

How to innovate successfully

A case study on the Netherlands' Land Registry and Mapping Agency

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SUMMARY

Innovation is all about creating new value and to be ready for the world after tomorrow. The challenges and opportunities that arise with societal changes need to be solved quickly and also sustainably to ensure continuity. Large organizations which are solely or partly responsible towards providing services to the society need to keep up with these challenges. This would require processes in place that ensure smooth transition and working of companies and people who bring in ideas and put the processes in place. Most ideas nowadays are initiated in cooperation with stakeholders within- and outside the organization, a process known as co-creation. Co-creation is important to share knowledge, explore possibilities and find solutions for complex situations and tricky problems. Empowering the interactions between policy, science, industry and society, known as the quadruple helix for innovation, is essential for the collective value. Collaboration from parties such as academic institutions, governmental bodies, private organizations, citizens and NGO's is needed to ensure sustainability. If only we could apply new technologies and knowledge on a national and international scale with a public instruments, solutions will become smarter, faster, and more social.

The Netherlands' Cadastre, Land Registry and Mapping Agency (also known as Kadaster), is an organization that performs its public tasks in service of society, with a goal to provide legal certainty, contribute to solutions relating to property rights and spatial data. Kadaster recognizes the need for sustainable innovation and has adopted methods to put it in practice. In order to manage the innovation processes within Kadaster an innovation board has been established, with a purpose to develop innovation and guide research by considering strategic goals and validating ideas. The innovation process encompasses three phases: a definition phase, an ideation and an experimentation phase before scaling up and embedding the solution. The innovators contribute to the digital transformation which is currently an ongoing process. This paper presents the innovation framework adopted by Kadaster in relation to innovation management that are in place to keep up with relevant trends and emerging technologies that ensure growth and continuity.

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1. Introduction

The Netherlands' Cadastre, Land Registry and Mapping Agency – in short Kadaster – performs its public tasks in service of society (Het Kadaster, 2022a). It is Kadaster's statutory task to maintain a number of registrations. Examples are the registration of real estate, topography, ships and aircraft. In doing so, Kadaster protects legal certainty. Besides information from its own registrations, Kadaster also provides information from registrations of other parties which includes maintaining so-called national facilities, by means of which we provide access to the data. Examples are the facilities for addresses and buildings, cables and pipelines, and energy labels. Kadaster is also responsible for national mapping and maintenance of the national reference coordinate system. For land-use issues and national spatial data infrastructures Kadaster is an advisory body. Furthermore, we also provide customized work and advice, predominantly to authorities. This refers to data selections and aggregations which helps them develop spatial planning policies. Our main customer groups are civil-law notaries, local authorities, businesses, financial institutions and private individuals.

Kadaster is an agency with a long history; an agency which can be traced back to almost 190 years ago with its origin in tax collection, with Napoleon as its founding father. Back then, registration of ownership was needed to raise taxes. Now, in 2022 we have other tasks and goals. Besides registers offering legal certainty and national mapping, we are a knowledge partner for solving challenges in society and building a platform for geo-information. We are part of a continuously changing society where users experience a Kadaster that offers reliable, complete and up to date information, supporting them in their activities.

Being an ambitious organization helps us to move forward and provide the context for innovations. The global sustainable development goals are an important source of inspiration. This paper will provide an insight in the importance of innovation for Kadaster as well as present the working method, co-creation concept and the governance on innovation as set-up at Kadaster.

2. Innovation Framework

In order to meet the challenges effectively and discover possibilities, Kadaster organizes innovation professionally. This is done in collaboration with stakeholders and customers, where

possibilities to renew the current business processes in the ecosystems are explored. Professionalization of innovation helps Kadaster to:

- Capture and weigh innovative ideas from internal and external sources
- Manage the portfolio of innovations
- Align the innovations with the organization goals
- Stimulate innovation in ecosystems
- Share the knowledge on innovations and its process

Innovation at Kadaster is mostly incremental, based on the current products and services, and improving them step by step. Sometimes innovations are more radical, based on the expectations what the future can bring, mostly with disruptive impact or new type of services. Therefore, innovation is focused on two aspects, namely:

- Innovative improvement of current processes and services to deliver value more efficiently and more effectively as a government and
- Innovations that respond to social issues, technological opportunities, and customer questions.

