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Digicampus — Preliminary Lessons from a Quadruple Helix Ecosystem for Public Service Innovation

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Abstract: Many governments want to harness the potential of new digital technologies for shaping an progressive and inclusive society. However, they often struggle to translate their ambitions into reality. Drawing on the quadruple helix model, Digicampus is an innovation ecosystem in the Netherlands in which government, academia, citizens and companies explore future public services. Since the launch of Digicampus, more than hundred requests for collaboration were submitted by public organizations. The objective of this ongoing research paper is to share the experiences of starting a quadruple helix ecosystem for public service innovation. We do this by discussing the innovation guidelines, research agenda and lessons learned in the first year of Digicampus. Important innovation guidelines are: embrace design thinking and an agile way of working, facilitate multidisciplinary knowledge exchange, co-create prototypes (make technologies tangible) and foster open experimentation (assess the potential). Other countries looking to explore future public services in a collaborative manner can benefit from the insights presented in this paper.

Keywords: public sector innovation, co-creation, digital government, quadruple helix

1. Introduction

Inspired by the instantly gratifying online services offered by tech-giants and Fortune 500 companies, citizens, entrepreneurs and politicians expect better public services. Compared to the smooth user experience we have when purchasing products online or booking hotels - where you get instant results and gratification - the user experience when requesting a parking permit or social services is still poor in many countries (*UN E-Government Survey 2018*). Nowadays, typical expectations include improved service responsiveness (instant results), pre-filled portals/apps (you already have some of my data), transparency (what is happening and what's next), legal certainty (did I do everything right), personal data management (users decide what to share and what not) and cross-agency interoperability (do not redirect me to another agency). Another challenging expectation is digital inclusion, referring to the goal to make all online public services accessable and user-friendly for all citizens, including the groups of less less tech-savvy citizens.

While looking to satisfy these expectations, politicians demand faster innovation cycles. However, known for their siloed agencies and systems, a risk averse culture, linear thinking in the application of new knowledge and top-down bureaucratic structures, governments are often resistant to experimentation and change (Hansson et al., 2014; OECD, 2014). Government agencies are often not able to deal with the ambidexterity of having to exploit and explore at the same time (Matheus & Janssen, 2016). Innovation seekers and change agents often face a complex political arena and a diversified value landscape. Moreover, e-government services need to comply with a wide range of strict rules and regulations, some of which (e.g. European regulations like the General Data Protection Act) take years to understand, interpret and implement. Furthermore, many government agencies do not have the necessary knowledge and skilled digital professionals in-house, and acquiring these skills in the public sector workforce remains a challenge in many countries (OECD, 2014). All the above makes public sector innovation very challenging (Bason, 2018), resulting in the 'policy-makers innovation dilemma' (Misuraca & Viscusi, 2014).

Recognizing these challenges in the Netherlands, the concept of Digicampus was launched in July 2019 (Bharosa et al., 2020). Digicampus draws on the Quadruple Helix innovation model (Arnkil et al., 2010; Leydesdorff, 2012). The Quadruple Helix model is an expansion of the Triple Helix model that links three helices – Academia, Government and Industry – for societal problem solving, research and innovation (Leydesdorff & Etzkowitz, 1998). The Quadruple Helix model characterizes a shift towards systemic, open and user-centric innovation policy (Arnkil et al., 2010). Activities such as linking basic and applied research with the market via technology transfer and commercialization mechanisms and shaping government–university–industry partnerships can constitute the essential mechanisms for innovation (Carayannis & Campbell, 2012). Since the launch of Digicampus, more than a hundred request for collaboration were submitted by innovators in the public service domain (we come back to this in the research agenda section). This paper provides a first-hand account of the context, conception, design and launch of Digicampus. The objective of this ongoing research paper is to share the innovation guidelines, research agenda and lessons learned at Digicampus.

This paper proceeds as follows. Section 2 focuses on why we need a Digicampus and presents the context that gave rise to the idea of Digicampus in the Netherlands. Section 3 focuses on the main innovation guidelines set by stakeholders for Digicampus. Section 4 elaborates on the research agenda for the coming years. Section 5 presents the lessons learned. This paper concludes with a discussion on public service innovation.

