

## Testbeds as a catalyst for innovative digital solutions

### Background paper for the seminar “Digital Growth in the Baltic Sea Region” on 9<sup>th</sup> December 2014 in Copenhagen

*Access to testbeds where companies can systematically test new and innovative digital products and services with relevant user groups can drive innovation and growth in the digital economy. The purpose of the seminar is to explore the importance of access to testbeds and discuss approaches to establishing the Baltic Sea Region as a global hub for testing innovative digital solutions. The conclusions of the seminar will provide inputs to the forthcoming project “Innovative Nordic digital solutions” under the Nordic Co-operation Programme for Innovation and Business Policy 2014-2017.*

#### Background

Danish Business Authority and Baltic Development Forum are actively seeking to promote innovation, growth and global competitiveness of the digital economy in the Baltic Sea Region. A key issue is to provide excellent framework conditions for digital entrepreneurs and SMEs from basic research to market introduction of innovative digital solutions.

In this seminar, we are focusing on the importance of testbeds for entrepreneurs and SMEs in the digital economy. Industry representatives have identified the access to testbeds as a key element in good framework conditions for innovation and business development, and in particular as an important component of a strong ecosystem for entrepreneurs.

There is no clear definition of a ‘testbed’, but testbeds may be defined as facilities (physical or virtual) that enable companies or researchers to develop and systematically test new and innovative solutions such as interfaces, apps and products and their associated business models (see discussion of definition below). The access to such testbeds enables entrepreneurs and SMEs to test and adapt their solutions to the market thus potentially 1) reducing the time and costs associated with the test and adaption of innovative solutions, and 2) increasing the likelihood of a successful market introduction.

#### ERHVERVSSTYRELSEN

Dahlerups Pakhus  
Langelinie Allé 17  
2100 København Ø

Tlf. 35 29 10 00  
Fax 35 29 10 01  
CVR-nr 10 15 08 17  
E-post [erst@erst.dk](mailto:erst@erst.dk)  
[www.erst.dk](http://www.erst.dk)

#### ERHVERVS- OG VÆKSTMINISTERIET

The potential contribution to digital growth and innovation makes access to testbeds important from both a business and policy perspective. However, the importance of access to testbeds has to date only received little attention at policy level and there is limited knowledge of the key players in this field, the services offered and the challenges faced by digital entrepreneurs and SMEs with regard to testing. However, according to a recent Capgemini report many companies face barriers related to testing of digital products in terms of lack of test environments and proactive measures that ensure timely engagement in the application delivery lifecycle.<sup>1</sup> But is this conclusion also valid in the Baltic Sea Region, and – if so – what can we do to change this situation?

An initial mapping of testbeds in the Baltic Sea Region by Danish Business Authority and Baltic Development Forum has helped identify a number of private and public testbeds and test providers. The next step is to analyse in more depth the full range of services offered and the quality of the services to better assess the need for new initiatives aiming at improving the access to testbeds in the macro-region.

Moreover, we need to explore opportunities for providing existing testbeds and test providers with the incentives and means to further develop their services and exploit the full potential of the Baltic Sea Region for the testing of innovative digital solutions.

The seminar will explore the importance of testbeds and the need for supporting the development of innovative services at regional, national and macro-regional levels, and in particular how increased macro-regional collaboration may contribute to developing innovative service offerings and in turn make the Baltic Sea Region a global hub for the testing of innovative digital solutions.

### **What are testbeds?**

There is no clear definition of a ‘testbed’. In this background note, a tentative definition is proposed: Testbeds are facilities (physical or virtual) that enable companies or researchers to develop and systematically test new and innovative products or services. The proposed definition implies that other and perhaps more well-known concepts such as Living Labs or FabLabs can be considered as testbeds.

Access to testbeds can be important in early stages of the innovation process as well as in later stages:

- Early stage: Companies may require access to testbeds that can help develop innovative solutions together with end-users or validate a prototype, for instance by getting access to research infrastructures or technical expertise;
- Late stage: Companies may require access to testbeds that enable a final adjustment of prototypes (products or services) together with relevant user groups before introducing the specific solution on the market.

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<sup>1</sup> Capgemini, Sogeti and HP 2014: World Quality Report 2014-2015

Testbeds can be managed by private companies, associations as well as by public organisations, and access to the testbeds will usually be provided on market terms or be subject to a fee.

Question: What are the key challenges for entrepreneurs and SMEs in terms of access to testbeds for innovative digital solutions in the Baltic Sea Region?

### **Why is access to testbeds important for entrepreneurs and SMEs?**

A recent study by Danish Business Authority shows that the testing and adapting of innovative solutions helps companies overcome market barriers. This is also the case for the digital economy: Testing digital solutions is becoming increasingly important and increasingly expensive for companies and entrepreneurs in the digital economy. According to World Quality Report 2014-2015, the average spend on application quality as a share of the IT budget has increased from 18 pct. in 2012 to 26 pct. in 2014, and the spend on application quality is forecast to grow even higher.<sup>2</sup>

While large companies and organisations may have developed an in-house capacity to manage test and quality assurance processes, entrepreneurs and small and medium sized enterprises often face a resource challenge in carrying out test and quality assurance. The possibility of making use of testbeds or outsourcing test and quality assurance to external service providers is thus vital for entrepreneurs and SMEs in bringing their digital solutions to the market.