Innovation at Kadaster is organized closely in context with different departments within the organization. In this way, there is an insight into relevant developments from the professionals, their challenges and thus innovations can be developed accordingly. Most ideas are explored by collaboration between internal and external stakeholders and professions, henceforth known as co-creation. As a result expertise is pooled and investigations are beneficial independent of an implemented solution arises from it. The knowledge acquired in pursuit of an idea always provides relevant insights.



Figure 1: The Kadaster Innovation Framework showing the three levels of innovation approach adapted by Kadaster.

The Kadaster Innovation Framework shown in Figure 1. provides an overview of the relevant aspects on organizing innovation successfully. The three levels of the framework represent all

components of the innovation approach. On the organizational level the alignment to strategic goals, creative culture and resourcing conditions are described. On the portfolio level the overall governance and the individual assessment of ideas and co-creation in ecosystems are drafted. And finally at innovation level the process from ideation to scaling up is presented to show the daily way of working and the tools used for this process.

2.1 Organizational level

2.1.1 Strategic goals

Kadaster is a governmental organization, which means it is publicly accountable. Thus, the plans for reaching the goals, are laid down in a long-term policy plan known as the “Meerjarenbeleidsplan” (Het Kadaster, 2022b). This plan is publicly available and is updated every year. The strategic goals laid out in the plan give direction to the developments of the ideas for innovation. The three driving forces for innovation are as follows:

- **First objective:** To provide the ‘certainty’ in ownership of everything above and below ground. We do this for example by improving our registrations. The multiplicity of rights and obligations in apartments or complex buildings increases the need for better insight and overview, especially in populated cities. So, in order to properly define the rights we for example explore 3D registration and visualization of stacked ownership rights in buildings.
- **Second objective:** To provide a ‘platform’ so everybody can get started with geographic information at any time and place. The “Geo-dataplein” program started in 2021, addresses this by ensuring data access to everyone. It will be demand-driven, service-based access and provision (through APIs) of the data from the key geo-registers. This enables integrated questioning and analysis from the key registers. The development of the “Geo-dataplein” takes place in close consultation with customers and users, both geo-professionals and non-professionals.
- **Third objective:** We are a partner for the use of geo-information as an indispensable link in social issues, both inside and outside the Netherlands. Partnering in innovation is needed as lot of initiatives start in co-operation. For example, on one of the large operations in the Netherlands, the revision of the legal framework on environment and related regulations regarding space, infrastructure, nature, and water, known as the Environment Act (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2013). It integrates 26 laws into one. It aims at showing instantly what is permitted and possible at a specific location. Technology enables this and we are involved in the digital infrastructure that provides these possibilities. This is done in partnership with national government.

2.1.2 Organizational culture

Innovative organizations are good at creating an environment where learning, improving, and experimenting is provisioned. A creative climate stimulates every employee to think about improvement, from small improvements to lofty ideas. Everyone needs to feel the need for

continuous improvement and the freedom to come up with ideas. The core values of Kadaster, being reliable, open, relevant and driven, are supportive in creating the right climate.

Kadaster is instilled with the importance of understanding data and technology. Several departments focus on data and technology and actively share this knowledge. It is embedded in our organizational culture to think about the potential implications before making decisions, which is vital as tech critics. Technology has become a crucial part of the society and the way in which people relate to one another without realizing it. Implementing technology without proper processes can have negative side effects eventually. For example Digital Twins (Wesselink and Future City Foundation, 2021) and Smart City initiatives (Wesselink and Future City Foundation, 2020), fueled by data, can potentially make a huge impact. However, issues regarding privacy must not be overlooked or regarded as of minor importance compared to the advantages. Questions that need to be asked are: What type of data is recorded and who can access it? What if, in the future the data is used for a different purpose than originally intended? The same applies to the European Digital Identity framework that is being created. It aims to make life easier and give citizens full control of their data. Nevertheless, it can also work as a channel obligating people to share personal data or being excluded from society. A classic example of what we witnessed is the QR-code, introduced during the Corona pandemic. This is why it is so important to understand technology and its implications, especially, for C-level executives and politicians who are the main decision makers. Technology is helpful, but not the solution to all our problems. It is hard to distinguish hype from reality and get an overview of the potential long-term effects. Good leadership is about knowing your limitations and surrounding yourself with people that complete you and dare to challenge the status quo.

