

Towards a Nordic and Baltic Sea Region testbed infrastructure

Final report with policy recommendations

BSR STARS S3 (Project Activity 2.3)

This report concludes activity A2.3 of the BSR STARS S3¹ project aiming to enhance collaboration between testbeds, including by piloting a macroregional innovation voucher scheme in the bioeconomy.

Overall, BSR STARS S3 aims to promote innovation in the Baltic Sea Region, including by identifying new opportunities for smart specialisation. The partner regions in the project are: Greater Copenhagen (Denmark), Sør Trøndelag (Norway), Skåne (Sweden), Tampere (Finland) and Lithuania (participating at the country level).

Project efforts to enhance collaboration between testbeds and the piloting the macroregional innovation vouchers scheme aims more specifically to:

1. Undertake a mapping of circular and bioeconomy related hard and soft test and demonstration infrastructures (in the project partner regions and countries) suitable for shared uses among SMEs.
2. Engage the target group (SMEs, RTOs and the policy level) through dialogue activities, including by organizing seminar activities to prepare the pilot implementation of innovation vouchers, and follow up on results.
3. Prepare a final report that evaluates the innovation voucher pilot and assess policy implications and opportunities for up-scaling.

Below follows to key findings, implications and policy recommendations of activity 2.3.

1. Findings from mapping

The mapping demonstrates that there are quite many – and a growing number of – test, demonstration and verification infrastructures that SMEs can benefit from when attempting to

¹ <http://www.bsr-stars.eu/bsr-stars-s3/>

commercialise new products, services or processes in the bioeconomy. It also demonstrates that countries in the Baltic Sea Region have complementary areas of testbed excellence – generally speaking with Denmark having a stronghold in test and demonstration infrastructures in the agriculture-based bioeconomy; Norway with particular strongholds in the forestry and maritime-based bioeconomy; and Finland and Sweden with unique test and demonstration infrastructure in the forestry-based bioeconomy.

Noting that there is strong evidence for the correlation between the competitiveness of technology-based SMEs and their access to test and demonstration infrastructures leads to an immediate conclusion that efforts should be made to share more a larger pool of testbed infrastructures among countries and across regions in the Baltic Sea Region.

The mapping discuss a number of gaps and opportunities to consider for such transnational cooperation:

The vast majority of test and demonstration infrastructures presented in the mapping report are legally open to SMEs in the bioeconomy from neighbouring countries. In reality however, SMEs commission test and demonstration services at home. This was also a key finding of the Nordic Council of Ministers publication “Development of the Nordic Bioeconomy” which concluded that: “There is a surprising lack of open access to test facilities available in the Nordic countries for upscaling new processes or products” – and that the macro-region should do more – “to move forward and harvest solutions from synergies”.

The mapping propose to consider developing a “single market” for test and demonstration technology services to SMEs in the bioeconomy in the Baltic Sea Region – starting with testing the feasibility of such cooperation by asking: “How could regional and national stakeholders in the macro-region practically go about networking and sharing existing test and demonstration infrastructures?” And: “What are the gaps that currently prevent SMEs to commission test and technology services in neighbouring countries”?

The mapping sheds light on a number of bottleneck discouraging SMEs to benefit more from test opportunities in neighbouring countries, including the complexity of the test and demonstration test ecosystem, insufficient knowledge of existing complementarities in excellence, and higher transaction costs when undertaking test activities in a neighbouring country than at home.

The mapping suggests to pilot an effort to overcome these restraints with a macro-regional innovation voucher scheme designed to compensate SMEs for (some of) the additional costs related to commissioning test and demonstration services in a neighbouring country.

The mapping was presented on 6 April 2017 when 32 stakeholders from Denmark, Germany, Estonia, Finland, Norway, Lithuania, Poland and Sweden met in Tampere.

Beyond presenting and discussing the mapping of test and demonstration infrastructures in the bioeconomy, the seminar also facilitated (in a parallel track) the discussion of opportunities for similar efforts in the digital economy – the later as a result of the seminar being co-hosted with the Baltic Development Forum who as part of the BSR STARS Activity 3.5 had undertaken a similar mapping exercise of test and demonstration infrastructures in the digital economy.

The seminar concluded that as a first step towards realising a shared testbed infrastructure in the Baltic Sea Region, cooperation efforts should include additional awareness raising on the various areas of particular excellence and the identified complementarities of test and technology services around the Baltic Sea Region.

It was also agreed that because test and technology service providers compete with their neighbouring peers on commissioned services for SMEs it is important to identify a set of cooperation areas that emphasise on complementarities and mutual. This led to a decision to pilot the planned innovation voucher scheme for SMEs in the bioeconomy, encouraging them to benefit from complementary testbed excellence and services across borders.

