Boosting Digital Government with Interoperability

Early-Career Researchers Paving the Way Ahead

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Blockchain Waste Management for Smart Villages:
An Italian Case Study

Gloria Marinsanti Rwakihembo

PhD Candidate at Roma Tre University, Department of Business Studies

Waste management

Waste management is a critical element of bioeconomy, allowing the natural environment to be kept clean, combined with the use of recycled materials, thus bringing economic benefits (Vambol et al., 2023).

The Italian sustainable waste management processes are guided by the measures of the National Waste Management Programme (PNGR) and the National Recovery and Resilience Programme (PNRR) based on the European Union's policy framework (European Green Deal - Directive 2008/98/EC).
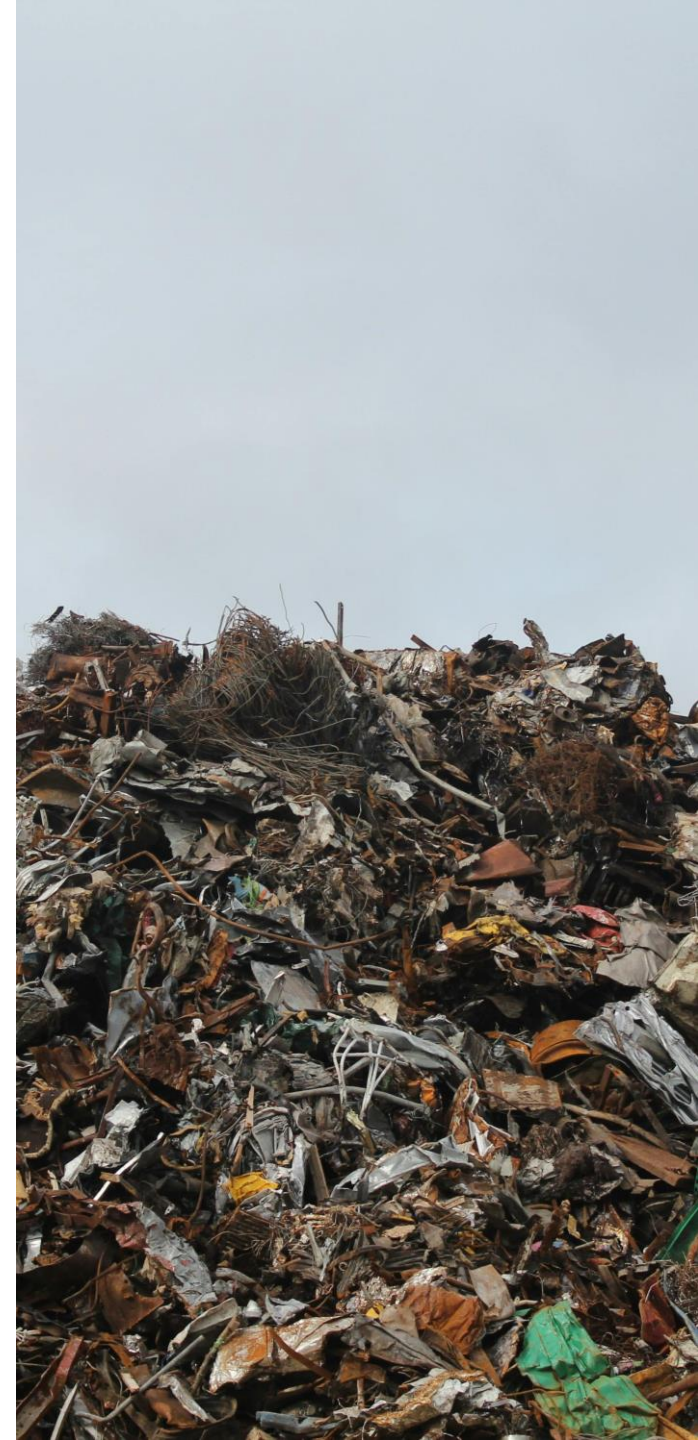
The main challenges in waste management

The main difficulties in waste management are related to the impossibility of safely and transparently tracing the path from collection to disposal of waste (Gopalkrishnan et al., 2019).

The PNRR program envisages the establishment of a nationwide monitoring system to address issues of illegal landfills and facilitate the achievement of sustainable development goals.
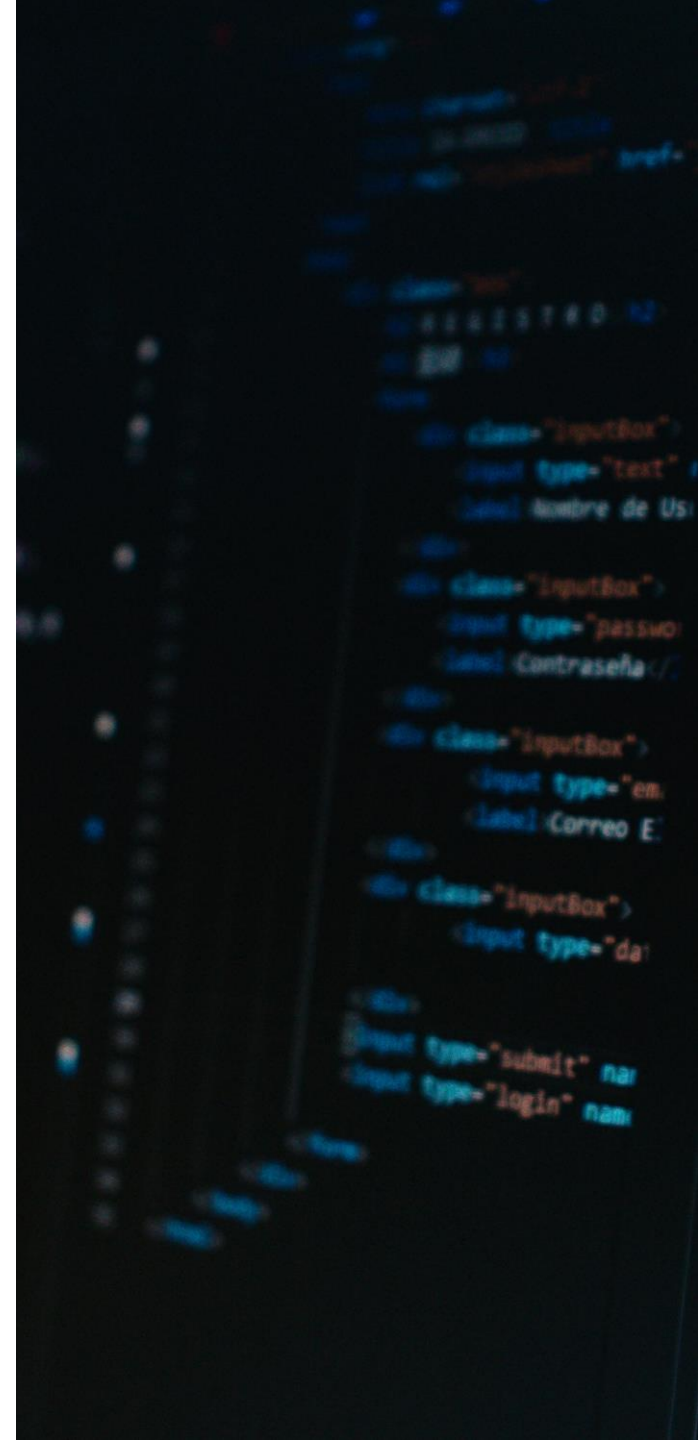
Research design

To detect perceptions regarding blockchain technology in waste management in small Italian municipalities, the TAM2 model has been applied.

Out of a total of 5.498 small municipalities in Italy, the size of the significant sample was found to be 360.
Subsequently, a two-tiered stratification was used: the first included the municipalities belonging to inland areas; secondly, the research considered a fundamental requirement underlying the potential of blockchain application: access to a broadband network structure (Sayadi et al., 2018; Tahir et al., 2020; Kaushik et al., 2021).