2.1.3 Organizational structure

Innovation within Kadaster is managed by the Innovation Board (IB). IB is set up in a way that it is represented by managers of teams where innovation takes place. Each of the managers is responsible for innovations or has members in their team who work on innovation. The group of managers together with the lead strategy, under the direction of the lead innovation, are responsible to keep the innovation processes running smoothly. They stimulate co-creation within and outside the organization and select the most relevant innovation ideas.

The legitimation of the board is organized by the Executive Board of Kadaster. The Executive Board has installed the IB, gives direction to the strategy of innovation and decides on innovation with high impact, supported by the strategy team. Figure 2. shows how innovation is embedded within Kadaster's organizational structure. We have chosen a honeycomb representation as innovation is connected to all departments and teams within and outside the organization.

The Core Innovation Team (IKT) supports the IB. IKT is composed of members from different innovation teams within Kadaster, for example from the emerging technology center and from the research team. The IKT advises the IB and steers the idea holders. Furthermore, they organize different events to encourage creative thinking on specific topics or to share knowledge. They are the executive workforce while the IB is the steering committee.

In addition, innovations always involve colleagues within the organization. On the one hand to provide specific knowledge, on the other hand to put innovation in practice. In order to be an innovative organization, there must be room for ideation in all teams at all times.



Figure 2: Innovation as embedded within the organizational structure of Kadaster.

Currently, four specific teams are focused on innovation from different perspectives namely, research, emerging technologies, geo expertise and data science.

The research team translates social, legal, technical developments and needs into applicable innovative improvements within the different value streams. By conducting and supervising studies, they build up knowledge and test the feasibility of innovations. It is not uncommon to see dual roles in this team, which combines academic research at a university with usable practices in the organization. The emerging technology center is engaged in signaling, exploring and making technological innovation understandable and applicable. The geo expertise center mainly focuses on geo-spatial data innovations, such as 3D base data. They also focus on the use of artificial intelligence and machine learning techniques for object recognition, for example for tracking changes on the key register topography. Finally, the data science team is involved in innovation and research in the field of data with the aim of creating as much value as possible from Kadaster data.

2.1.4 Resourcing

The most important part of innovation is people. Without complete commitment of the employees, no innovation can reach the finish line. The resources required for the exploration of an innovation are embedded in the structure of the organization, as described above. In addition, a structural budget is available to participate in innovative events and cooperation’s or to finance any hiring of specific expertise. A typical innovator at Kadaster has the ability to turn new ideas into products or services that make customers happy. The individual has the guts and is curious. In addition, the person can network and has the ability to bring different

stakeholders together. This can be only achieved with the necessary knowledge of the organization.

2.2 Portfolio level

One of the most important reasons to organize innovation as it is now, is that Kadaster wants a solid governance on the whole of the innovation portfolio. This is due to expertise on innovation being apportioned over various departments of Kadaster. Since 2019, the IB has been established and advised by the IKT to govern and stimulate innovation.

2.2.1 Validation

Kadaster is an organization where renewal and innovation are of paramount importance to ensure continuity. Therefore, new initiatives start regularly. We work on our goals based on objectives mentioned in section 2.1.1. The idea begins with the initiator making a short innovation proposal where the idea is explained along with the reason as to why it should start or is important now. The proposal also including answers to general questions like, involved stakeholders, relatability to other innovations and impact can be pitched every two weeks at the IB. The IB then decides whether the innovation is approved and under what conditions. All innovations must contribute to the task the Kadaster has in society. The IB also decides on collaboration at tactical level.