2. The Need for a Shared Digicampus in the Netherlands

The main driver for launching Digicampus is the ambition of the Dutch government regarding the digital society. The Netherlands is often referred to as one of the top performers when it comes to its use of technologies for the benefit of society. In the 2018 United Nations (UN) E-Government Development Index (UN, 2018), the Netherlands is in the top 5 of the E–Participation Index and in the top 15 of the leading countries in e-government development. The current administration has again underlined the importance of an progressive and inclusive digital society and has launched

an ambitious national digital agenda[1]. This Digital Government Agenda is an agenda drawn up together by all levels of government and it promotes collaboration with academia and industry, including start-ups. It focuses on utilising opportunities and protecting rights and acknowledges that innovation will require experimentation and learning. Seeking to achieve the goals stated in the Digital Government Agenda, a consortium of government agencies (Logius and ICTU) together with the Delft University of Technology drafted a proposal to Ministry of Interior Affairs and Kingdom Relations to launch Digicampus. This proposal was approved in February 2019, and Digicampus was launched four months later. Digicampus has received government funding for a three-year period. This is seed funding, participating companies and universities are required to bring in co-funding in various forms, including research challenges with budged, expertise, tools, datasets and building blocks for co-creating prototypes. This ensures that Digicampus does not become a purely state funded lab that is limited to the research interest of the funding agencies.

3. The Guidelines for Open Public Service Innovation

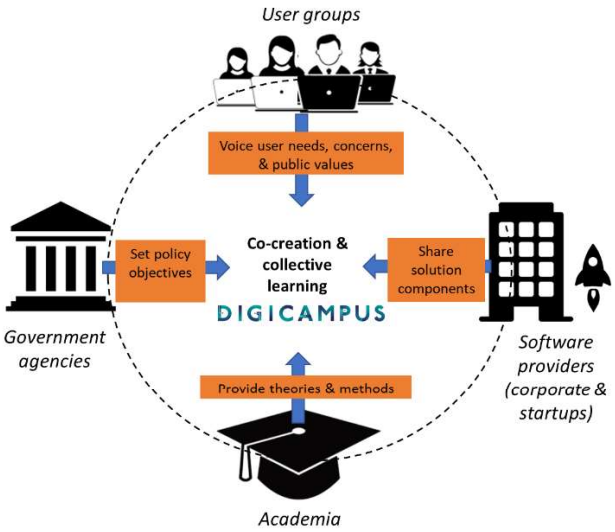
Digicampus has grown into a shared public service innovation ecosystem for academia, governments, industry and citizens. In order to be successful in achieving its goals and build a community with a positive impact on society, the following innovation guidelines were elicited from a dozen interviews and workshops with policy makers, architects, academics and company representatives with a stake in Digicampus:

- Ensure quadruple helix representation on all levels of Digicampus (governance, management and research activities).
- Work with a progressive, yet mission driven research and innovation agenda.
- Facilitate collective design thinking (i.e. using workshops, scenario/policy reflection sessions).
- Work with mockups/prototypes that demonstrate the potential and limitations of new technologies (i.e. UX/interaction design, simulation, proof of concept).
- Experiment as early as possible in order to assess the potential of new technologies/solutions.
- Develop and maintain an overview of the public service innovation landscape, including existing labs, ongoing experiments and lessons learned from previous innovation efforts.
- Develop and maintain and overview of public service building blocks and promote their reuse.
- Build a multidisciplinary community: technical, legal, policy, organisational, economical and ethical expertise is needed to adequately address the challenges for public services.
- Ensure a level playing field: both large companies and start-ups must be able to pick up challenges, experiment and demonstrate solutions.
- Work as a 'lab of labs': focus on connecting labs to challenges and pool existing resources.
- Work tech-neutral: technologies must always follow end user needs.
- Let users express their needs and reflect on ethics and public values in the design of solutions.
- Both proven and experimental technologies must be considered in solution designs.

These innovation guidelines have resulted in the high level design of Digicampus (see Figure 1).

[1] https://www.digitaleoverheid.nl/digital-government-agenda/

Figure 9: High-level Design of Digicampus



The Digicampus design connects the four helices and is tailored to create a community of practice that must connect policy-makers and implementors, users groups, companies and researchers focusing on addressing societal challenges that are grouped into missions (discussed latter in this paper). Depending on the type of challenge, different (research) activities are triggered, ranging from desk research and data analysis to design workshops and prototyping. The scope of challenges is limited to subjects that fit the agenda setting phase and the policy development phase of the policy cycle depicted in Figure 2.

