

**TAL
TECH**

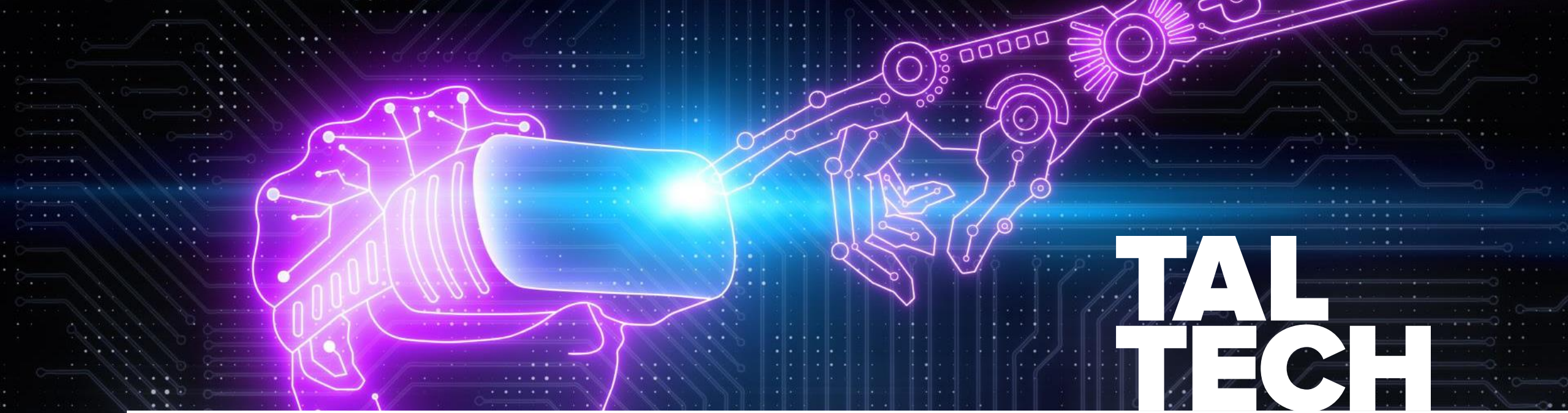
**NEXT GEN DIGITAL STATE
(NGDS) RESEARCH GROUP**

OUR RESEARCH GROUP

- **We address the technological complexities** of how governments can satisfy the current and future needs of their citizens
- **We focus on digital government ecosystems** by investigating technologies that support digital transformation, innovation and implementation
- **We collaborate with** Estonian and international public sector agencies, ministries, and departments for developing next-generation government-technology
- Research topics focused on artificial intelligence architecture and policymaking, interoperable data exchange, and understanding the socio-economic effects of technological implementation



- **We strive to be on the forefront of public sector innovation research!**



**TAL
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**PAST / CURRENT
PUBLICATIONS**

Past/Current Publications

Blake Jackson, E., Dreyling, R., & Pappel, I. (2021, October). **A Historical Analysis on Interoperability in Estonian Data Exchange Architecture: Perspectives from the Past and for the Future.** In *14th International Conference on Theory and Practice of Electronic Governance* (pp. 111-116).

- **Premise:** Understanding how Estonia's X-Road platform developed historically, with a focus on its interoperability components, assessment of possible microservice architecture implementation (asynchronous communication)
- **Method:** Qualitative case study approach with thematic analysis, interviewed NIIS CTO and X-Road creators
- **Results:** use of public internet with encrypted data exchange led to high adoption (no need for expensive networking) interoperability in X-Road relies heavily on SLAs between organizations – no plans for transitioning to microservice architecture
- Legacy lock-in?

Past/Current Publications

Dreyling, R., Jackson, E., & Pappel, I. (2021, July). **Cyber Security Risk Analysis for a Virtual Assistant G2C Digital Service Using FAIR Model**. In *2021 Eighth International Conference on eDemocracy & eGovernment (ICEDEG)* (pp. 33-40). IEEE.

- **Premise:** How to measure or financially quantify cybersecurity risk for a virtual assistant that provides G2C services? Estonia has proposed such services and public sector moving towards utilizing such services. Cybersecurity risks
- **Method:** Factor Analysis of Information Risk (FAIR) analysis,
- **Results:** demonstrated a financial quantification method for measuring cybersecurity risk analysis for G2C virtual assistant (or 3rd party VA provider)

Past/Current Publications

Dreyling, R., Jackson, E. B., Tammet, T., Labanava, A., & Pappel, I. (2021). **Social, Legal, and Technical Considerations for Machine Learning and Artificial Intelligence Systems in Government.** In *ICEIS (1)* (pp. 701-708).

- **Premise:** When implementing AI, what considerations should public stakeholders have regarding social, legal and technical concepts?
- **Method:** qualitative approach with expert interviews in AI
- **Results:** sometimes technical methods can be used to ameliorate data privacy issues and bias

Past/Current Publications

Weck, M., Jackson, E. B., Sihvonen, M., & Pappel, I. (2022). **Building smart living environments for ageing societies: Decision support for cross-border e-services between Estonia and Finland.** *Technology in Society*, 102066.

- **Premise:** How to provide aging populations in Estonia and Finland with cross-border Silver Economy e-services (smart living environments)? This requires not only interoperability but understanding the state of play.
- **Method:** Combined cognitive mapping and DEMATEL to facilitate the analyses and modeling of cause-and-effect relationships. Workshops between QH stakeholders in Finland and Estonia
- **Results:** Understanding biggest challenges facing Silver Economy population for adopting e-services (low trust, low awareness), which cross-border e-services would have utility? (education, mobility, etc). Interoperability components – use existing X-Road architecture for cross-border e-services, establish SLA agreements between different service providers.

Past/Current Publications

Jackson, E. B., Dreyling, R., & Pappel, I. (2021, July). **Challenges and Implications of the WHO's Digital Cross-Border COVID-19 Vaccine Passport Recognition Pilot.** In *2021 Eighth International Conference on eDemocracy & eGovernment (ICEDEG)* (pp. 88-94). IEEE.

- **Premise:** WHO proposed solutions for globally recognizing COVID digital certificates, Estonia was part of a working group that proposed X-Road architecture to facilitate interoperable
- **Method:** Qualitative intensive workshops with WHO Estonian working group.
- **Results:** Potential X-Road architecture for WHO cross-border vaccine was schematized, ultimately a lightweight dataset was proposed that would require low-overheard costs for implementation
- X-Road proposal was not adopted, political and ethical reasons involved.



TAL TECH

LET'S BUILD THE DIGITAL FUTURE TOGETHER!

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