

# What does industry want from open access facilities?

NNFCC designed and ran an online survey targeting industry participants to understand their needs and wants when it comes to scaling-up a new bio-based process or product. The survey was done in the context of the BBI JU Pilots4U project (<https://www.biopilots4u.eu/>) to determine whether industry needs can be effectively addressed by existing open-access centres, or whether new interventions or initiatives are required

At this point it is necessary to take a step back to define the term ‘open-access’ and what these types of facilities offer (see Figure 1). Open-access means open to any start-up, SME, large enterprise or research organisation. However, it does not mean free to use and some contract for engagement needs to be agreed. These facilities make available to clients ready to use and state-of-the-art large-scale infrastructure (and the associated expertise) to enable the translation of laboratory scale innovations into industrially viable processes. The open-access model helps save time and money during the scaling-up process, shortening the time required for a new product or process to reach the market, and lowering the financial risks associated with scale-up. A key aim of the project as a whole is to help industry and project developers to gain an understanding of, and access to, the wide range of existing open access facilities across Europe.

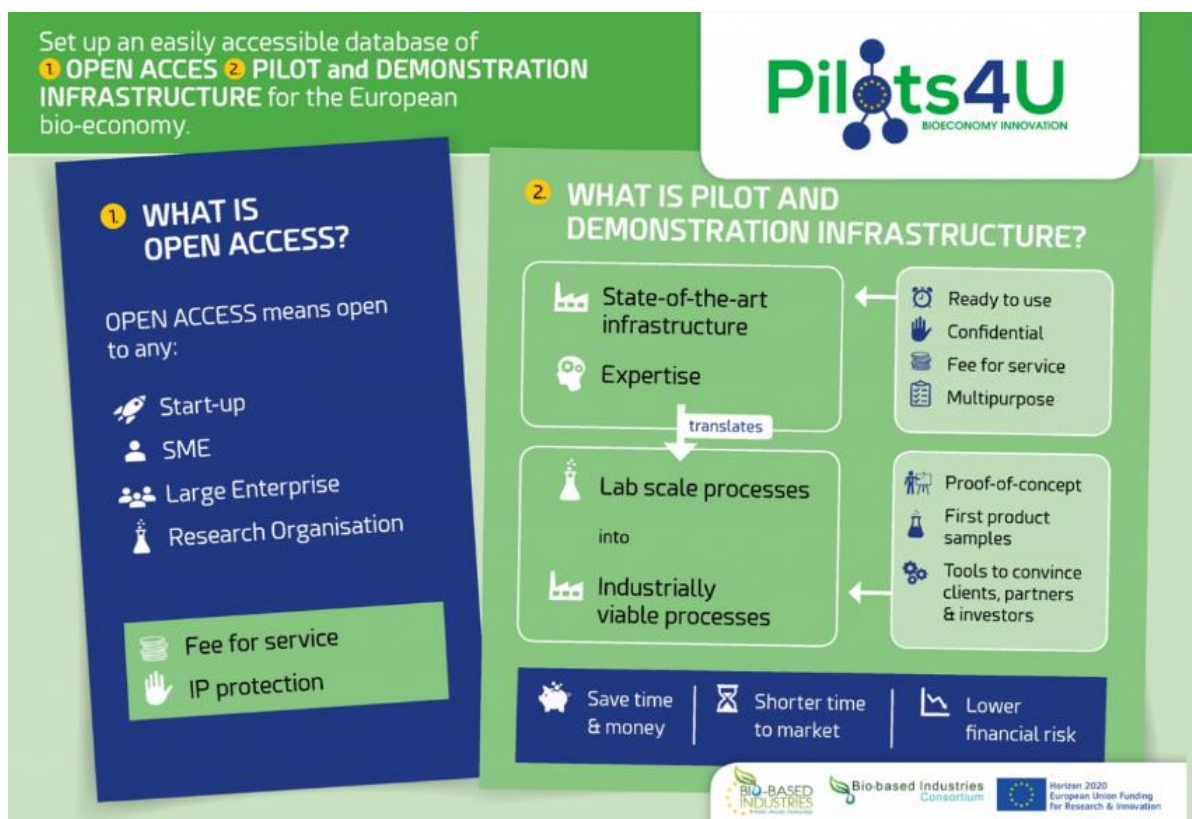


Figure 1 Infographic designed by the Pilots4U project to explain 1) what open-access means and 2) what these centres offer to their clients.