Data was collected through a questionnaire via the EuSurvey platform.
A statistical hypothesis test has been applied based on the 8 hypotheses formulated which are hereafter briefly exposed.
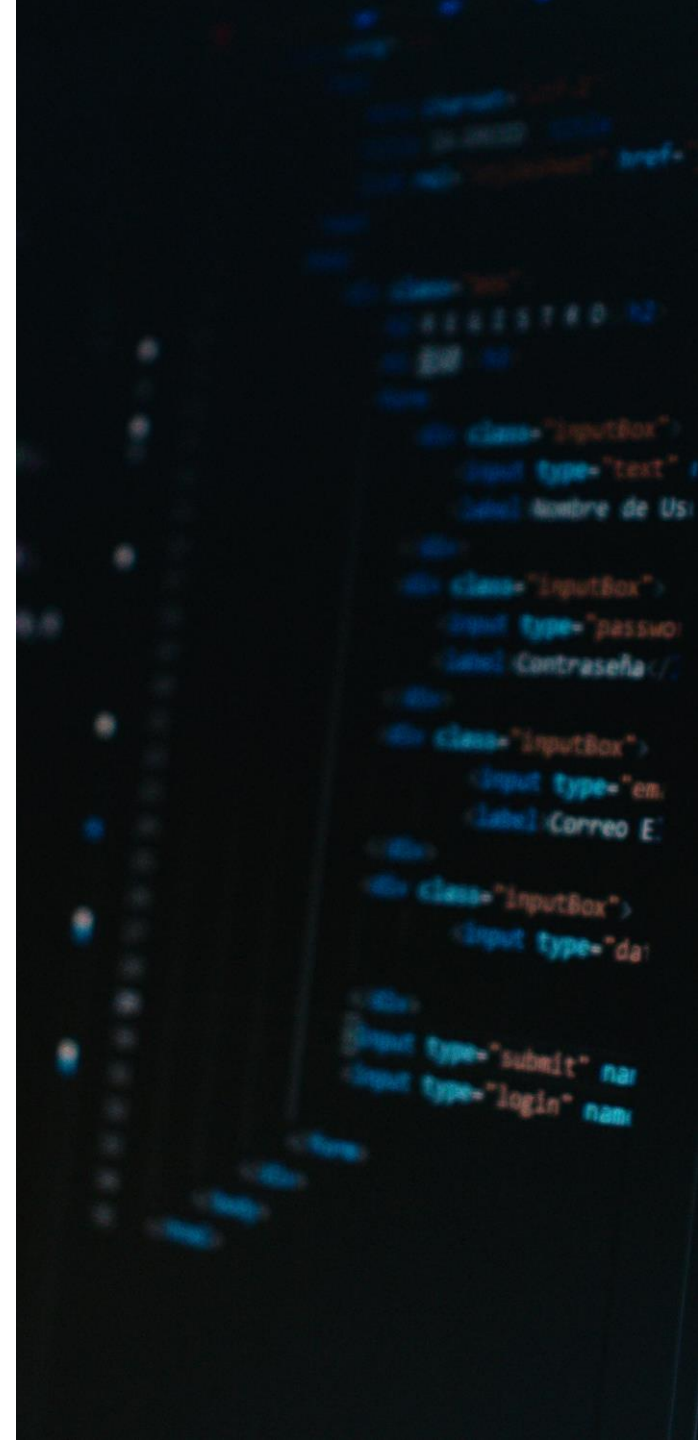
Results overview

Competencies

There is a need for training not only for the managers to develop the necessary skills to benefit from the blockchain platforms but most importantly for the overall knowledge of the characteristics and the possibilities of new value creation in waste management services.

Value perception

There is no perception of blockchain technology bringing additional value to one's work in the waste management sector.

Change of paradigm

The application of blockchain depends on the willingness of companies to adapt to the broader context of sustainable development through new digital technologies.

Interoperability

The knowledge and competencies that could encourage the implementation of blockchain in waste management should be linked to organizational, semantic, and technical interoperability of the blockchain system with the current waste management systems.

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Gloria Marinsanti Rwakihembo

Building Smart Living Environments for Ageing Societies: Decision Support For Cross-border e-Services Between Estonia and Finland

Marina Weck, Häme University of Applied Sciences
Eric Jackson, TalTech University
Ingrid Pappel, TalTech University
Markus Shihoven, Häme University of Applied Sciences

Introduction and Background

- Population aging is having acute affects on Estonian and Finnish societies

- EC recognizes e-services and products based on ICTs can be leveraged to alleviate some of this pressure

- Concept of "Smart Living Environments" (SLEs)

- Estonia and Finland have high cross-border mobility, substantial Estonian population living in Finland

- X-Road data exchange layer enables internal and external interoperability between Estonia and Finland

Research Questions

RQ1   **What factors are inhibiting the provision of cross-border e-services between Estonia and Finland?**

RQ2   **What types of cross-border e-services between Estonia and Finland have been identified as needed most?**

RQ3   **How can interoperable cross-border e-services and age-friendly SLEs be established in Estonia and Finland?**

Main Results

Barriers

- Older people are generally biased against and distrustful of technology, which hampers their potential use of cross-border e-services. This distrust is common in Estonia and Finland.

- Lack of high-speed broadband access

- Organizations lack specific knowledge about the needs of older people, the types of e-services required, and the necessary data and reference architectures to provide these services.

- Lack of organizational interest and insufficient funding in Finland are major impediments to implementing cross-border e-services.

Cross-border e-Services

- Identified seven broad areas for e-service intervention
- Cross-border proactive event-driven public services

Recommendations

Conclusions/Future Outlook

- SLEs have high cross-sectoral characteristics

- The X-Road has a roadmap to be compatible with Data Spaces

- Cross-border interoperability has inherent complexity, which tends to lean towards organizational collaboration and coordination over technical challenges

- Estonia and Finland have a positive political and cultural relationship, enabling more cross-border coordination than usual, anchored to the X-Road's trust architecture
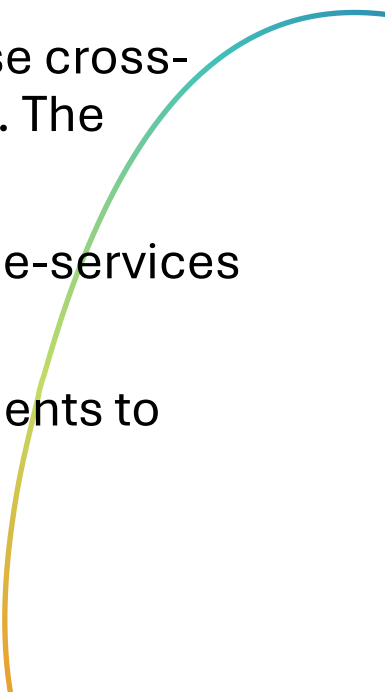
Thank you

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Main Results: Recommendations

- Estonian and Finnish cross-border e-service actors should conduct workshops for each intervention area, involving older individuals of varying age ranges and their contact persons.

- Emphasis on incorporating quadruple-helix perspectives

- In addition to the X-Road, both countries have their citizen portals (Eesti.ee and Suomi. fi) that could be leveraged as one-stop shops for older people to access cross-border e-services.

- SLEs orientate towards private-public partnerships, interesting aspect was the panelists didn't consider public sector influential in service provision

Main Results: Barriers

- A methodological combination of cognitive mapping and decision-making trial and evaluation laboratory with Estonian and Finnish QH stakeholders elicited barriers, viable cross-border e-services, and implementation.

- Main Barriers

    - Older people are generally **biased against and distrustful of technology**, which hampers their potential use of cross-border e-services. This distrust is **common in Estonia and Finland**.

    - **Lack of high-speed broadband access** significantly hinders older people's ability to use cross-border e-services, despite Estonia's high internet accessibility and digital infrastructure. The affordability of high-speed internet, particularly in rural areas, remains a barrier.

    - Organizations **lack specific knowledge about the needs of older people**, the types of e-services required, and the necessary data and reference architectures to provide these services.

    - **Lack of organizational interest and insufficient funding** in Finland are major impediments to creating cross-border e-services.

Main Results: Identified Cross-Border e-Services

- Contact persons of older people play an integral role in cross-border e-service provision

- Identified seven broad areas for e-service intervention
  - Caregiving
  - Lifelong learning (Open University)
  - Mobility

- Proactive event-driven public services

A1: Social Welfare and Healthcare, Medicine and Caregiving
S1: Access to e-service providers
S2: Assistive technology (to provide independence)
S3: Monitoring older people's health
S4: Online training (keeping active with online training)
S5 Status monitoring (home-based solutions, wearables, etc.)

A7: Educational, Professional, and Other Activities
S31: Different events and trainings in the community
S32: Easy platforms to keep the mind and brain active and in shape
S33: Involvement of older people in sharing their knowledge
S34: Promoting lifelong learning
S35: Raising digital skills of older people etc.