2.2.2 Portfolio governance

To keep track of all the innovations taking place within Kadaster, a form of a register was needed. At times, there are a lot of innovations going on at the same time. To capture this information and map the ongoing innovations, the innovation teams came up with an idea of a corporate innovation funnel. The innovation funnel is a dashboard, that is open and transparent for the entire organization (see Figure 3.). This visualization offers the needed overview and makes it easier to connect, inform and update each other while utilizing the expertise. The innovation funnel is kept continuously up to date and only current innovations are visible. It is built on a simple interface to meet the demands of internal users varying from executive board members to members on operational level. By selecting an innovation topic one can see all the relevant information on the internal Wikipedia, for example the people working on it and the contribution to the strategic goals.



Figure 3: The innovation funnel dashboard as set up at the Kadaster.

2.2.3 Co-operation

As a governmental organization, we are aware of the added value our data and services provide. Legal certainty, reliable and accessible geo-information are essential, and application of our data can make an important contribution to numerous social issues. In order to be able to continue to do this the best way and to respond pro-actively to current issues, we actively seek co-operation. In this way we contribute to legal certainty for everyone and a sustainable society. The same applies to innovation when it comes to collaboration. We believe that “alone you go faster, together you get further”. At the start of each innovation, potential partners for most effective result are explored. This applies both to the internal association and to external collaborations to create synergy. We distinguish different types of collaboration on innovation as: internal co-creation, co-operation with the industry and academia, co-creation in an ecosystem and partnerships. We will describe them in the following sections.

- **Internal co-creation:** Kadaster being a large organization with around 2000 employees, knowledge is spread over different departments. While one is expert on the legal aspects of key registers, another experiments on blockchain solutions and the third is developing a vision on Kadaster’s role in smart digital cities. For example, an assessment on the possibilities of a registration of sensors needs the expertise of all three colleagues, accompanied by an innovator who is the expert on how to explore possibilities and start a valuable experiment. Multidisciplinary teams are the key if we are to comprehend the complex systems and technology around the world. Studying the

relationship between phenomena often tells us more than considering them as stand-alone entities This holistic (world)view is also applied to innovation within Kadaster. We reflect upon three aspects; being able to (technological perspective), being allowed to (legal perspective) and wanting to (ethical and policy perspective). Nevertheless, there can also be interconnections between these perspectives. Legislation is often slow in keeping up with technological developments. So, we involve a legal expert in the process from the start. They need to understand the technology at a basic level to be able to apply the relevant laws to the use case. Our legal experts don't just advise us about the things we are not allowed to do, instead they proactively explore possibilities and/or try to identify new legislations that might be needed. Our multidisciplinary teams always combine expertise in a certain domain, process, or customer segment with knowledge about technology, legislation and policy.

- **Co-operation with the industry and academia:** Government, academia and industry, each has a different interests and perspectives on development. In a collaboration, partners learn and adapt qualities from each other, inspire each other and share lessons learned. This dynamic contributes to an improved innovation process that helps each party to focus on their own added value and role. For example, in a field lab setting we tested use AI-technology on automatic change detection on topographical maps on national level. This was a project where each party could have their own goals but also a common interest in the findings.
- **Co-creation in an ecosystem:** We define an ecosystem as one that consists of several partners, both public and private, that are interconnected in such a way that they influence each other. The interconnectivity ensures a shared innovation result between the organizations. For example, the initiative of “Zorgeloos Vastgoed” is an ecosystem with representatives from the real estate transaction process. For this initiative a protocol system is designed with common technical language, principles and information models. This will lead to the unburdening of the consumer when buying or selling real estate and the better co-operation between the parties. Better, quicker and safe access to data for all parties involved is the goal of this cocreation. When a citizen or end-users' perspective is involved, Kadaster uses the quadruple helix model, based on Henry Etzkowitz and Loet Leydesdorff (Etzkowitz and Leydesdorff, 1998). The model describes the interaction between the public sector, academia, industry and citizens and how it can lead to more successful, user-oriented innovations. The study suggests that in this type of set-up the end-user will be more likely to accept and use the innovation, and will be inclined to trust the system and become an active part of it. Then again, an import aspect of an ecosystem is effective communication and trust (van Meerkerk and Edelenbos, 2014).
- **Partnerships:** Partnerships have a prominent place in our objectives. Stronger partnerships are required in order to meet complex challenges of the society. Recently, we have strengthened our ties with the National Statistics Institute. A strong co-operation existed already with reciprocal trust, working on an alliance was the next step. Together, we raise added value on topics like housing market where combined data insights are an important foundation for the entire real estate sector. Together we are working on knowledge sharing on emerging technologies like multi-party computation

and also are working on improving regional statistics on installed solar capacity that helps with energy transition.