Following the seminar in Tampere the Nordic Council of Ministers – in partnership with testbeds and RTOs in Denmark, Finland, Norway and Sweden – developed the framework for piloting the Baltic Sea Region Bioeconomy Innovation Vouchers.

2. Findings from piloting BSR Bioeconomy Innovation Vouchers

The first call for vouchers was opened in September 2017.

Having not received any applications for the bioeconomy innovation vouchers from SMEs at the end of 2017, the call period was extended until May 2018. Also that produced no results in terms of voucher applications. Telephone interview revealed the primary reasons for this were:

- Lack of marketing the vouchers among testbeds and RTOs.
- Lack of awareness among testbeds on the unique complementary testbed infrastructures of neighbour countries' testbeds.
- Concerns about competition among testbeds causing them to hesitate with “sending potential customers out the door”.
- The voucher amount, EUR 5.000, was insufficient to compensate the SMEs for the additional transaction costs when undertaking test activities across borders.

During 2017-18 a parallel Nordic dialogue among RTOs and testbeds emerged, also exploring opportunities for deepening cooperation between RTOs and testbeds in the Nordic countries. Similar to the BSR STARS S3 project, the Nordic RTO dialogue highlighted technology and business development in the bioeconomy and the digital economy as areas of particular interest for transnational cooperation – though adding also technology and business development in the health sector.

And furthermore, the potential value added of test bed cooperation in the Nordic countries was demonstrated by a cooperation project “Nordic Test Beds” funded by Nordic Innovation. This project concluded that (collaboration between) “test beds provide health technology companies and start-ups leads to faster product development times and access to wider markets and improved implementation of the solutions”.

In an effort to merge these multiple efforts a meeting participated by representatives of BSR STARS S3 project, the Nordic RTO network and Nordic Innovation was organised in September 2018. The meeting confirmed the opportunity and interest in enhancing further cooperation between testbeds in the Nordic and Baltic Sea Region – and importantly it also provided a foundation for relaunching a call for BSR STARS S3 Bioeconomy Innovation Vouchers.

In the second call the voucher amount was increased to EUR 10.000 – with a minimum of 80% going to the SME in support of the actual test service and with up to 20% going to the RTO/testbed expert(s) for work related to identifying a complementary testbed in a neighbouring country and help facilitate the implementation of the test. The SMEs together with the respective RTOs/testbeds could apply for the voucher through a simple application template provided by the Nordic Council of Ministers.

This approach – combined with a significant push by the RTOs and testbeds themselves to match SMEs with each other's complementary testbeds – proved successful. By the end of 2018 four SMEs were in pipeline to undertake a test activity using the voucher. By March 2019 three SMEs had completed their test activity with the last to finish in March/April.

- Dagsmark Petfoods Oy from Finland had an extrusion processing test undertaken of selected raw materials for dog dental sticks at the pilot plant at Danish DTI.
- Finnish company Paptic Ltd was supported in testing a novel fiber-based packaging material at the RISE's Swerea textile testbed in Sweden.
- Norwegian SMEs Kvanne Industrier AS undertook a test at RISE built environment testbed in Sweden of the physical properties of prototypes for sound insulation in efforts to improve – also environmentally – manufacturing of high performance industrial doors.
- A fourth innovation voucher has been granted but the test not yet completed. This voucher was provided to the Norwegian company Biocluster AS that at RISE Processum in Sweden during March-April 2019 will undertake a test on the feasibility of production scale-up of single cell proteins.

A second and final seminar was organised on 28 February 2019. The seminar attracted 29 participants representing the BSR STARS S3 project, SMEs and RTOs benefitting from the innovation vouchers, the Nordic RTO network and representatives of other European and Nordic programmes and projects also aiming to improve the opportunities for SMEs to benefit from a more integrated testbed infrastructure.

The seminar presented and discussed lessons learned from the BSR STARS S3 innovation voucher schemes and other transnational innovation voucher schemes; and it presented and discussed a number of critical barriers currently hindering cross border cooperation between RTOs and testbed.

The seminar highlighted a number of lessons learned for the SMEs and RTOs/testbeds benefitting from the Bioeconomy Voucher:

- The vouchers have provided an opportunity for the SMEs to have tests undertaken that could not have been done as effectively with test equipment available at the respective SMEs national RTOs/testbeds. Therefore, the innovation vouchers provided transnational value added by exploiting complementary test excellence among testbeds across borders.
- In general – both on the side of the SMEs and RTOs – those benefitting from the vouchers agreed that the procedure for applying for funds and receiving payments was smooth.
- For some of RTO/testbed experts involved it had been challenging/time consuming to identify a testbed in a neighbouring country with the specific test equipment requested by the SME. Because RTOs/testbeds operate based on paid services, it was stated that “vouchers of only EUR 10.000 in support for both the SME-RTO/testbed matchmaking efforts and the test itself, are insufficient”. Other RTOs stated that “the voucher amount was sufficient to plan and implement the test on our normal terms and rates”.
- SMEs benefitting from the vouchers highlighted that a key benefit for them was that the vouchers had encouraged them to speed up their innovation process. Had it not been for the opportunity of gaining support through the voucher scheme they would not have been able to undertake the testing at this time. “Now on the other hand – because of this *teaser* we got – we are on to further product development. We have already planned another test with the same testbed and that test we pay ourselves in full” one SME stated.