Interoperability governance of technology, products and services in the field of emergency management

Recommendations

01 **Highlight it**

Recognise interoperability of emergency management services a preeminent role within the ERCC

1a **Leadership**

Appoint a CIO at the ERCC in charge of the strategy and agenda for the improvement of emergency management services

02 **Seat at the table**

Ensure that organisations in charge of emergency management services have a seat at the interoperability governance table

2a **Make it specific**

Develop a specific interoperability framework for emergency management services

03 **Who-is-who**

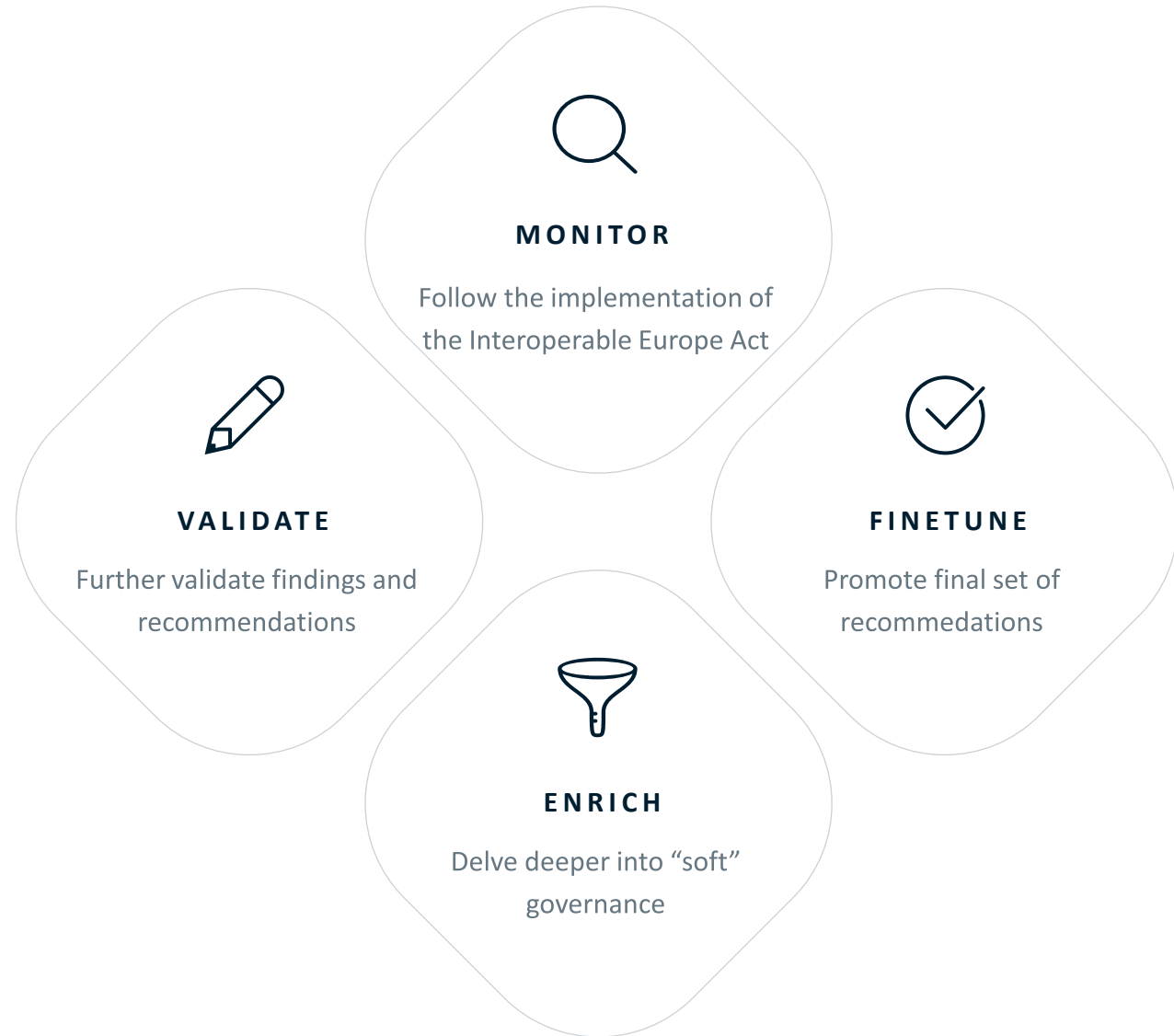Identify the most adequate actor to implement interoperability policy in emergency management services

04 **Streamline it**

Empower (and make accountable) the actors in charge of downstreaming interoperability policy and encourage use of existing resources

Conclusions

Describe, assess and improve interoperability in cross-border emergency management services through policy recommendations (within TEMA, Horizon Europe)

MONITOR

Follow the implementation of the Interoperable Europe Act

VALIDATE

Further validate findings and recommendations

FINETUNE

Promote final set of recommedations

ENRICH

Delve deeper into "soft" governance

Thank you

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Institutions in digital government transformation: What is the role of different administrative cultures?

A comparative study analysis of Estonia and Slovenia

Eleonora Bonel
Blue Book Trainee @DG DIGIT
MPP Sciences Po, MSc Erasmus Rotterdam
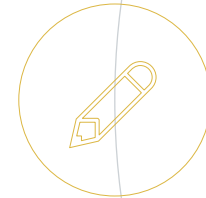
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Three questions

Despite research on digital government implementation, there is a gap for understanding how administrative norms, practices and attitudes impact digital government implementation.
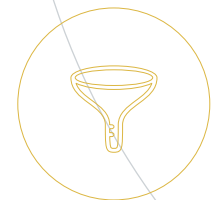
What is administrative culture?

How does administrative culture impact digital government transformation?

Which dimensions of administrative culture are most relevant to explain digital government impact?
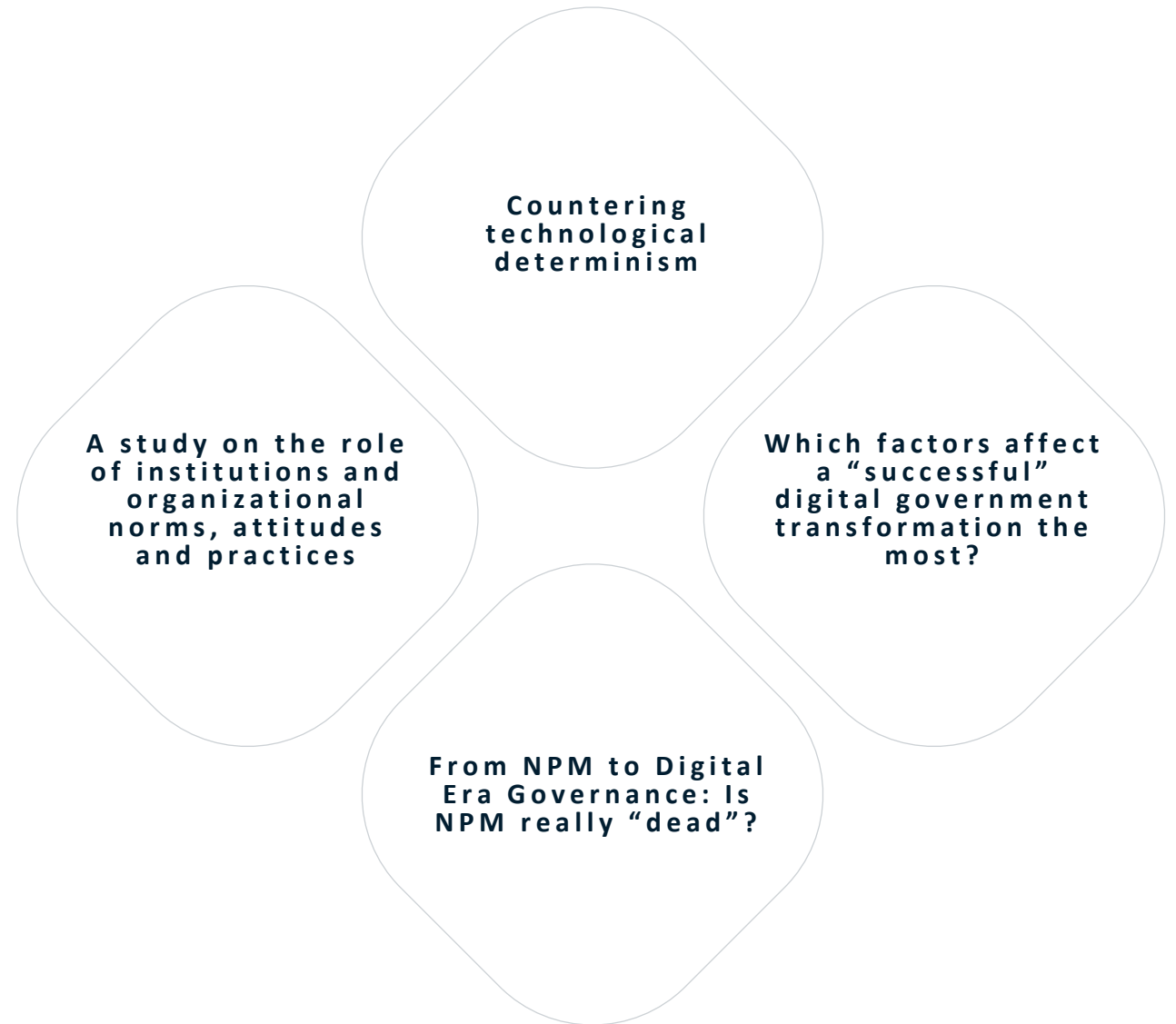
Background and research focus