The survey targeted bio-based industry representatives, who represented 63% of all the responses received, including commercial manufacturers (37%) and technology developers (26%), the remaining

37% being mostly members of academia and RTO centres.<sup>1</sup> A closer look to the industry representatives showed two very differentiated respondent profiles: micro (<5 employees) or small business (<50 employees), most of them start-ups, focused on the development of new technologies, as opposed to large (>250 employees) commercial manufactures (see Figure 2). Most of the technology developer start-ups were not yet trading at the time of the survey (42%), or their turnover was below the € 100k/y mark (26%).

Industry responses came from 11 countries, across northern, central and southern Europe and several others from across the globe. A significant number of responses were received from technology developers in the UK (44%), in contrast to commercial manufacturers, which presented more scattered origins. With regard to the respondents' area of business, technology developers were clustered around three sectors: biotechnology, biofuels and the production of chemicals and plastics (64, 44 and 48% respectively). Commercial manufacturers' interests were spread across many sectors, with focus in the food, beverage & tobacco, biotechnology and the production of chemicals and plastics sectors (31, 33 and 28% respectively).

Thus, the majority of interested industry respondents represented micro or small businesses, mostly start-ups, focused on the development of new technologies in the areas of biofuels, biotechnology and the production of chemicals/plastics, and large (>250 employees) commercial manufactures with spread interests from which biotechnology the production of chemicals/plastics and the food & beverage sectors could be highlighted.

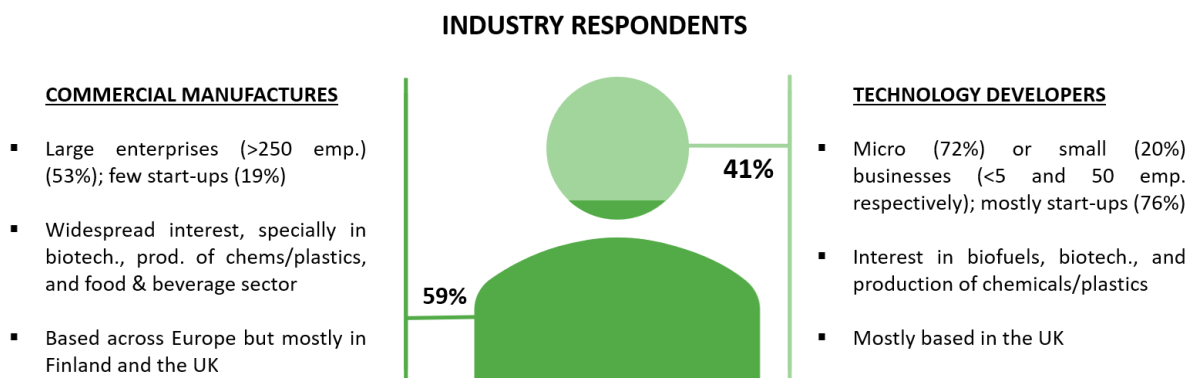


Figure 2 Industry respondents profiles.

In terms of specific 'needs and wants', the majority of industry respondents (67%) stated that their need for large-scale infrastructure in the next 5 or 10 years was *likely or very likely* (see Figure 3). Industry respondents can therefore be considered as potential clients of open-access pilot and demonstration centres in the near future.

Secondly, it was important to understand the factors that make the open-access model appealing to industry. Results showed that key drivers to use open-access infrastructure were identified as lower cost compared to the construction of an in-house pilot line, and access to equipment and expertise not available in-house, referenced by approximately a third of the industry respondents. Aside from organisations considering that they already have appropriate equipment in-house, a key consideration that hampered working with open access centres was concern around preserving IP (44%) (see Figure

<sup>1</sup> Throughout the report, only responses from industry representatives have been taken into account, and industry respondents may be referred to as 'respondents' for simplicity.

3). Preservation of IP was more of a concern for commercial manufacturers, who were also worried about the cost of accessing open-access centres.<sup>2</sup> So, while cost of access may be a motivational factor for some respondents it can be a point of concern for others. This suggests that the open-access model is not yet clearly understood by all industry stakeholders. A co-ordinated, targeted and effective communication campaign could help to address such barriers.

