is used in the digital platform to generate instruction lists.

Operators can remove and insert modules in the FabLab at any time when the machine is not producing. Any change in the FabLab configuration is communicated to the digital platform.
If a new type of module is created, the Digital Platform must be updated with information about this module and the required parameters.

Cleaning and maintenance

All the containers that hold materials can be taken out of the machine and washed. For a more thorough cleaning it might require dismounting of the feed screw. Those modules that has a heating element attached to it, might require to dismount this equipment.

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Powder FabLab

Modules

Table 1 shows the modules suggested for Powder FabLab.

Section	Slot	Module
1	1	M30 Cup and Lid-module
	2	M40 Printer
	3	M70 Mixer
	4	M70 Mixer
	5	M70 Mixer
	6	M50 Sensorholder
2	1	M210 Powder module - Large tank
	2	M210 Powder module - Small tank
	3	M210 Powder module - Large tank
	4	M100 Sidemodule for jetting liquid
	5	M210 Powder module - Small tank
	6	M210 Powder module - Small tank
3	1	M210 Powder module - Small tank
	2	M210 Powder module - Small tank
	3	M210 Powder module - Small tank
	4	M110 2x Perfume spray
	5	M210 Powder module - Small tank
	6	M210 Powder module - Small tank

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Liquid FabLab

Modules

Table 2 shows the modules suggested for Liquid FabLab.

Section	Slot	Module
1	1	M30 Cup and Lid-module
	2	M40 Printer
	3	M70 Mixer
	4	M70 Mixer
	5	M70 Mixer
	6	M50 Sensorholder
2	1	M310 Liquid module - Large tank
	2	M310 Liquid module - Small tank
	3	M310 Liquid module - Small tank
	4	M310 Liquid module - Small tank
	5	M310 Liquid module - Small tank
	6	M310 Liquid module - Small tank
3	1	M310 Liquid module - Small tank
	2	M310 Liquid module - Small tank
	3	M310 Liquid module - Large tank
	4	M110 2x Perfume spray
	5	M310 Liquid module - Small tank
	6	M310 Liquid module - Small tank

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Communication overview

The FabLab has three forms of communication with the digital platform. Figure 19.

FabLab Hardware Configuration

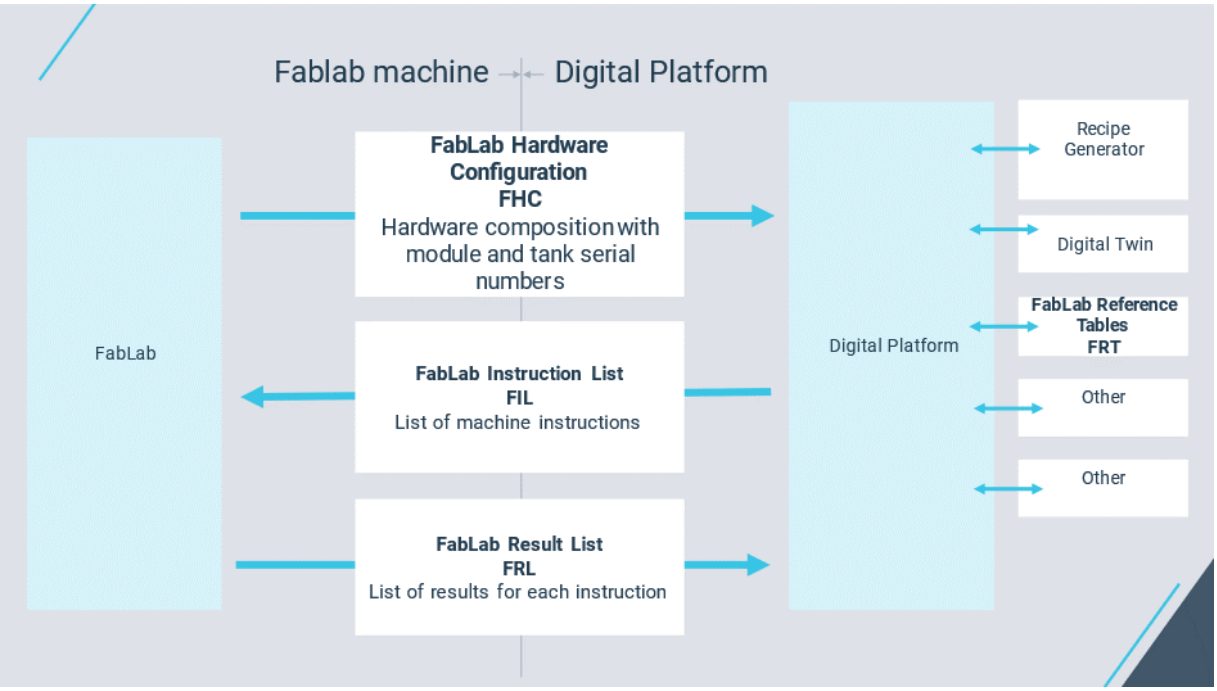
The FabLab will periodically, and on change in hardware setup, report the composition of the FabLab machine to the Digital Platform. This report has a predefined structure and will tell the Digital Platform what types of modules, what types of tanks attached to modules and the placement of these modules.