The research examines digital government implementation in Estonia and Slovenia through the lens of administrative culture and contextual variables. Key underlying assumption to be assessed: **technology only goes to enhance, if not replicate, the existing administrative and institutional system in place.**

Countering technological determinism

A study on the role of institutions and organizational norms, attitudes and practices

Which factors affect a "successful" digital government transformation the most?

From NPM to Digital Era Governance: Is NPM really "dead"?

Variable	Administrative culture			
Definition	The common beliefs and attitudes of public servants and bureaucrats surrounding the role of their organization and towards the state administration.			
Dimension	**Bureaucratic culture**	**Normative culture**	**Professionalism**	**Shared attitudes and vision**
Definition	Bureaucratic culture is defined as the distinctive attitudes and shared beliefs of public administrators towards bureaucratic ideals (Zhang and Feeney, 2020; Hendryadi et al. 2019).	Normative culture can be operationalized through the availability of in-service training, which allows an organization to reform and innovate in order to achieve more efficiency and responsible governance (Riggs, 2002).	Professionalism is operationalized as the extent to which a public servant adheres to the rule of law. This can further take different characteristics according to administrative procedures or ethics code.	
Indicators	(1) **Regulation-oriented**; Adhering to more bureaucratic procedures. (2) **Participatory nature**; Focused on results and less bureaucratic oriented	Availability of in-service training.	Respect of the rule of law.	To be defined inductively.

Table 2: Definition of administrative culture and its four dimensions.

Figure 1: Conceptual framework of variables

Findings and Conclusions

Estonia

- E-gov: Transformational.
- Administrative culture: RELEVANT.
    - Results oriented bur. culture.
    - Innovation-oriented and pragmatic.
    - Network-type, openness to change
    - Large availability in-service training

Slovenia

- E-gov: Transactional
- Administrative culture: RELEVANT.
    - Regulation-oriented bur. culture.
    - Shared attitude: hierarchical structures
    - Highly bureaucratic culture
    - Availability in-service training but less on transversal skills development.

The co-variational study underlined the theoretical relation between technical and institutional approaches in digital government: suggesting that the effects are not linear and independent as suggested.

A relation between administrative culture and e-government implementation can be identified, however it can be considered only of marginal relevance. **Possible confounding effect of: ICT infrastructure** and **political will.**

… So, what is the relevance for Interoperability?

- A first **empirical** attempt to draw the relation between administrative culture as an explanatory variable and e-government implementation.
- "**Bureaucratic culture**" and "**Shared attitudes and vision**" emerge as most relevant dimensions.

- **Research designs:** Acknowledging the limitations of co-variational case studies.
- **Possibilities for future research:** a large-scale survey investigating their relationship. (Reference: Hofstede, 1980)

- Literature suggesting importance of **institutional determinants** for successful digital government transformation.
- Public administrators' neutrality?
  - **Accountability** and **Promotion of values and norms** among civil servants.
  - When organizations "go online" - they are mediated by the administrative culture in place. Some could contribute to a more effective digital government transformation, through openness, shared vision, in-service training and network-type culture.
- Case Estonia: administrative culture important, but also ICT infrastructure, political will and political continuity as confounding variables.
  - This brings us back to the idea that incorporating interoperability as a **political priority is crucial.**
- Setting the ground for future research: what are the ingredients for successful turn to more interoperable administrations?

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Future Implications

01

INTEROPERABILITY BARRIERS

Study how advances in interoperability and EIF layers depend on involving institutional norms and bureaucratic practices that favor innovation, flexibility and cross-departmental collaboration. What are the barriers?

02

ADMINISTRATIVE CULTURE(S) as enabler(s)?

Identifying enablers of interoperability across different administrative contexts in the EU.
Future research could study administrative culture interacting with digital government implementation more at EU-level, through a large-scale study.

03

TARGETED EFFORTS

Having identified AC as a institutional factor mediating digital government implementation, further research can inform policymakers and public managers to focus on strategies to harmonize processes and standards, increase in-service training, and foster a culture supportive of interoperability.

Interoperable Europe Act
– ensuring the effective delivery of digital public services in the EU

…through

structured and co-owned EU cooperation

mandatory interoperability assessment

Strengthened interoperability support

recognised reusable interoperability solutions

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Thank you!

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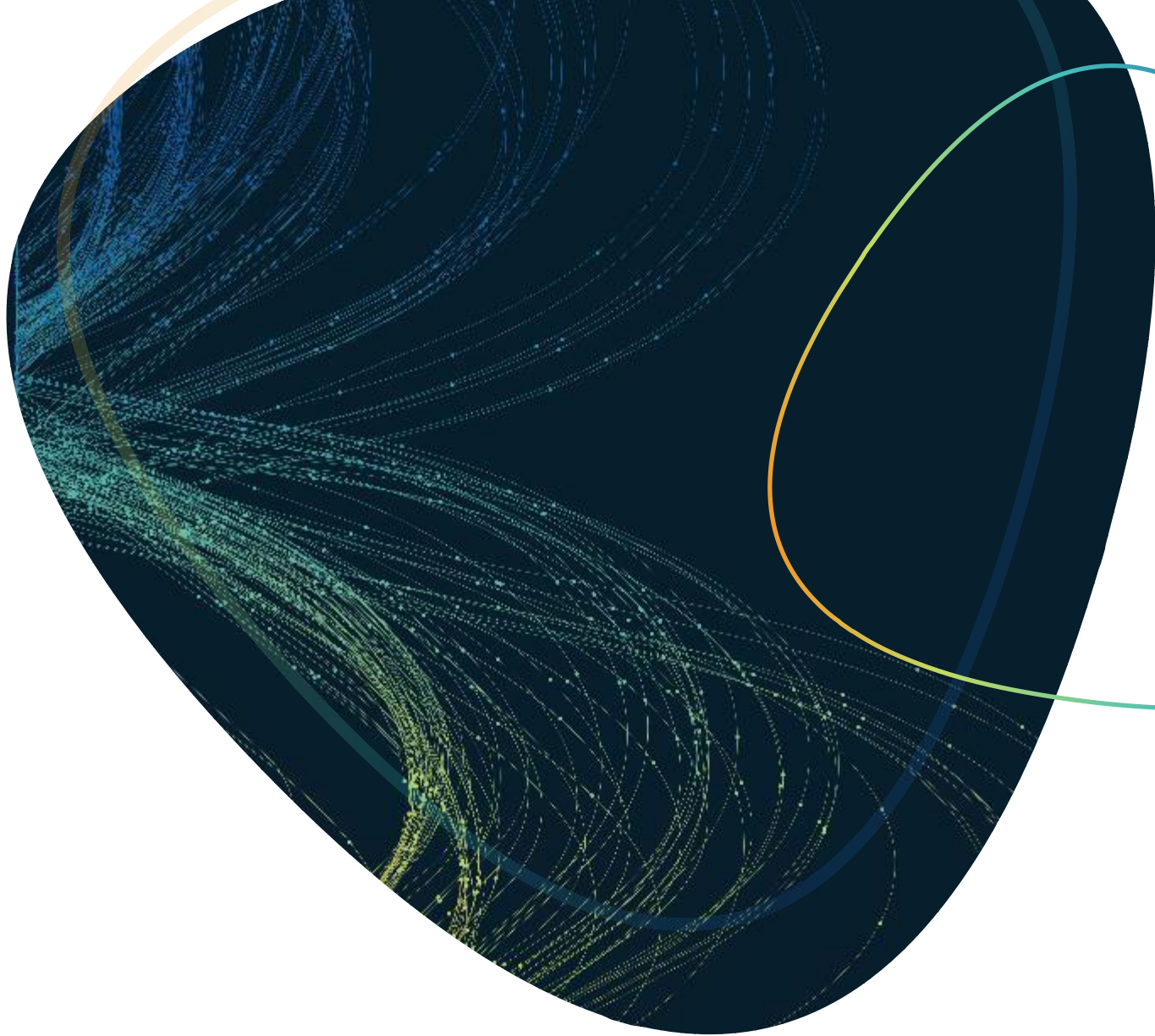
Applying (Data) Interoperability to Business Platform Models for Citizen Services

