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Testing – a working method for quicker learning

Innovation and new technology are needed to achieve a sustainable society. The business sector and public sector actors should both use testing strategically and purposefully as a tool for responsible innovation and renewal of technology and regulatory frameworks. To use testing as a working method promotes creativity and provides an understanding of problems and what is being tested.

Testing¹ involves structured experimentation and is a learning methodology for developing and adapting new solutions. It can involve a new product, service or process based on new technology or the use of existing technology in new ways. It can also involve testing new working methods, business models or regulatory frameworks. If a new solution does not work, that in itself is a result and a path to quicker learning.

By using testing as a working method, the benefits and problems associated with the new solution become visible. The aim of testing is to improve and secure new solutions before a large-scale launch or the adoption of permanent regulation.

Testing is to be conducted under *controlled conditions* and *with clear delimitations*. This means that the testing is limited, for example, to a certain user group, time period or geographical area. In addition, those responsible for testing are to ensure that the test is conducted according to plan and that it can be concluded prematurely if necessary, for example, if an unforeseen risk situation arises.

Testing commonly takes place in laboratories or simulating environments. The word testing in this context refers to tests that take place in *real environments*, such as geographical or socio-technical environments².

Testing

Komet defines testing as work involving both experimentation and verification of new solutions in a real-world environment under controlled conditions and with clear delimitations.

One test can include testing and verification of multiple new solutions at the same time.

¹ The word testing in this publication does not refer to testing in the form of research requiring ethical review under the Act concerning the Ethical Review of Research involving Humans (2003:460).

² Geographical environments are real or physical environments that can be delimited – e.g. a district, municipality, company, or nature area. Sociotechnical environments are usually described as technical systems, such as IT, heating, water, and sewage, that are dependent on societal, social and economic systems that enable the technical systems to fulfil their functions.

Testing in regulatory greenhouses

'Testing activity' is used in Swedish acts and ordinances when there is a need for special regulations to conduct certain trials, e.g. development of autonomous vehicles. Acts and ordinances on testing activity are usually temporary and followed by an evaluation. In this case, testing is a tool for regulatory development. To highlight the link to regulatory development and describe the environment in which testing can be conducted, Komet introduces the concept of *regulatory greenhouse*.

Testing in a regulatory greenhouse means testing that is temporally and spatially limited, where regulatory frameworks are developed or adapted while new products, technologies, services, processes, working methods or business models are tested in a real environment. It can also involve increasing knowledge of how existing regulatory frameworks relate to a situation that has changed as a result of technological development.

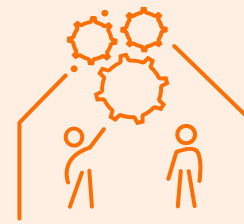
Exemptions from certain regulatory frameworks can be granted, or specifically adapted regulations can be applied, within the scope of a regulatory greenhouse. One of the objectives of promoting testing in a regulatory greenhouse is to raise the knowledge level of regulators. This can be achieved by providing the opportunity to test a new solution together with those who will later use it.

Special monitoring by a supervisory authority, involving more frequent controls and reporting for example, may sometimes be needed when something new is tested in a regulatory greenhouse.

'*Regulatory sandboxes*' is often used internationally for testing that includes developing regulatory frameworks. What this concept means may vary from organisation to organisation and from country to country.

Greenhouse as a metaphor

Greenhouse is a metaphor for the environment in which experimentation can be conducted. A greenhouse is transparent, what happens inside is visible and its purpose is to promote cultivation and growth in an orderly manner. Some actors can be granted permission to use the greenhouse for a limited time.



Why do we need an increased focus on testing as a methodology right now?

New technological solutions or the use of existing technologies in new ways can contribute to solving many of the problems that society faces. Komet sees the following challenges:

- Today's major societal challenges require that new solutions can be quickly adopted in a responsible way.*
- Development and use of new solutions are complicated by the fact that technological development is cross-sectoral, whereas regulatory frameworks are often based on a traditional division into sectors and industries.*
- Technological development and regulatory development are out of step.*

To meet these challenges, working methods that promote transfer of knowledge and cross-sectoral collaboration between public and private actors are needed. Testing in a real-world environment is one such method.

Further reading: 'Why Sweden must manage accelerating technological development'. Komet describes 2019:05E

Testing as a methodology for responsible technological development

Various ethical issues may arise in the work involved in testing. One example is the balance between the individual's right to integrity and possibilities of developing products or services that build on data from various people. Another example is lack of clarity concerning responsibility, because decisions are shifted from individuals to autonomous systems.