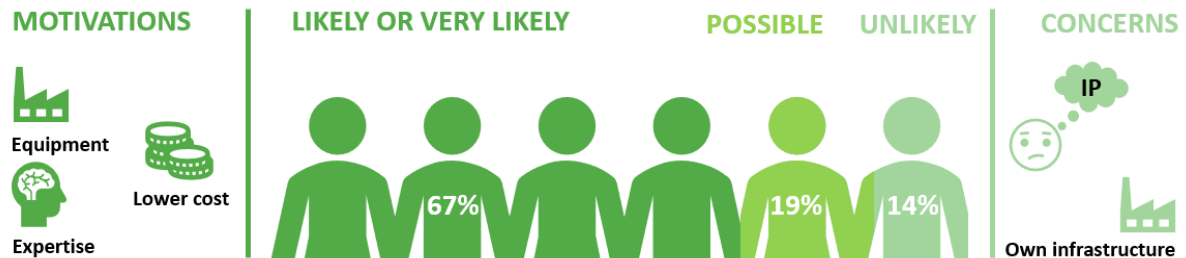


Figure 3 Likelihood of accessing large-scale infrastructure in the near future (middle), and motivations and concerns expressed with regard to working with open-access centres.

Understanding what type of services are most valued by industry allows open-access centres to perform self-assessment exercises to recognise whether they are sufficiently well-equipped to respond to these needs (see Figure 4). The survey demonstrated that around two thirds of industry respondents would potentially look to gain access to large-scale infrastructure for scaling-up a new process, for production of first commercial samples and for process development (69, 68 and 61% of respondents respectively). Other services typically linked to open-access facilities such as bench to small-scale piloting experiments and the characterisation of feedstock and products were also of interest to a significant number of respondents (44 and 28% respectively). In terms of expected aspirations, around two thirds of industry respondents expected to achieve a technology readiness level (TRL) of 5-7 after having accessed the required pilot/demo infrastructure.

In terms of demand for equipment, gaining access to large scale liquid fermenters was top of the list for almost half of all industry respondents (44%). A closer examination revealed that interest in this type of assets came mainly from technology developers (60% of respondents who were self-classed as technology developers). Commercial manufacturers displayed diverse interests with 28% of respondents in this category expressing interest in several assets at once (4 or more). Technology developers also articulated interest in accessing chemical reactors specifically for aqueous based reactions (42%). Commercial manufacturers were more interested in equipment capable of processing biopolymers and biocomposites (36%) such as assets for extrusion, injection moulding or thermomoulding.

Less interest was expressed in accessing specialist equipment such as algae bioreactors, solid state and gas fermenters or gasification units. This may reflect that such technologies are in an emergent phase, particularly in relation to commercial examples.

The option to connect equipment available at the pilot plant to that available 'in-house' (known as 'plug-and-play') was appealing to many respondents (45%), suggesting that mobile units could be a useful asset for open-access pilot/demo centres.

<sup>2</sup> The number of responses for this question was low as only respondents that have previously stated unlikelihood of accessing large-scale infrastructure responded to this question. Therefore, results should be interpreted carefully.

Moving on to access to technical expertise, gaining access to engineering know-how and process technology support were at the top of the list for industry respondents where the vast majority of them considered these skills as *very important or essential*. These results were backed up by an expressed willingness to pay to accessing such skills which highlights the importance placed on such knowledge and skills, and the symbiosis existing between large-scale pilot infrastructure and expertise.

In addition to technical advice, many technology developers (41%) also identified access to financial and legal advice as *very important or essential*, 71% of which were willing to pay for such skills; although R&D expertise was also considered *very important or essential* for 55% of industry respondents, only 48% of these respondents expressed a willingness to pay to access this expertise.