Yves Vanderbeken

Topic: Self-Service citizen services

- **Government as Business Platform Provider, Marketplace & Ecosystem Manager**
  - Same convenience as Uber, Airbnb, etc., but not for profit
  - Personal budgets
  - Digital Marketplace and industry suppliers
  - Allowing digital self-service
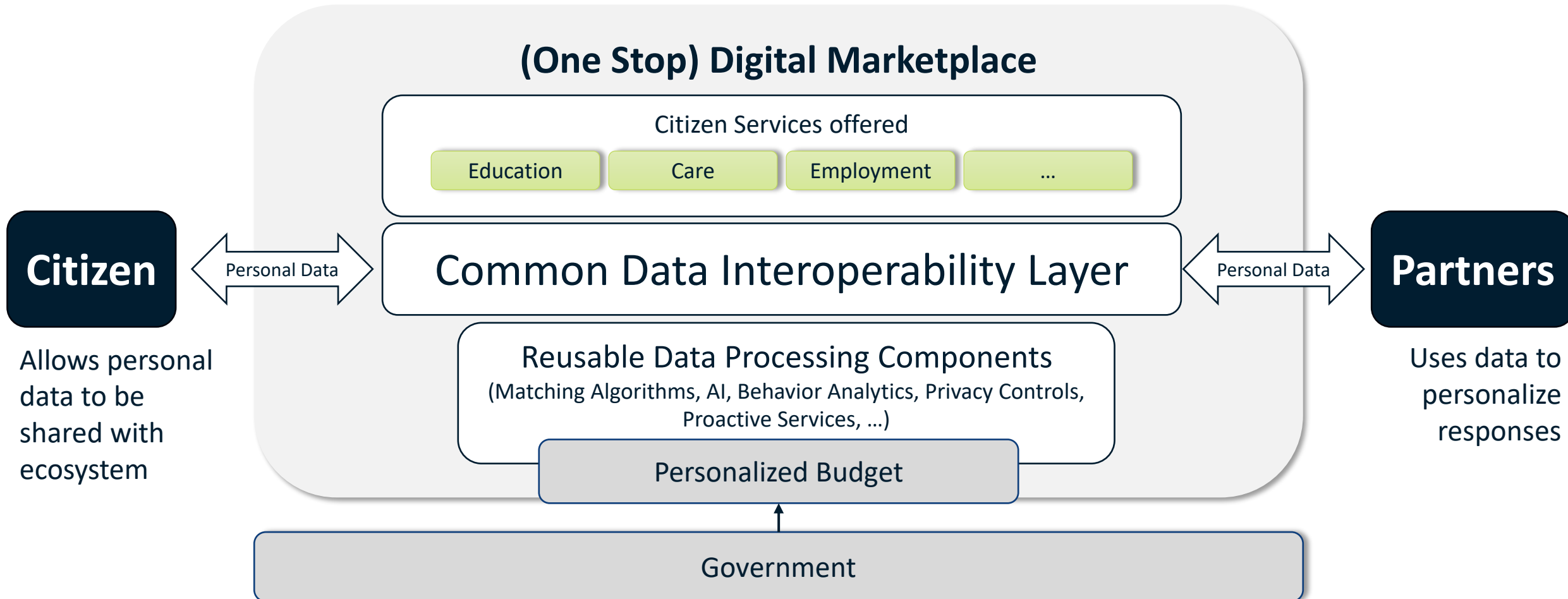 - Personalized, Proactive Services
  - Ecosystem Governed

- **Deployed around the world**
  - Education, Care, Employment
  - Focused on Matching

"Platform models spring up like mushrooms in a field" (*)

Self Service

Citizen — Data — Market place — Data — Eco system

Government as Digital Platform Provider

(*) Schreieck, M., Wiesche, M. and Krcmar, H. (2016). "Design and governance of platform ecosystems - Key concepts and issues for future research." 24th European Conference on Information Systems, ECIS 2016, (June).

Common Data Interoperability Layer

(One Stop) Digital Marketplace

Citizen Services offered

| Education | Care | Employment | ... |

Citizen ⟷ Personal Data ⟷ **Common Data Interoperability Layer** ⟷ Personal Data ⟷ **Partners**

Allows personal data to be shared with ecosystem

Uses data to personalize responses

Reusable Data Processing Components
(Matching Algorithms, AI, Behavior Analytics, Privacy Controls, Proactive Services, ...)

Personalized Budget

Government

Data Interoperability (and Data Spaces) Standards exist, but should be made available as building block and prescribed across "Whole-of-Government"

Research Question

How to govern a business platform model for citizen services?

Includes enablers like strategy, value, but also Data

Today

Risk of data exchange organized per entity

Question

Should we identify Data Interoperability as a critical success factor (or not)?

39
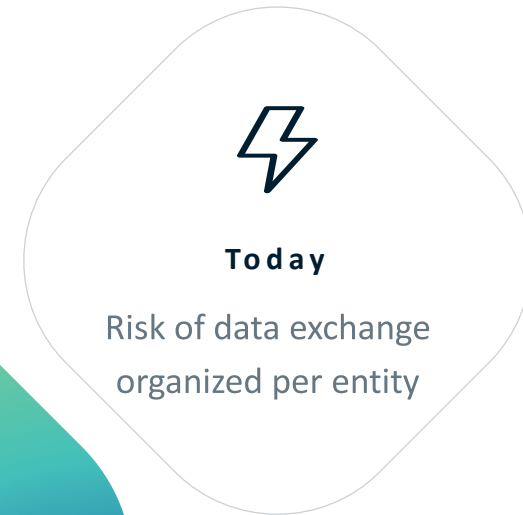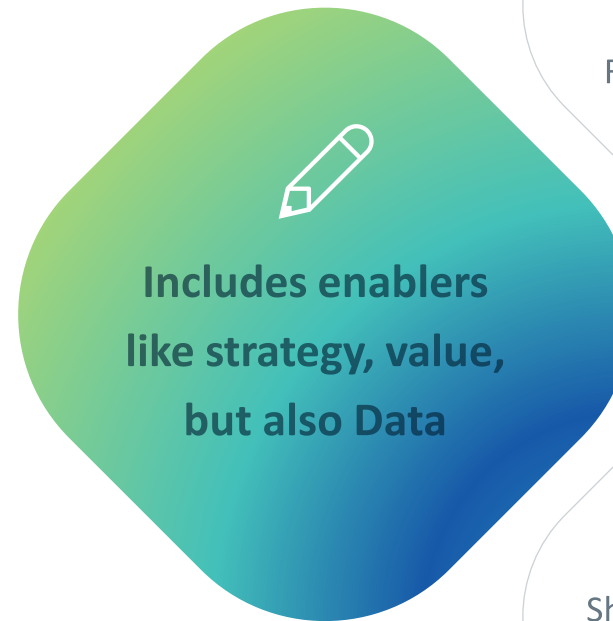
Thank you

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Towards Data Modeling in Complex Domains

Štěpán Stenchlák, Jakub Klímek, Petr Škoda, Martin Nečaský

CHARLES UNIVERSITY
Faculty of mathematics
and physics

Technical Interoperability of Open Data

Directive (EU) 2019/1024 of the European Parliament and of the Council on open data and the re-use of public sector information

DEFINITION OF CONCEPTS

HTML documentation, diagrams

Semantics
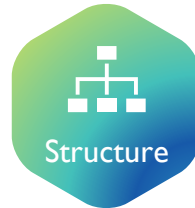
DATA SCHEMA

JSON, XML, CSV Schemas, Database schema, RDFS

Structure

SUPPORTING DOCUMENTS

Data samples
Data transformation scripts

Misc.

