

Report:
Testing future Societies?
Developing a framework for test beds and living labs as instruments of innovation governance¹

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Test beds are usually thought of as places where we test technology under real-world conditions. However, in test beds we can equally well test how societies can be reconfigured for a new set of technologies. With this statement at the beginning of his talk entitled “Testing future societies? Developing a framework for test beds and living labs as instruments of innovation governance”, Professor Sebastian Pfotenhauer, Technical University Munich (TUM), immediately gave away an important conclusion.

Defining test beds

Test beds (also known as “living labs” or “real-world laboratories”) are a prominent innovation tool that is deployed by companies and research institutions to drive innovation in a designated experimental space. They aim to provide a controlled experimental space that aids the collection of feedback on a new technological invention under realistic conditions. After shaping this invention to perfection in a safe way, it can be expanded (“scaled up”)² from the test bed to other parts of society. Examples of test beds are Masdar City³ in the United Arab Emirates, Sidewalk Toronto⁴ in Canada and the Catalan Living Lab⁵ in Spain.

In the context of test beds, it is important to point out that when scientists replicate their perception of humanity, they also frame future society. Therefore, test beds not only shape technology but also reinvent the way we perceive society. Pfotenhauer illustrated this fact using two examples of test beds in Germany.

Two case studies of the testing of future energy systems

The “Energiewende” in Germany has resulted in many test beds as part of the work on more sustainable living alternatives for the future. Two prominent examples are the “European Energy

¹ Sebastian Pfotenhauer’s talk was based on the paper: Franziska Engels, Sebastian Pfotenhauer, and Alexander Wentland, “Testing future societies?” *forthcoming in 2019*.

² For further research on scaling in this context, see the H2020 Project SCALINGS, of which Sebastian Pfotenhauer is the project leader: www.scalings.eu accessed 25 June 2019.

³ <https://masdar.ae/en/masdar-city/> accessed 25 June 2019.

⁴ <https://www.sidewalktoronto.ca/> accessed 25 June 2019.

⁵ <http://catalonialivinglab.com/> accessed 25 June 2019.

Forum” (EUREF),⁶ an urban smart energy campus in Berlin, and the “Energy Avantgarde Anhalt” (EAA),⁷ a regional renewable energy network in Saxony-Anhalt.

EUREF has quickly become a flagship initiative of a new sustainable way of urban living. With its hip and “berlinesque” flair, it attracts a young and innovative crowd. Because the property is privately owned and its infrastructure is fenced off, it is fairly easy to advance further discoveries in this controlled environment. Although some consider the EUREF to be a space for carrying out testing, others are critical that the EUREF has become nothing more than a showcase for public demonstrations.

The EAA, on the other hand, is not fenced off, is located in a rural environment and is spread over a much larger territory than the EUREF. Located in the state with the highest average age and second-lowest GDP per capita in Germany, this test bed faces obstacles that are rather different from those encountered by the EUREF. Moreover, the EAA is – in contrast to the EUREF – relatively open to any citizen wishing to join the project. However, not many have seized this opportunity.

Three tensions of test beds in society

Because of the unique combination of defining elements that make up a test bed, it is subject to different expectations that cannot all be met at the same time within the same project. This creates certain tensions, three of which Pfothenhauer elaborated on during his talk.

Controlled experimentation versus messy co-creation – Although scientists usually want to work in a controlled, replicable environment, they also need a certain unpredictability to test how a product functions in an unexpected situation.

Testing versus demonstrating viability – Not every experiment ends with a positive result. Trial and error is an acceptable scientific method. However, if a test bed is meant to demonstrate progress, a public failure under the gaze of an interested crowd is usually not desirable.

Unique real-world settings versus scalable solutions – Test beds are under pressure to perform under very unique social conditions but at the same time to produce results that are applicable to similar obstacles everywhere.

Legal protection of society

There are many practical considerations when it comes to implementing a test bed in research. Do we want an opt-in or an opt-out system? How practical is either of these if the only way to opt out is by avoiding the test bed in question?

In any case, the legal protection of the individuals affected by the testing is crucial for the acceptance of test beds. According to Pfothenhauer and his SCALINGS colleague Iris Eisenberger, this can be facilitated through different regimes.

First, it is possible to require informed formal consent for participation in a test bed, which can be compared to the consent one gives in a medical context. This regime is often used when it comes to

⁶ <https://euref.de/> accessed 25 June 2019.

⁷ <https://www.energieavantgarde.de/> accessed 25 June 2019.



testing robots that interact with individuals, for example. Second, persons affected can rely on judicial protection if they have legal standing in court. The law can determine under what circumstances a person affected by a test bed has legal standing. Third, legal protection can be achieved not on an individual but on a general level if the legislator defines specific conditions that must be met by a test bed. Nevertheless, the legislator's conditions must be in accordance with the fundamental rights of the individuals involved on both sides. Here, the key challenge is to balance the innovator's rights to protection of his or her property, to research and to run a business for example, on the one side, and the affected individuals' rights to bodily integrity and privacy for example, on the other side.

At the end of the lecture, the audience discussed among other things where the current craze of naming every laboratory a living lab came from, and whether obtaining consent from participants hinders the progress of research. The ethical boundaries of test beds and, in particular, the comparison of animal testing and "human testing", prompted many follow-up questions.

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