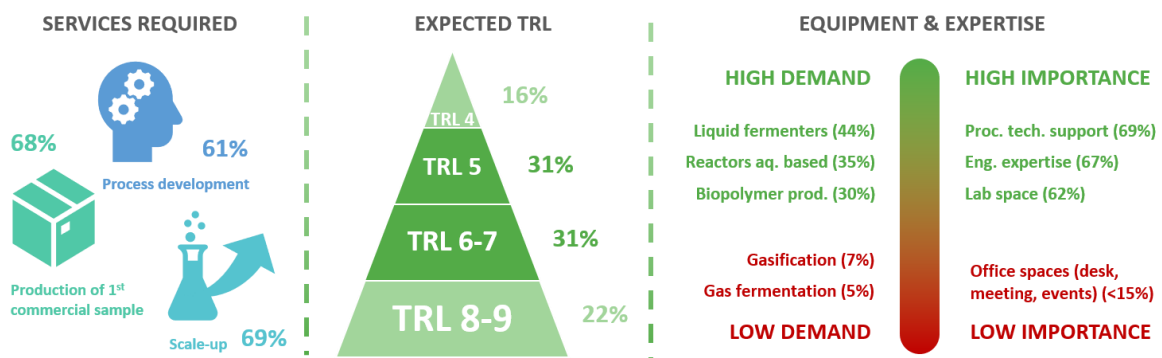


Figure 4 Needs and wants expressed by industry in regard to accessing large-scale infrastructure: type of services required (left), expected TRL to be achieved after accessing the infrastructure (middle) and equipment and expertise required for the process (right).

In terms of other logistical or support measures, access to laboratory (62%) and storage spaces were deemed important (storage refers to both feedstock and equipment storage). Access to feedstock storage was a major consideration for most. In contrast, access to co-located office spaces and meeting facilities was not generally considered as a necessity by industry respondents (<15%).

Although industry ‘needs and wants’ represented the main focus of this study, other factors such as the terms and conditions under which industry would be willing to work with open-access facilities should not be overlooked (see Figure 5) – the availability of relevant infrastructure and expertise will not be enough to attract industry without appropriate conditions of access in place. These findings are therefore important learning points for open-access centres, looking to develop bespoke client targeting strategies. But also, for policy makers, as gaining an understanding of the most convenient terms for industry players to access scale up infrastructure can help shaping future public policies aimed at supporting effective scale-up in support of development of the European bio-based sector, in line with the European Bioeconomy Strategy.

As mentioned above, one of the key concerns for industry respondents was around control of IP. However, a significant number of respondents prepared to express an opinion were willing to share any IP generated during the scaling up process with the open access plant facility (38% for versus 19% against (the remainder preferred not to express an opinion)).

A number of industry players were also willing to travel in order to access the right open-access facility to scale-up their innovation. Only a few respondents constrained their interest to their local region (5%) or country (12%); the majority of industry participants were willing to travel to either

neighbouring countries (21%), across the EU (45%) or globally (14%) to access the right open-access centre.