In co-creation we find the shared interest and often conclude that together we achieve more. Most challenging problems need co-operation for the best results and to do that we need to share knowledge outside the borders of the organization.

2.3 Innovation level

2.3.1 Process

It all starts with an idea. An idea arise from new technology, customer needs, current processes that can run more smoothly, etc. These ideas are summarized into a proposal based on which the IB decides at an early stage to give a go or no go on exploration.

Our process is based on Design Thinking. This means that we try to get a profound understanding of the questions surrounding a topic (for example, the problem behind a customer complaint) before we start providing solutions. This helps in streamlining as to why the innovation is needed. With these initial insights, we then start exploring potential solutions and implications. In some cases, this assessment leads to development of a prototype, but only when this adds value and/or deepens our understanding.

So, the process always starts with an idea and ends with insights. Innovation doesn't always lead to a follow-up. Although, this might feel counter-intuitive, especially when we don't proceed to the implementation phase, we can still view the innovation as a success. For example, learning about the (current) shortcomings of a technology is just as useful as realizing that the technology is not mature enough for implementation. Implementing an innovation isn't a goal in itself, as we state the research questions at the center of our innovations.

2.3.2 Signaling ideas

As organization it is impossible to know everything about everything, even in the field of your expertise. By participating in the quadruple helix model, we signal ideas together with the public sector, academia, industry and citizens. The focus is on solving challenges and creating opportunities together instead of trying to figure everything out alone. Co-creation over competition, obviously within the market and government principles. This way "we" signal a lot of ideas. In specific domains we have experts that read professional journals, participate in working groups and attend conferences.

Every two years we make a strategic exploration: a report summarizing trends and developments with potential implications for the Kadaster. Besides this, we have our own "TechRadar", an application that gives an overview of relevant technologies based on technological reports and hype cycles ("Kadaster Labs," 2022). Additionally, this radar can perform a potential impact assessment of technologies applicable to Kadaster. As a consequence, many colleagues have a basic understand of trends, developments and technologies that might influence Kadaster within a given time frame. These insights are on a meta-level, from which different ideas might be signaled.

2.3.3 Innovation toolbox

We use different methods and activities to stimulate innovation. As mentioned, our innovation process is based on Design Thinking. This is an innovation methodology in which out-of-the-box thinking and directly involving end-users is crucial. In theory, the phases of empathize, define, ideate, prototype, test and implement is followed and in practice the methodology isn't applied so rigorously. However, we do make sure that we start with researching the context and investigating customer needs before thinking about possible solutions. Furthermore, we involve end-users as much as possible instead of thinking for them. The method also includes an iterative approach, by which we learn quickly.

If an exploration is accompanied by the development of a prototype, “**High5**” is a useful methodology to speed up the process. The idea here is that multidisciplinary teams have their schedules cleared for a focus week and develop a prototype in five days. Nowadays, everyone is busy and since members from different teams (internal and external) need to be involved, this methodology requires good planning. By the short lead time this will result in a quick insight into the possibilities.

We also have some recurring activities designed to professionalize our innovation capability. We regularly host a “**super innovation stand-up**” for everyone interested or involved in innovation. During an hour colleagues get each other up to speed and share new initiatives and insights. “**Innovation Friday**” is another opportunity for technological experts to spend a day experimenting and trying to build new solutions. The “**Let's Brainstorm**” offers colleagues an opportunity to utilize their knowledge and creativity and enrich two current topics. Twice a year business owners and sponsors can propose topics in which they can use the expertise or new perspective of colleagues participating in the brainstorm.

