Moving beyond the potential of a great idea on paper - Challenges with the design and use of AI-based tools in public sector in Estonia

Steven Nõmmik, Tallinn University of Technology

Potential for AI-based solutions... in paper

- Improvements in **efficiency** – more efficient front and back-end services; automation of (standardized) processes; reducing costs for administrative systems

- Improvements in **quality** – supporting existing decision-making through improved risk-analysis and information processing, improved fraud detection

- Improvements through **transformation** – ML-based solutions for prediction and decision-making, pro-active service delivery based on Big Data, new knowledge from ML-based solutions, more balance government-to-citizen interactions via virtual assistants

Challenges in design and implementation (1)

- **Organisational and system determinants behind the selection and launch of AI initiatives**

  - Task environment complexity;

  - Established power structures;

  - Long-term norms and values;

  - Technological capacity of actors.

Challenges in design and implementation (2)

- **Dynamics during the design of the AI-based tools**

  - Level of control and discretion within the tool

  - Variety and priorities in interpretation – intra-organizational goals, societal values, legal challenges

  - Governance design – access to ideation, ability to engage in decision-making

- **Dynamics during the implementation of the AI-based tools**

  - Challenges processing irregularities and extreme situations

  - Traditional case-by-case decision-making vs system level bureaucracy

  - Skepticism towards machine judgement and duplicating forms of processes

Methodology

- A **multi-case study** of transboundary collaborations for designing and implementing AI-based solutions in Estonia

- Data collection - Interviews and document search

- Method of analysis – Thematic analysis

- Based on RITA1/02-96-12 "Machine learning and AI powered public service delivery"

Estonia as an open environment for digital innovation

- 90s Building blocks for future development (e.g. Tiger Leap programme; First strategies for use of IT)

- 2000s significant developments (e.g. X-road; eID; i-voting; e-health)

- 2010s maximizing existing framework (e.g. e-residency; digital referrals; e-prescriptions)

- 2020s finding new paradigms of thinking?

Vision for AI-based solutions in Estonia – "krativäeline" state

- First analysis by a Working Group under the Government Office and first Action Plan for AI adopted in 2019

- From 19 AI-based initiatives completed in early 2019 to 130 in 2024

- Digital Agenda 2030

- All interactions with the state possible through the bürokratt

Example cases of AI-based initiatives in Estonia

	Unemployment risk detection tool	Fire risk scoring tool	A cybersecurity monitoring tool
Goal of the initiative	Detect potential risk of future unemployment and provide service bundles for career counsellors	Evaluate levels of risk and provide recommendations for preventive fire safety checks	AI-based support tool for detecting and categorizing different potential threats
Engaged actors	ETCB, EUIF, Statistics Estonia and University of Tartu	Rescue Board, Statistics Estonia, Estonian Weather Service and University of Tartu	TalTech and AS Cybernetica
(Preliminary) Results from the initiative	Successful pilot, successful implementation	Partially successful pilot, failed implementation	Successful pilot, partially successful implementation

Broader country context

Limited impact from strong political support

Uneven technological capacities amongst agencies

Legal uncertainty and ethical concerns

# Challenges during the design process

Technical aspects

Challenges to data (data properties and accessibility, depth of data available)

Technical complexity of the tool (relevance of the different variables in the models, interpretation of the results and the use)

Governance approach

Intra-organizational biases towards "external solution"

Limited and exclusive end-user engagement during the design process

Challenges during the implementation process
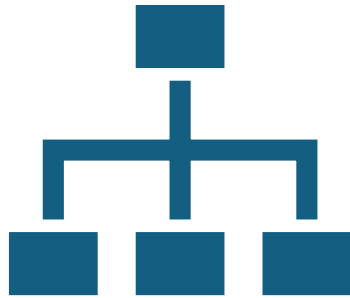
Scaling up and moving beyond the project team

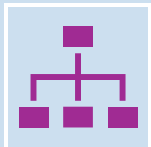Risks originating from the AI-based tool

How to move from idea towards solutions

The complexity and customization with AI-based tools require **multi-functional teams** that engage **diverse sources of knowledge**

Scaling up **AI-based tools** requires an **evaluation of discretion** and cognitive biases civil servants have in its use

Strong sense of **ownership** present within the **recipient organization(s)**

Thank you!
Questions?