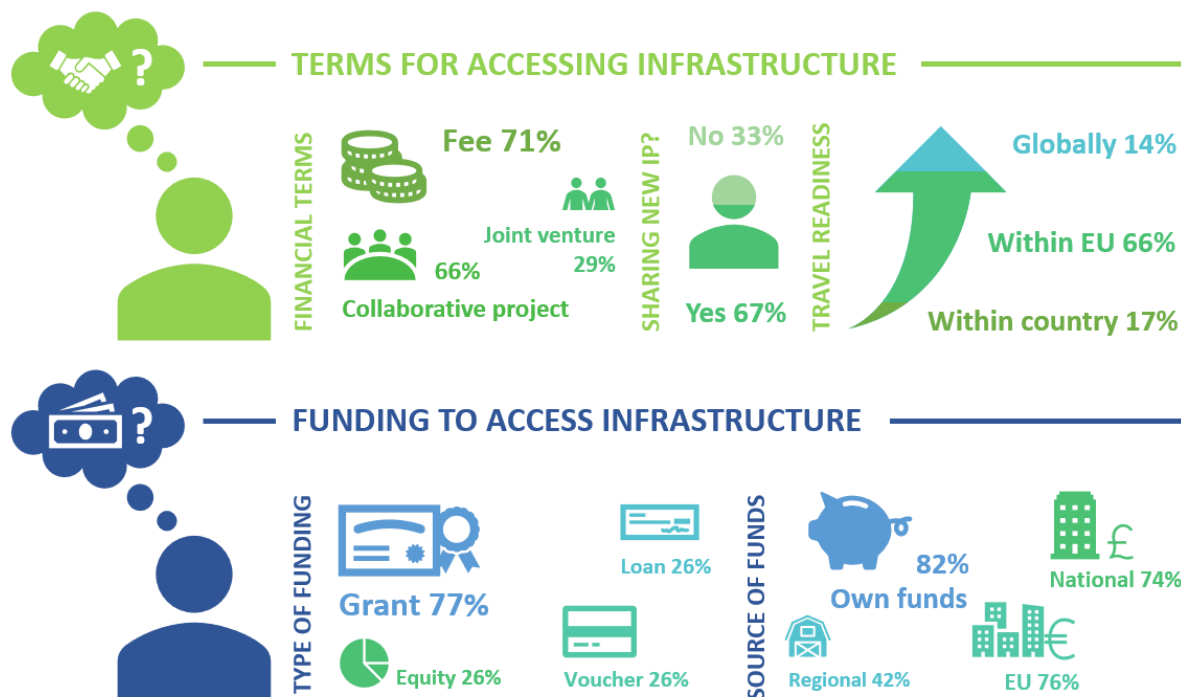


Figure 5 Terms and conditions by which industry would be willing to work with open-access centres (top) and funding options and sources to cover the access to infrastructure (bottom).

With regards to gaining access, the preferred options were either a fee to access (71%) or via participation in a consortium-based funded project (66%). The least attractive option was the establishment of a joint venture with the open-access centre (29%). Commercial manufacturers generally preferred to pay an access fee (82%) although most of them would also consider the participation in a collaborative funded project (59%); In contrast, technology developers were willing to participate in collaborative funded projects (75%), but were less attracted to paying a fee to access (56%).

In terms of where external funding would be sought to gain access, obtaining a public grant was the preferred option for most respondents (77%). However, a significant number of technology developers would also be willing to consider the use of discount vouchers to access infrastructure (38%) (a mechanism now commonly being adopted by regional public funding mechanisms across a range of sectors). In contrast, large commercial manufacturers were more interested in working on an agreed shared equity basis as an alternative means of gaining access to support (32%). Over three quarters of respondents were willing to use their own funds (82%) and/or European funding (as part of a project) (76%) to finance access to facilities. Accessing national funding, was seen to be more appealing to technology developers as 94% of them would consider this, compared to only 59% of commercial manufacturers.

**To conclude,**

this survey gathered industry views of priority needs when facing the challenges posed by the scale up of a new bio-based process or product, addressing issues such as the needs and wants for equipment and expertise and type of support services required. In addition, the survey reveals

motivations and concerns expressed by industry relating to gaining access to open-access centres supporting process scale-up.

Data relating to industry needs is limited, so the outcomes of this survey are of key importance to both, existing open-access centres and policy makers looking to support innovation actions in the bioeconomy to ensure actions are targeted at real areas of need.

In conjunction with additional work packages within the Pilots4U project which collated equipment lists for existing facilities offering open-access equipment, a legacy of this project will be a database of equipment held in European open-access centres that will help to signpost potential client interests to open-access centres. An associated gap analysis matched to expressed industry needs showed little evidence of the need to invest in the development of additional new facilities. However, there was seen to be a need to support greater co-operation between centres to provide holistic service offerings and to make the most of previous public investment in such facilities. There will be a need for ongoing investment in such facilities to ensure equipment is replaced, maintained and upgraded to reflect technical development. Pilots4U intends to establish a network of open-access facilities to continue to promote the needs of the sector and to help signpost industry to the services and equipment available to them.

The results of this survey demonstrate the importance placed by bioeconomy industry interests in the ability to access open-access scale-up facilities, but operators need to appreciate the concerns held by industry over IP and the costs of accessing services, which are prohibitive to some. In terms of future public investment, overcoming hurdles to access should be a key issue. Some forms of funding especially at a local level can also be restrictive in terms of hampering investment in cheaper reconditioned equipment or may discourage or not extend to support working across regional boundaries. In trying to deliver more cost-effective solutions to support innovation and develop new businesses, these are issues that should be easy to remedy.

## Acknowledgement

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## Partners in the project