FabLab Instruction List

The Digital Platform will send an instruction list where each action is commanded through a data structure containing slot number, submodule number, function and parameters related to the module.

FabLab Result List

After the instruction list has been executed by the FabLab it will send FabLab Result List, containing measured values from the manufacturing.



Data exchange between FabLab and Digital Platform

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Open Innovation Competition overview

Timeline

The Open Innovation Call starts with the announcement on the EU participant portal and on the EU DIY4U project website.

The OIC is **open from 1st of February to 30th of April 2022**.

Evaluation (incl. signature of Sub-Grant Agreement) is expected to be completed no later than 31st of August 2022.

Funded Open Innovation Projects (OIPs) are expected to start no later than 1st of September and completed by 28th of February 2023.

Funding

The aim of DIY4U's Open Innovation Call is to fund **up to four winners**.

Each winner will be funded up to 75 000 € for running one Open Innovation Project.

Only **one proposal per applicant** may be selected for funding under the OIC.

Applicants selected under the OIPC call will carry out their proposed project and deliver a Final Project Report, before receiving the lump sum payment of € 75 000 exclusive VAT (maximum) Two cost categories are foreseen as eligible:

A. Direct & Indirect cost

Purchase of a service by an approved sub-contractor on a daily fee basis and at reasonable market rates. The indirect costs charged by a knowledge provider shall not exceed twenty percent (20%).

B. Travel costs up to 5% of the total amount.

The financial contribution shall be invoiced according to the following invoicing schedule:

1. 35% of the maximum financial contribution following execution of the Contract (Sub-Grant Agreement).
2. Max. 30% of the maximum financial contribution when mid-term review report is approved by the Mentoring Committee.
3. Max. 35% of the maximum financial contribution when final review report and deliverables are approved by the Mentoring Committee.

In case the final project report/ deliverables are not approved by the Mentoring Committee, based on objective criteria and with justifications, no payment will be done and the Contractor shall resubmit a new version of the final project report/ deliverables.

SINTEF reserves the right to withhold the payments in case the Contractor does not fulfil with its obligations and tasks, and SINTEF is entitled to recover any payments already paid to a defaulting Contractor.

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Sub-grants are fully funded by European Union's Horizon 2020 Research and Innovation Programme - grant agreement No. 870148. It is not possible to accumulate this sub-grant with any other public aid.

Submission process

Submission of applications

To submit an application to the OIC, the application form at this site must be filled out: https://digitalcatapult.submittable.com/submit

In the application form, the applicants will answer eligibility criteria questions and provide more detailed information on their proposed solution and background.
In addition it is recommended to use the SME Self-assessment Tool to be sure to be within the EC SME definition and also you need to register your organisation as an SME under EC Funding and Tenders Participant register.

Only NON-CONFIDENTIAL MATERIAL shall be included in the application.

Evaluation process

Evaluation of proposals

The information provided in this submittable form will be used to evaluate the prospective applicants.

Proposals which do not fulfil the eligibility criteria will not be further considered.

Proposals whose technical feasibility is rated > 3, will be further evaluated externally (by experts who are independent from the organisations involved in the Consortium and from the OIC applicants) based on the Evaluation Criteria detailed below. The final score will be calculated as an average of the individual assessments provided by the Evaluators.

The highest rated proposals will be invited to pitch their Open Innovation Projects and give a more detailed description of their proposals. A List of Finalists and Reserve List will be drawn up at a Consensus meeting of the Evaluation Committee.