Question: How can the public sector help facilitate access to testbeds for digital entrepreneurs and SMEs?

### **What is the role of the public sector?**

The public sector can play an active role in driving innovation, also in the digital economy.<sup>3</sup> The range of policy actions can include facilitating partnerships between the public and private sector, providing access to public data, tax incentives and regulation, promoting the EU Single Market, reducing market barriers, innovative public procurement, providing funding for research and innovation, etc.

In the case of testing innovative digital solutions, the involvement of the public sector may even be a necessity: While testing of digital products and services for mass markets is relatively simple and mainly requires access to a sufficient number of test users in relevant markets, testing can however be more difficult if the digital products or services are targeting users in public sector domains such as health care or education, and/or where testing requires complementary technologies or products. The public sector can help drive innovation by facilitating the

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<sup>2</sup> Capgemini, Sogeti and HP 2014: World Quality Report 2014-2015

<sup>3</sup> Mazzucato, Mariana 2013: The entrepreneurial state. Debunking public vs. private sector myths, Anthem Press

testing of new digital solutions in public institutions, i.e. in schools, health care and public administration.

The public sector is also a key player in innovation processes due to its involvement in different value chains. Applying a value chain approach has the advantage of making it easier to export the digital solutions as multiple interconnected actors in the value chain, including public organisations, have tested them.

One example is the *integrated value chain approach*, which has been applied in the UK to facilitate end-to-end testing of innovative digital solutions. This comprises low risk and low cost trial zones, where for example network owners, operators and content providers can test products together. UK examples of such integrated value chain testbeds are:

- New monetization methods for online content
- New business models for sharing and exploiting intellectual property
- New models of identity management
- Content-aware network operation.<sup>4</sup>

Question: What can the public sector do to facilitate access to testing innovative digital solutions in public sector domains and in digital value chains?

### What can we learn from existing testbeds and testproviders in the region?

Danish Business Authority together with Baltic Development Forum have identified a number of existing testbeds and testproviders across the Baltic Sea Region that represent different approaches as well as different industries. Three of the testbeds and testproviders are presenting their approaches and experiences at the seminar as well as giving their perspective on the added value of increased macro-regional collaboration:

- **Testbirds (Germany)** is a private company providing crowdtesting services to companies: [www.testbirds.com](http://www.testbirds.com)
- **Acreeo National Testbed (Sweden)** brings together regional, national and international institutions and companies working with research and development of today's and tomorrow's ICT products and services within smart living, eHealth, service distribution and broadband networks: [www.acreeo.se/](http://www.acreeo.se/)
- **Malmö Sustainable Business Hub** is finalizing a project aiming at establishing testbeds to drive innovation in environmental technologies: [www.sbsub.se/projekt/innovation-genom-testbeds-och-innovationsupphandling](http://www.sbsub.se/projekt/innovation-genom-testbeds-och-innovationsupphandling)

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<sup>4</sup> Digital Britain: Final report

The identification of the added value of increased collaboration between key actors in the BSR can help guide new initiatives aiming at promoting innovation and digital growth in the region.

Question: What can we learn from existing experiences with testbeds and how can the public sector support the development of innovative services?

**What is the relevance of a macro-regional perspective on digital testbeds?**

Testbeds are important elements of a strong eco-system for digital entrepreneurs and a driver of competitiveness for companies in the digital economy. But why is it relevant with a macro-regional perspective on testbeds?

According to the World Economic Forum (2014), the countries in the Baltic Sea Region are characterized by relatively

- high levels of ICT readiness with regard to infrastructure and digital content, affordability and skills;
- high levels of internet and ICT uptake and usage by individuals, businesses and governments; as well as
- high levels of technological and non-technological innovation.<sup>5</sup>

The high levels of readiness, usage and innovation make the Baltic Sea Region an attractive geographical area to develop and test innovative digital products and services. Not only for indigenous companies but also for other European or global companies.

Increased collaboration between existing testbeds and test provides in the region can help develop innovative and more specialised test services as well as cross-border services that exploit the full potential of the Baltic Sea Region thus enabling a transformation of the region into a global hub for the development and test of innovative digital solutions.

Question: How do we exploit the full potential of the Baltic Sea Region and support the transformation of the region into a global hub for the development and test of innovative digital solutions?

*The background paper has been prepared by Danish Business Authority. We are grateful for the comments received by two external reviewers, Joakim Lundblad, researcher at Lund University and Casper Høgenhaven, Hoegenhaven Consult. Danish Business Authority is responsible for this final version of the paper, including all shortcomings.*

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<sup>5</sup> World Economic Forum 2014: The Global Information Technology Report 2014