Concerning overall lessons on critical barriers currently hindering the emergence of a macro-regional testbed infrastructure, the findings from the Tampere seminar were reaffirmed:

- There is a lack of platforms for networking, awareness raising, trust building between testbeds.
- The regional and national innovation and testbed infrastructures is highly complex leaving testbed experts with many questions and barriers when attempting to match a specialized test need from a SME with the right testbed in a neighbouring country.
- There is a need for building personal ties and trust to ensure win-win. RTOs and testbeds rely financially on commissioned services by companies. This cause testbeds and RTOs to hesitate about “sending potential customers out the door” to a neighbouring country testbed unless the testbeds and RTOs feel convinced about the opportunity for also having more customers coming their way.
- The higher transaction costs for SMEs related to commissioning test services abroad should be acknowledged – and efforts should be made to reduce these costs through voucher schemes or in other ways.

Towards the end of the seminar the group leading RTOs from Denmark, Finland, Norway and Sweden presented a proposal for a pre-project that could pave the way for developing a joint macroregional testbed infrastructure longer team. The proposal includes: 1) A foresight study to identify future specific testbed cooperation areas in the bioeconomy; 2) Piloting a number of Nordic Testbed Days aiming to increase awareness; share information on testbed excellence and identify opportunities

for smart specialisation; and develop a dialogue with SMEs; and 3) To prepare a position paper “Towards a Nordic testbed infrastructure”.

The group of RTOs asked for Nordic Innovation to consider co-financing this next step, as a first effort after the closing the BSR STARS S3 project. The immediate response from Nordic Innovation was that the proposal presented by the RTOs could well be a fit for receiving matching pre-project funds from Nordic Innovation, possibly in the range of DKK 3-500.000.

3. Implications and policy recommendations

Overall activity 2.3 of the BSR STARS S3 project was implemented in accordance with the set objectives and outputs.

That said, the journey undertaken towards the grander objective of developing a more integrated testbed infrastructure in the Baltic Sea Region proved to be **challenging for four reasons**:

1. The macro-regional testbed ecosystem is enormously complex. For the bioeconomy this includes a vast amount of national testbeds with many different areas of expertise and unique excellence. This does offer many opportunities for benefitting from complementarities through smart specialization and cooperation between testbeds but it also constitutes a multifaceted challenge in terms of practically connecting the dots in operationally efficient ways that are both manageable for the testbeds and the RTOs – as well as encouraging/seamless for the SMEs to pursue.
2. Beyond the complexity, there prevails also a conflict between cooperation and competition between testbeds and RTOs whose activities are mostly revenue driven, causing them to hesitate advising potential customers (SMEs) to explore available services among competing RTOs and testbeds in the Baltic Sea Region.
3. Also, because RTOs and testbed mainly engage on commercial terms it is financially cumbersome for them to fund collaborative activities that are unlikely to benefit revenue in the short term. Developing a macro-regional testbed infrastructure is – given point 1 and 2 above – a longer term effort requiring network and trust building, identification of the specific operational cooperation opportunities; and rallying of support at the policy level.
4. Finally, though the SMEs benefitting from the bioeconomy innovation voucher were only allowed to undertake rather inexpensive trails and tests – due to the small amount of the voucher – they did feedback that the voucher had been instrumental for them to trigger proceeding with product and process innovation at this point in time. Without the voucher the test would not have been done now, if at all.

Overcoming the challenges will require further efforts

While a new potential Nordic project – propelled by the cooperation efforts of BSR STARS S3 – including foresight study, matchmaking activities and a continued policy dialogue, would be instrumental for taking the macroregion towards a more integrated testbed infrastructure such a project can only be the first next steps.

Longer term there is a need for more substantial efforts to connect the macroregion's many testbeds and supporting organisations – both vertically and horizontally: Vertically in terms of integration and smart specialization efforts within the bioeconomy, and horizontally with similar efforts in other industries and sectors where there is joint strategic interest for developing a more integrated testbed infrastructure.

Two points of observation in this regard:

Firstly, the opportunities and bottlenecks for integrating testbed infrastructures are not the same across industries – so efforts in the bioeconomy should be carefully tailored to the specific nature of the macroregional bioeconomy testbed ecosystem. Similar efforts in e.g. the digital economy should be tailored to the specific nature of the digital testbed ecosystem, similarly with effort in the health economy, etc.