3. Success Factors

The Kadaster has had experience with a professional innovation process for some time. In addition, we find it imperative to be a learning organization, so that we keep adding value to our stakeholders and customers. Below we summarize what our most important ingredients for being a successful innovative organization are.

- **People:** The key element in innovation is the people working on it. Professional on how to explore an idea, but also energetic, experienced in involving stakeholders and with good understanding of the organization and its goals. Furthermore we need people who come up with ideas and have the expertise to validate the innovation.
- **Multidisciplinary structure:** To manage a diverse portfolio, involvement of the various innovation teams and managers is required to be brought together. A suitable governance on the entire portfolio has to be organized in a way that is easy to access and track. In this way, you work on the most important innovations with the most impact and value to society.
- **Co-operation:** Think outside your own boundaries. Work on innovation in collaboration, both in a multidisciplinary way within your own organization and with

other parties outside. Involve other governmental bodies, businesses and academia and don't forget to involve your end-user.

- **Ideas:** Make room for ideas. Invest in a culture where anyone inside and outside the organization can come up with ideas or issues. Create a process where the initiators continue to be involved in the exploration and development phase.
- **Sponsorship:** The vital part of a successful innovation is that it requires support at the highest level of the organization. An organization wide funding facilitates an opportunity to innovate and allows for dialogue at the right level. To keep adding value to society both continuity and innovation are equally important.

Being an ambitious organization performing its public task in service of society helps us to move forward and to apply these success on innovation.

REFERENCES

- Etzkowitz, H., Leydesdorff, L., 1998. The Endless Transition: A “Triple Helix” of University-Industry-Government Relations. *Minerva* 36, 203–208.
<https://doi.org/10.1023/A:1017159001649>
- Het Kadaster, 2022a. About us- Kadaster [Online]. URL <https://www.kadaster.nl/about-us> (accessed 4.9.22).
- Het Kadaster, 2022b. Meerjarenbeleidsplan 2022-2026.
- Kadaster Labs [Online], 2022. URL <https://labs.kadaster.nl/tech-radar/index.html> (accessed 4.9.22).
- Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2013. Omgevingswet - Rijksoverheid.nl [Online]. URL <https://www.rijksoverheid.nl/onderwerpen/omgevingswet> (accessed 4.9.22).
- van Meerkerk, I., Edelenbos, J., 2014. The effects of boundary spanners on trust and performance of urban governance networks: findings from survey research on urban development projects in the Netherlands. *Policy Sci.* 47, 3–24.
<https://doi.org/10.1007/s11077-013-9181-2>
- Wesselink, J.W., Future City Foundation, 2021. Zo bestuur je een slimme stad: de democratie versterken in een digitaliserende samenleving. Future City Foundation, Amersfoort.
- Wesselink, J.-W., Future City Foundation, 2020. A smart city, this is how you do it: connected, flexible and meaningful; make the reel future city. Future City Foundation, Amersfoort.

BIOGRAPHICAL NOTES

Nick van Apeldoorn is an advisor working for the Emerging Technology Center and core innovation team at Kadaster. He focuses on strategy, innovation and emerging technologies. Combined with a background in Business Administrations he tries to bridge the gap between business and IT. Has been working at Kadaster for almost 6 years.

Linda ter Heerdt is a senior strategy advisor at Kadaster. She is, as the innovation lead, responsible for innovation and is chairman of the Innovation Board. Linda ter Heerdt has been working on business development, innovation and process improvement in governmental and non-governmental organizations for 20 years; almost 8 years at Kadaster in the Netherlands.

Bala Bhavya Kausika started her career as a researcher at Utrecht university in 2013, where she worked on solar monitoring projects. Later in 2018, she joined Kadaster a Geodata specialist at the Geo Expertise Center and is now a member of the core innovation team. She creates innovative geospatial data products and techniques through research and innovation. She finds integrating Remote sensing and Earth observation techniques with energy studies challenging and strives to work closely with governments to develop geo-spatial methods to provide reliable data for sustainable energy transition.

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