Dataspecer Structure Editor
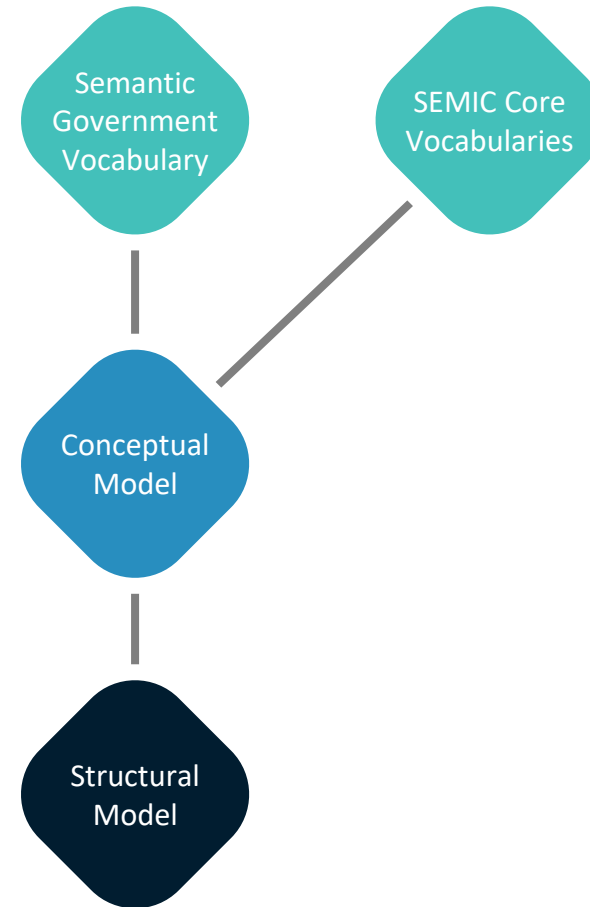
Tourist destination ✏️

Data structure for Tourist destination. A place, area, or region within a country that is notable for its unique features, historical significance, natural beauty, or cultural interest and is specifically recognized and frequented by tourists.

- ⌄ **Tourist destination** (`tourist-destination`) ➕ ✏️ ⋮

  add

  - — **capacity** (`capacity`) : `Integer` [1..1]

  - — **smoking allowed** (`smoking`) : `Boolean` [0..1]

  - ▦ ⌄ **has owner**: **Owner** (`owner`) **with specializations** (`owner`) [0..*]

    - ⌄ **specialization Owner as a human** (`human-owner`)

      - — **full name** (`name`) : `String` [1..1]

    - ⌄ **specialization Owner as a juridical person** (`company-owner`)

      - — **name of juridical person** (`company-name`) : `String` [1..1]

  - ▦ ⌃ **barrier-free-access**: [refers to] **Barrier-free access** (`barrier-free-access`) (`barrier-free-access`) [0..1]

Semantic Interoperability of Application profiles

The main issue: management the ecosystem of specifications and their profiles

DCAT

W3C

defines concepts (Catalog, Dataset, Distribution) and relations between them

DCAT-AP

SEMIC

adds cardinalities, specifies definitions, describes how to use the concepts

DCAT-AP-CZ

CZ

adds range restrictions for relations, adds Czech definitions

Thank you
for your attention
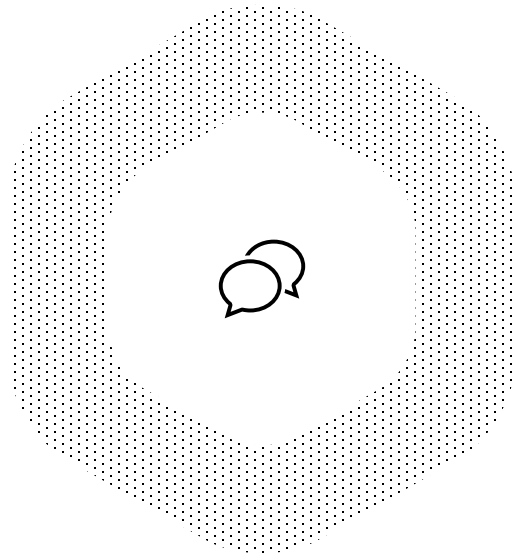
Štěpán Stenchlák, Jakub Klímek,

Petr Škoda, Martin Nečaský

Department of Software Engineering

Faculty of Mathematics and Physics

Charles University

dataspecer.com

Balancing data sharing and data protection in light of semantic interoperability

Michiel Fierens – CiTiP KU Leuven

Cast >

Timothée Chalamet
Paul Atreides

Florence Pugh
Princess Irulan

Zendaya
Chani

Rebecca Ferguson
Lady Jessica

Christopher Walken
Padyszach Im...

Jason Momoa

Aanvangstijden >

In de buurt van Leuven

DI 27 FEB

Kinepolis Leuven
1,2 km·Bondgenotenlaan 145-149, 3000 Leuven

Standaard   19:50

UGC Cinema's Aarschot
15,6 km·Demervallei 4, 3200 Aarschot

Standaard   19:45

Meer bioscopen →

Tickets kopen   Al bekeken   Wil bekijken

Over

Dune: Part Two is een toekomstige Amerikaanse sciencefictionfilm, geregisseerd door Denis Villeneuve en het vervolg op Dune uit 2021. Wikipedia

Releasedatum: 28 februari 2024 (België)

Directeur: Denis Villeneuve

Geschreven door: Frank Herbert

Bewerking van: Duin

Producenten: Denis Villeneuve, Tanya Lapointe, Mary Parent, Patrick McCormick, Cale Boyter, Joseph M. Caracciolo Jr.

Dit kennisvenster claimen   Feedback

Mensen zoeken ook naar

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Open, dynamic environments

Data <u>Protection</u>
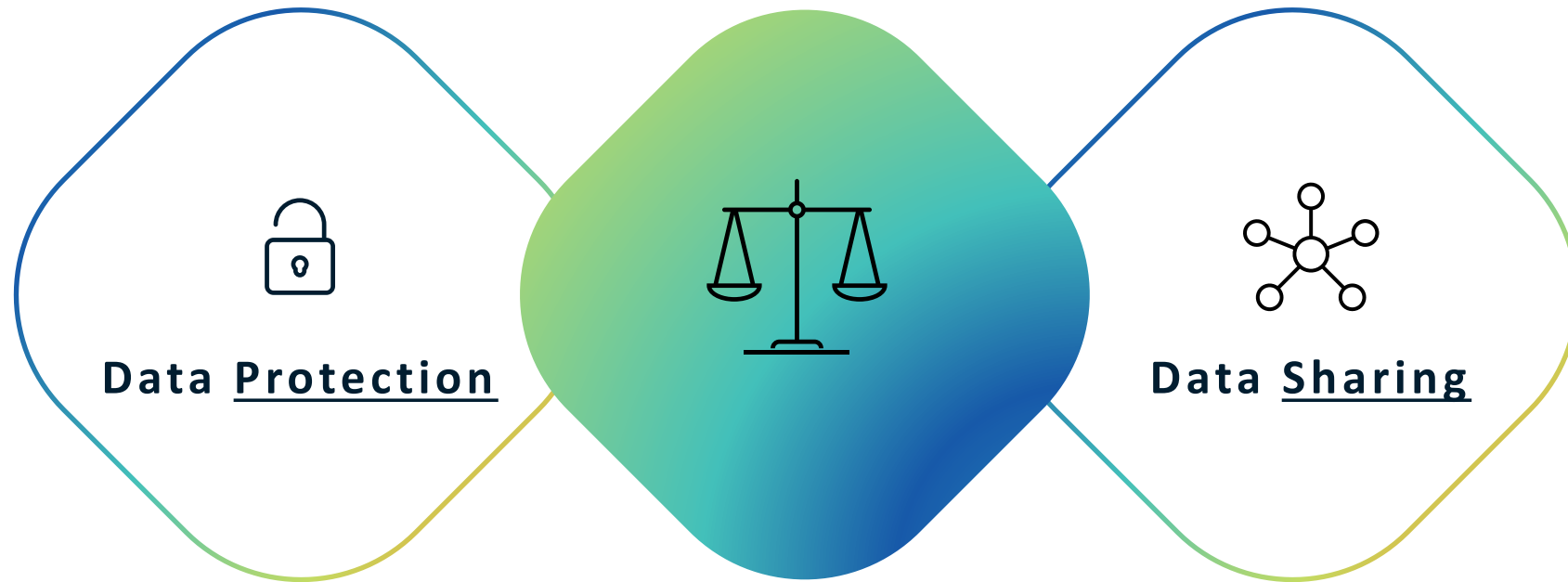
Data <u>Sharing</u>