A report on the OIC and its outcome will be sent to the European Commission. A public summary of the report will be published on the project website within 30 days after the end of the evaluation.

Evaluation Criteria

Applications will be evaluated according to the following criteria with equal weights in each:

Relevance to the challenge
Do the applicants understand the challenge described in the brief? Do the applicants strongly demonstrate their relevance to the challenge against several or all the following key aspects: market, technology, and context?
Delivery Feasibility
Have the applicants stated clearly enough their proposal delivery needs - what do they need to run, what don't they have, and is that easily accessible? What is top-line budget, project plan and timeline during the

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delivery period? How easy is it to maintain the technology, what roadblocks do they foresee and how will they tackle them? Time of development and implementation?

Team Quality

Who's in the team? What are their different expertise areas? What is their availability / capacity during the time of the program? Does the applicant demonstrate good enough expertise and complementary skills in terms of backgrounds?

Novelty and Innovation

How new is this project compared to existing ones? Are the applicants able to identify competing existing offers/solutions? Are they also able to demonstrate how their application/approach is unique / different? Can the applicants explain novelty beyond just technical, and tell us how innovative their approach/project is socially, environmentally, economically, legally, ethically? Rate of adoption - how novel is the applicants' solution user engagement process? Do they know / can they inform on their rate of adoption?

Scoring

The proposals will get a score between 1 and 6 for each of the four evaluation criteria, where the scale is defined as follows:

1 – Poor
2 – Fair
3 – Average
4 – Good
5 – Great
6 – Outstanding

Open Innovation Projects

Sub-Grant Agreement

Before starting any Open Innovation Project (OIP) activity, the project coordinator (SINTEF AS) will sign a Sub-Grant Agreement with each winner, on behalf of the DIY4U consortium.

Deliverables in the OIPs

- A final project report containing detailed descriptions answering to all elements in the accepted proposal

Support to the winners during the Open Innovation Projects

The relevant DIY4U partners shall provide with reasonable assistance in order to ease use of DIY4U resources, review deliverables and results and monitor overall. In particular, the partners will organize and provide:

- Welcome event within four weeks following the signature of the sub grant agreement (Digital meeting)
- Clustering workshop for linking the OIPs and the overall DIY4U approach
- The technical partners in DIY4U will provide technical mentorship during the OIPs and the mentors will also evaluate the OIPs and their performance

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Additional information

Reservations and amendments

Substantial reservation and amendments to the Sub-Grant Agreement will lead to rejection of the application.

Reservations and amendments shall be precise and clear, making it unnecessary for the partners in the DIY4U project to seek clarification regarding these elements during the evaluation process.

Reservations and amendments shall clearly and unambiguously refer to the relevant annex and section of Sub-Grant Agreement.

Reservations and amendments shall be clearly listed in a "Reservations and amendments log" together with the consequences such reservations and amendments may have on the performance or any other elements of the application.

Change and cancellation of the competition and rejection of applications

The DIY4U consortium partners have the right to modify the provisions of this OIC at any time prior to submission due date.

Clarifications and additional requirements can be added. Notification of such changes will be provided on the Project web site.

The DIY4U consortium partners have the right to cancel the competition or to reject any or all applications, at no cost and at their own discretion.

IPR

The following Intellectual Property Rights (IPR) conditions must be adhered to:

1. The application shall only include NON-CONFIDENTIAL material.
2. The application must be solely based on original works of the applicants and their foreseen developments must be free from infringement of third-party rights. Any limitation to freedom to operate must be clearly stated in the application.
3. All background provided by the funded applicant is and shall at all times remain the property of the funded applicant.
4. All results (incl. any related intellectual property rights) created by the funded applicant solely and/or in collaboration with the DIY4U consortium partners, will be owned by the DIY4U consortium partners which shall be free to exploit such results without obtaining any consent from, paying additional compensation to, or otherwise accounting to the funded applicant.
5. Any results solely developed by the funded applicant can be exploited by the funded applicant (and its Affiliates) after the termination of the action, within the funded applicant's normal operations.
6. Any marketing activities, and approved publication by the funded applicant shall clearly indicate that the project / result has received funding from the European Union, the DIY4U project and Horizon 2020 displaying the EU logo on all printed and digital material, including websites and press releases.

Intellectual Property Rights (IPR) conditions, confidentiality and publication are further detailed in the Sub-Grant Agreement.

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