Various risks arise depending on the test's focus. When testing new technology, for example, there are risks associated with everything from data fraud, cyberattacks, manipulated information and identity theft to the use of substances that can harm people or nature. For a participating public agency, there are also risks associated with indirect advance notice and conflict of interest.

A public sector actor that chooses not to test anything new may view it as a strategy to avoid making mistakes. However, this could also impede necessary development and transition.

Testing involves experimenting and verifying new solutions on a small scale for the purpose of examining the effects that the new solution can provide. In this way, testing is a methodology for development and renewal. To ensure responsible technological development, an ethical and sustainable approach should be applied. In each test, risks need to be identified, analysed, and weighed against the benefits. A balanced assessment may result in the decision to not conduct a certain test.

Given that benefits and risks are weighed against each other in every single test, Komet sees the potential of testing as a tool to build up knowledge about how new solutions can be used responsibly in society under controlled conditions.

Testing as a component of innovation

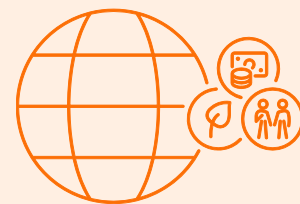
The term innovation has multiple definitions. In the Swedish Government's innovation strategy, innovation is defined as new or better ways of creating value for society, businesses and individuals.³ Value creations means that the innovation has spread throughout society, in other words, that it has been commercialised or introduced to users in another way.

Facilitating the spread of the new product or process is crucial for innovation but also one of the greater challenges. Komet believes that testing is a methodology that can support innovation by accelerating learning and dialogue around new solutions and creating better conditions for experience sharing with other actors. Testing allows collaboration and learning to increase in a natural way within and between organisations and sectors of society.

Responsible technological development

Komet defines responsible technological development as:

- development and dissemination of new technology taking place securely, safely and based on an ethical approach*
- development of an environmentally, socially, and economically sustainable society*
- utilisation of the possibilities of technological development by establishing good conditions for innovation and competitiveness*



³ [The Swedish Innovation Strategy](#). Swedish Ministry of Enterprise, Energy and Communications. N2012.33

Testing as a methodology for innovative administration

Public sector activities need to be able to benefit from new technology and new solutions within their administration. Public sector actors also need to be involved in co-creating new solutions with other actors in society. Their approach must also ensure that they do not stand in the way of innovative solutions that can contribute to positive and sustainable societal development.

At the same time, innovation must be balanced against ethical values, fundamental rights and freedoms, and sustainability. Komet uses 'innovative administration' as the all-encompassing term for this.

With a rapid pace of social change, public sector activities and organisations need to adapt and find working methods that develop the administration and promote responsible technological development. Komet believes that testing as a methodology can contribute to this by new solutions being tested on a small scale in a structured way. This in turn creates the possibility of systematic evaluation with the aim of increasing knowledge both inside and outside an organisation. The actors that use testing as a methodology for innovative administration also need to share the results, regardless of whether the outcome can be viewed as positive or negative. It is crucial to ensure transparency and openness in learning and results for activities where public resources are used.

Innovative administration includes:

- *Innovation within an organisation*
Develop internal activities, create better services and more effective processes.
- *Innovation outside of an organisation*
Promote innovation within the scope of the organisation's mandate.
- *Ensuring a balance between advancement and responsible innovation*
Balance innovation against ethical values, fundamental rights, and sustainability in the role as issuer of permits and regulator.
- *Representing demand*
Contribute to creating markets for innovative solutions in the role as purchaser of services and products.

Komet's proposals for enabling more testing throughout the country

It is important that the Government assumes clear responsibility for, and takes a proactive role in, issues concerning testing, e.g. by more effectively identifying and managing regulatory barriers that impede testing. In late 2020, Komet therefore presented the following proposals.

- The Government should develop a strategy and an associated action plan that promotes increased use of testing throughout the country. The purpose is to highlight the importance of testing as a method to: i) responsibly develop and use new solutions and ii) create and disseminate knowledge and experience for use in regulatory development and innovative administration.

- A committee should be instructed to manage regulatory barriers that inhibit testing. Municipalities, regions and government agencies should be able to report regulatory barriers to the committee. Based on those reports, the committee makes assessments and continuously submits preparatory material to the Government for adaptation of applicable law.

Further reading: 'Tests'. Komet describes 2020:23