Balance affected

SEPARATION – INTERCONNECTION

INDIVIDUAL – COLLECTIVE

DATA SHARING – KNOWLEDGE SHARING
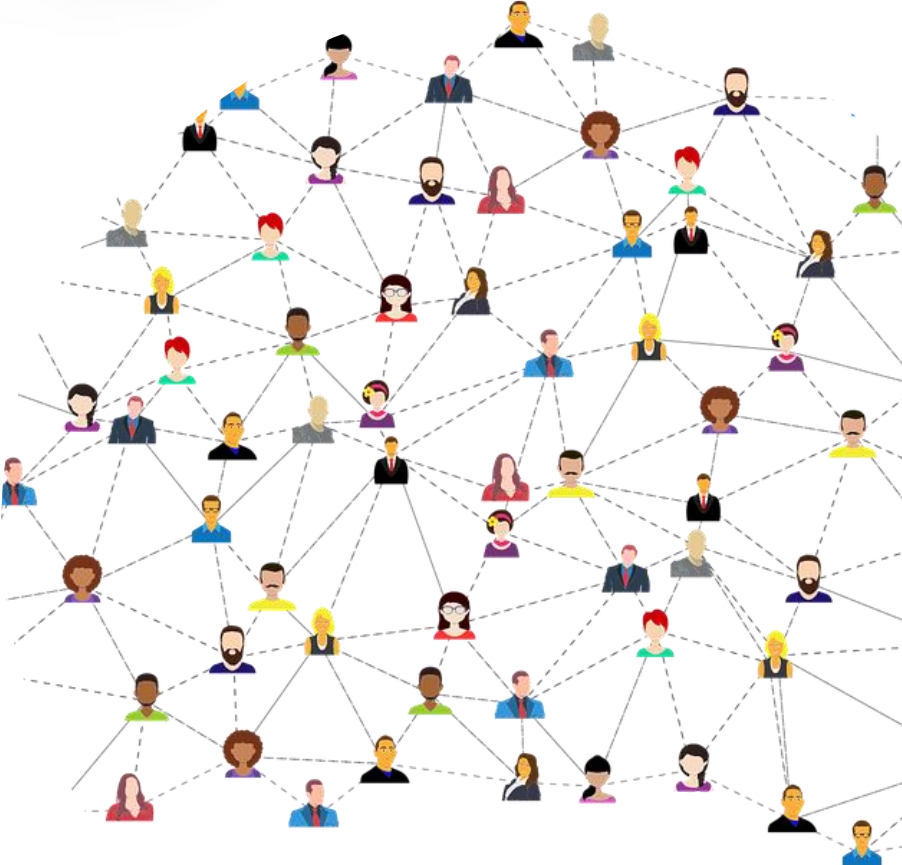
DIVISION OF RESPONSIBILITIES

COLLECTIVE DIMENSION

INFORMATION-INDUCED HARMS

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Thank you

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Semantic assets in the era of datification and AI

Giorgia Lodi - technologist at CNR-ISTC
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Data everywhere!

⊘ **Data Volume and Variety**

The **volume of data** (structured and unstructured) **is increasing** as well as its **variety,** coming from heterogeneous sources

⊘ **Data is a network**

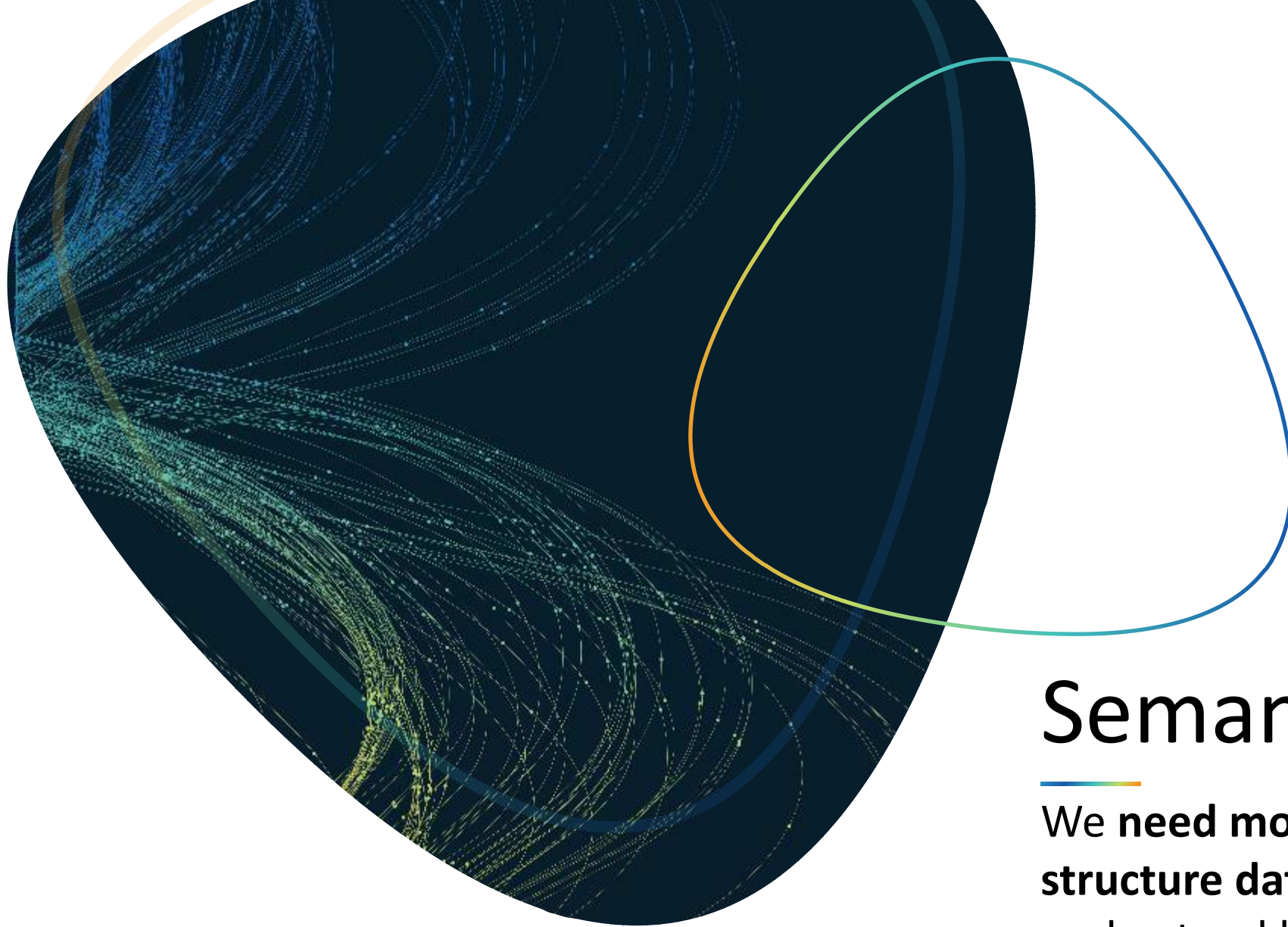It is not just having **more data that unlocks its value**, but **linking it together**