Figure 10: Position of Digicampus in the Policy Cycle

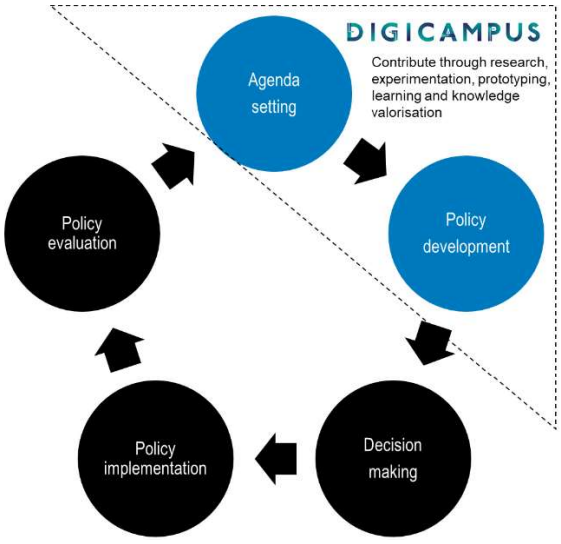


Figure 2 illustrates that Digicampus activities must contribute to policy agenda and decision-making regarding future public services. Many digital society or public policy problems are a class

of wicked problems where no optimal solution or a single answer exists (Rittel & Weber, 1973). The multitude of interdependent actors within society is growing and adds to the complexity of finding solutions acceptable for all. This makes it difficult for policy-makers to assess choices and determine the impact of policy-interventions. The main proposition of Digicampus is that co-creation between government, academics, companies and citizens is needed to facilitate learning for addressing wicked problems. From a policy maker's perspective, Digicampus adds value by experimenting, learning and sharing the lessons learned for policy development and decision making.

4. The Progressive Mission-driven Research Agenda

How do you organize and prioritize research and innovation in a quadruple helix setting? We followed a four step process in order to answer this question. First, we invited the entire Dutch society to mail us their public service innovation challenge: what do you want to collaborate on with Digicampus? This invitation was shared during a nationwide e-government conference and via social media. As a result, more than a hundred challenges (and counting) were submitted by innovators in the public domain. The range of challenges and request are quite broad, and include:

- Help in evaluating an app for small companies that need government support due to the COVID-19 virus and must send various data sets to multiple government agencies.
- Help citizens with personal debt problems to easily obtain a financial overview and share this overview with debt counsellors.
- Evaluate the accuracy of voice authentication technologies for public service requests via phone.
- Help citizens to get more insight in their energy consumption through data analysis and recommendation services.
- Assess the potential of machine learning for data analysis and decision making based on structured financial data from the education domain.
- Create insight in the innovation landscape: what is everyone working on and what can we collaborate on?

While writing this paper, Digicampus employs sixteen people who combined are the equivalent of nine full time employees. This includes management, researchers and innovation designers, but excludes board members and master students that work on specific challenges. By no means is such a small resource pool sufficient to handle more than a hundred innovation challenges. Yet, this first step yielded an overview of what the public innovation landscape in the Netherlands is working on.

Second, and in parallel with the first step, we examined most of the publicly available research and innovation agenda's in the Netherlands. The examination of thirty-seven agenda's revealed a dominant focus on high level policy themes, such as climate change, migration and population aging on the one hand, and key technologies such as Artificial Intelligence and Internet of Things on the other hand. The challenges of public service users are not explicitly mentioned in the research and innovation agenda's across the Netherlands. This highlighted the need to focus on public services and opened the way to position Digicampus as the innovation ecosystem for public services.

Third, we formulated three impact missions based on the insights collected from the previous steps. Each mission is broken down into three concise tracks (innovation projects with a narrow scope and predefined deliverables). The following missions and tracks are on the agenda:

1) Increase the level of data sovereignty for citizens. The tracks in this mission are: self-sovereign identity, personal data management and consent management.
2) Improve digital interactions for everyone. The tracks in this mission are: proactive services, digital inclusion and voice authentication.
3) Transform government agencies from data silos to data partners. The tracks in this mission are: trusted data ecosystems, artificial intelligence in public services and future government data strategies.

Each track follows a pipeline of six successive stages:

- Stage 1 — Exploration: what is the underlying problem, what did we learn from previous efforts, what can we reuse?
- Stage 2 — Coalition building: who is working on solutions and how can we collaborate?
- Stage 3 — Agenda setting: what is needed to progress on this challenge? What are the next activities needed in this track?
- Stage 4 — Prototyping: co-create a prototype of an improved public service, from the end-user perspective.
- Stage 5 — Experimentation: how well does the prototype work for users? How does it score on performance, ethics, compliance, security and implementability?
- Stage 6 — Stimulation of adoption by public agencies: dialogue with the responsible public agencies (who already onboarded in stage 2) on how to take the prototype to the next level so that users can benefit from improved public services?