Secondly, the Nordic-Baltic macroregion is not the “winning geography” for cross border cooperation between testbeds in all industries and sectors. To identify target industries and sectors for testbed cooperation in the Nordic and Baltic Sea Region important questions include: Is there a strategic fit – i.e. do the countries and regions share research, innovation and technological development objectives? Within industries and sectors, do the countries and regions all have sophisticated testbed infrastructures that provides opportunity to mutually benefit from cooperation? And does the Nordic-Baltic macroregion offer additional value added vis-à-vis cooperation with other countries and regions? (in robotics for example, the most productive partnership to integrate regional and national testbed infrastructures proved to be a partnership of testbed from Denmark, France, Germany and United Kingdom).

Funding the transition towards a macroregional testbed infrastructure

In going forward it is proposed that a basic (small) budget is established for activities related to mainly network building and strategic management of cooperation efforts. The project proposed by the Nordic RTOs to Nordic Innovation could potentially provide this platform. It is unlikely, that the RTOs and testbeds – since they revenue-driven organisations – will be able to sustain cooperation efforts without dedicated additional funds.

Ultimately, cooperation efforts are about servicing companies with the best available test service the Nordic-Baltic macroregion has to offer. This is an attractive proposition to companies but even so, and in particular for SMEs, the higher transaction costs associated to undertaking test activities in another country will prevent many from pursuing the opportunity. The BSR STARS S3 project has demonstrated that modest – though not too modest – innovation vouchers can provide the a triggering incentive for SMEs to undertake test opportunities across borders.

Putting in place a macroregional innovation voucher scheme would be a longer term effort and it is an effort that is recommend to be pursued, even if it is a challenging one.

In parallel, it is recommended that existing regional and national innovation voucher schemes are reciprocally made available to SMEs from neighbouring countries. This would be a no cost effective way to encourage SMEs to benefit from the best available testbed in the Baltic Sea Region.

A third instrument that should be considered is to develop frameworks for macroregional innovation vouchers as part of e.g. Horizon 2020 projects, similar to those that have proved successful by the ROBOT-NET and Superbio H2020 projects, and other projects providing innovation vouchers and coupons with support from e.g. the Interreg programmes.

Integrating the macroregional testbed infrastructure without additional funding?

As indicated above it is unlikely, that the RTOs and testbeds – since they revenue-driven organisations – will be able to build a strong network and platform to integrate better the macroregional testbed ecosystem without financial support. In this regards it is important to note that the main beneficiaries of such financial support are not the RTOs and testbeds but the SMEs. For the RTOs and testbeds additional revenue resulting from a macroregional voucher scheme would be only a marginal contribution to overall revenues.

While attracting funding for network activities and other efforts that sets the stage for future cooperation towards a more integrated macroregional testbed infrastructure seems feasible, attracting sufficient funds in the short to medium term to roll out a mainstream-type macroregional innovation voucher scheme seems less likely. This would require a significant commitment at the political level. At the Nordic level, the Nordic Ministers have made statements to encourage RTOs and testbeds to seek closer cooperation and explore opportunities for developing an integrated testbed infrastructure – but the Nordic Ministers have made no indications to support such efforts financially. At the European level it is unlikely that special financial provisions for a mainstream-type macroregional innovation voucher scheme could gain the needed support. More likely reference would be made to exiting programmes and funding opportunities, and in particular H2020.

There are also opportunities for moving the macroregion towards a more integrated of testbed infrastructure and encourage SMEs to explore testbed opportunities in neighbouring countries without additional financial support.

For example as mentioned above, countries and regions could open up existing regional and national innovation voucher schemes for SMEs from neighbouring countries. This would require no additional funds but only some technical corrections.

Another approach could be to organise summits / large conferences funded by sponsors and registration fees – e.g. “Innovation in the Bioeconomy”, “Innovation in the Digital Economy” and “Innovation in the Health Economy” as three summits or as one summit with three tracks.

Such summit(s) could be tailored to provide very tangible (economic) benefits to both companies, investors, RTOs and testbeds – as well as an attractive stage for the policy level:

- RTOs and testbed could benefit from an opportunity to present themselves and market their test services towards (hundreds of) participating companies from the microregion and beyond.

- Companies would benefit from an opportunity to quickly and efficiently browse for test opportunities in the Baltic Sea Region – thereby saving resources and also become reassured that they get the possible test for their investment.
- For smaller companies (start-ups and young SMEs) and investors the summits could be a venue to meet and explore growth and investment opportunities related to product development that requires testing before going to market.
- The policy level would benefit from such summits by gaining access to a dialogue with the business and research community on challenges and opportunities for developing a common macroregional testbed ecosystem longer term.

The Nordic Testbed Days proposed as part of the pre-project potentially to be co-financed by Nordic Innovation could be frontrunners – pilots – for such larger summits.