Finally, we crafted a research agenda and a way of working around the missions and tracks. Basically, each mission has its own sub-agenda and combined they form the research agenda of Digicampus. The research agenda consist of research questions and innovation ideas/propositions, some fuelled by theory and some from practical experience. Research questions are answered via a predefined set of methods, including surveys, workshops, desk research, interviews, design sprints, master thesis projects and PhD research. The goal is to have at least one PhD student for each mission, and at least one master student for each track. Currently, two PhD students and five master students are working at Digicampus. In the summer of 2020, two additional PhD student positions will open up, funded by Digicampus. The funding of PhD research that have a four year perspective ensures that more in depth knowledge development and valorisation takes place at Digicampus.

5. Lessons Learned

While Digicampus is still in its infancy, there are four main lessons learned that can inspire other government agencies that are working on developing public service innovation ecosystems. First is the need to create incentives for collaboration in the quadruple helix design. We found that Digicampus has attracted various actors in the four helices because there is something to gain for all of them. Government agencies can gain an external R&D/innovation team that can help them to innovate their public services more quickly. We found that Digicampus attracts already running

government programs because it can be used as a gateway to collaborate with universities and companies that share an innovation mindset. Companies can meet and talk with policy-makers and implementors, understand their needs and constraints, help co-create prototypes and showcase their expertise and solution components. In some cases, this might lead to future business. The National Association of Digital Technology providers in the Netherlands (NL Digital) acts as the gateway to software providers in Digicampus. Please note that companies that are not a member of NL Digital (e.g. start-ups) can also participate in Digicampus tracks directly. When it comes to knowledge institutes, scholars can collect research data and gain a deeper understanding of the challenges facing the digital society from the perspective of policy-makers, companies and citizens. To date, four universities are participating in Digicampus tracks. Citizens can play a more influential role in shaping public services before they are affected by it. They can voice their needs and concerns, and shed light on ethical dillema's, for instance when considering the use of Artificial Intelligence in public services. Citizens are engaged through for instance interviews, surveys and participation in design sprints. Depending on the challenge at hand, various citizen groups can be consulted.

Second is to work with a mission driven research agenda with room for learning and adaptation to challenges signalled by the innovation ecosystem. The latter refers to 100+ calls for collaboration submitted to Digicampus. Each of these calls is provided with a response, most of them being that we cannot collaborate on this challenge at this moment. However, the goal is to build enough capacity to handle 20% of the external calls for collaboration by 2021. Nevertheless, a clear focus and expertise building within a manageable number of public sector topics is essential.

Third is to organize work into smaller tracks and pipelines. Missions have a mission lead who is an authority on the subject matter and coordinates the innovation tracks needed to achieve the mission. Each track has a dedicated track leader and team, consisting of members from public agencies, companies, research institutes and citizen groups/representatives. This is done in a uniform manner for all missions, making it easier to communicate progress to the environment of Digicampus. While the track leaders are free to choose their methods and tools, they must all follow the innovation guidelines presented earlier in this paper.

Finally, we learned that it is paramount to ensure that the public agency that is responsible for delivering a specific public service (e.g. provide unemployment benefits or childcare benefits) participates in the innovation track that focusses on this public service. This is needed in order to build commitment and ensure that after successful experimentation, prototype solutions can be translated to working solutions for citizens/companies that interact with that government agency.

6. Discussion

Government agencies can no longer solve all social challenges on their own. As policymakers around the globe want to innovate their public services and better serve their constituents they need to find ways to create an environment that is conducive to co-creation, experimentation and learning. The foundation needed for this is a sense of urgency and willingness to open up public service innovation for the entire society. In the Netherlands, the following factors lay this foundation for Digicampus: (1) anchoring in the National Digital Government agenda as a vehicle for

addressing the identified challenges across government agencies (2) awareness and momentum: actor groups have started acknowledging that resource scarcity and small scale/non synergized research and innovation will have little positive impact and adoption and (3) co-governance and co-funding: government agencies, companies and research institutes all need to bring resources to the table, even if it is 'in kind' or already allocated to research and innovation programs that coincide with the challenges on the digital government agenda. In our experience it is also important to frame the required resources as a broad category of items including research funding, people, expertise, data, office space, lab facilities, tooling, methods and access to online building blocks (can be services in a testing environment) in order to allow all actor groups to be able to commit to the concept.

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