Data quality

✓ **Curate data!**

If data **is not curated**, by also leveraging
the large knowledge of domain
experts, (human in the loop)
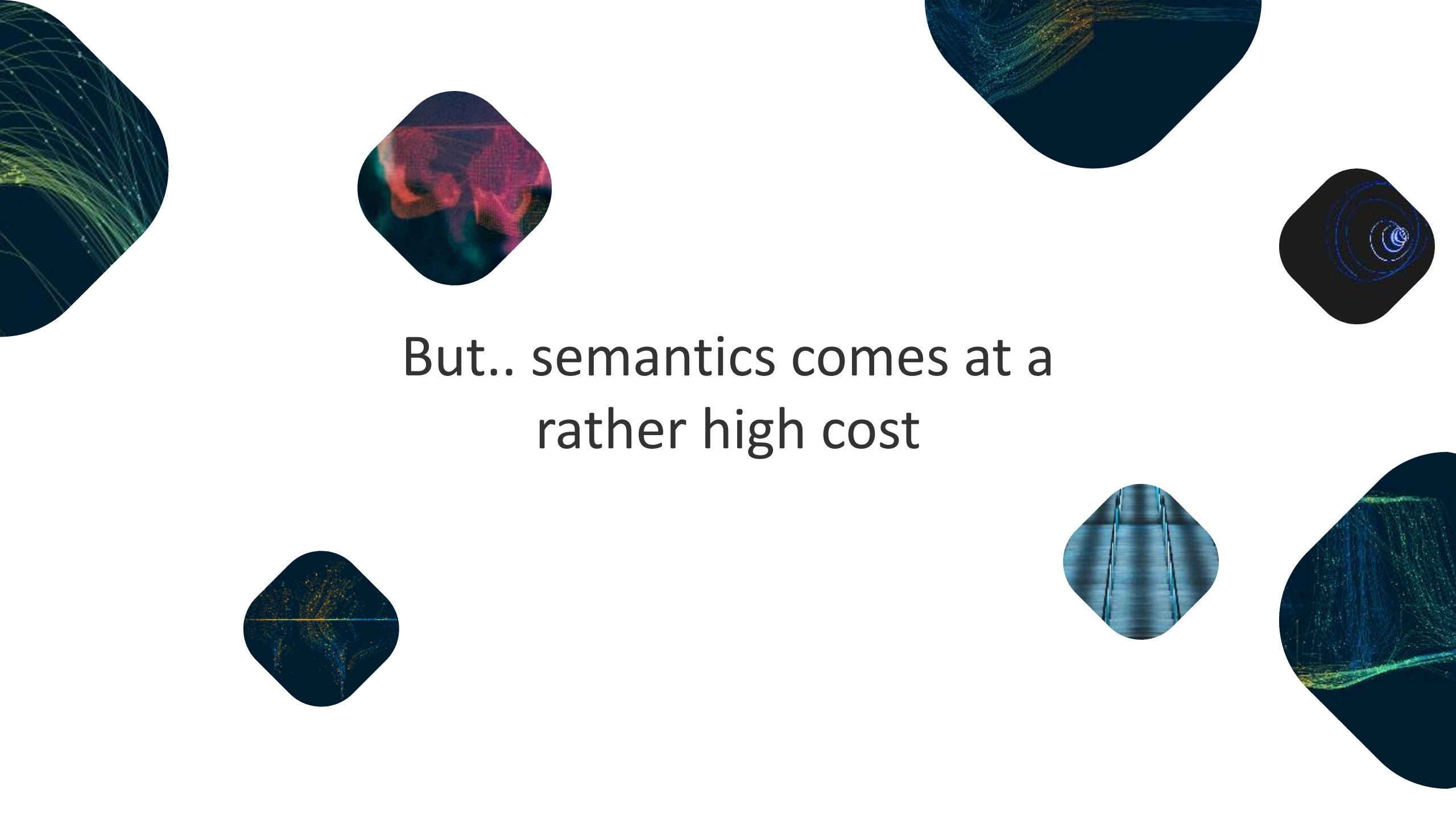**Garbage In Garbage Out
(GIGO) law applies**
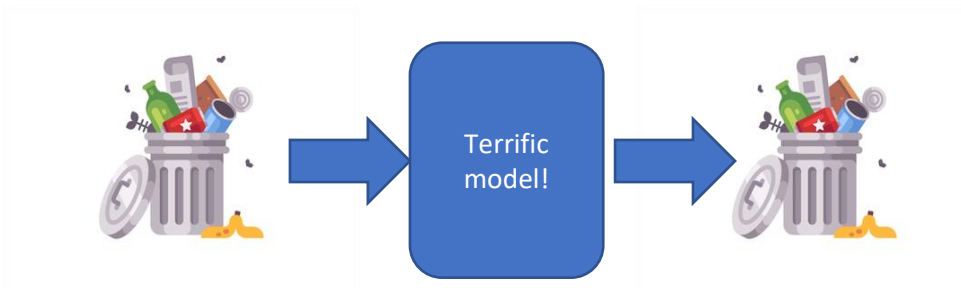
Semantics

We **need more than before** to **structure data with a clear semantics,** understood by humans and machines, so as **to augment data quality**
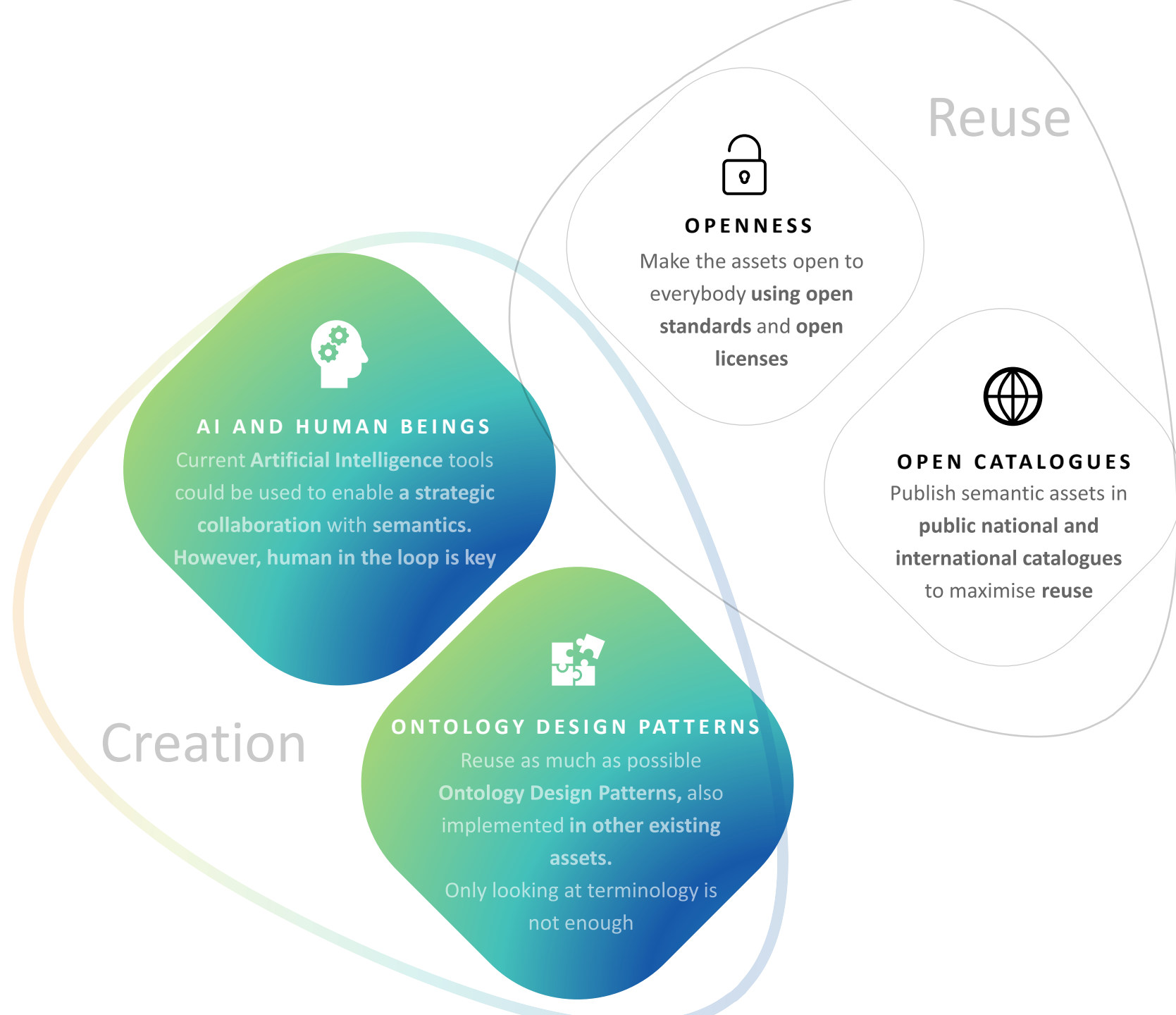
But.. semantics comes at a rather high cost

Semantics assets creation and reuse

Take home messages

Reuse

OPENNESS
Make the assets open to everybody **using open standards** and **open licenses**

OPEN CATALOGUES
Publish semantic assets in **public national and international catalogues** to maximise **reuse**

Creation

AI AND HUMAN BEINGS
Current **Artificial Intelligence** tools could be used to enable **a strategic collaboration** with **semantics. However, human in the loop is key**

ONTOLOGY DESIGN PATTERNS
Reuse as much as possible **Ontology Design Patterns,** also implemented **in other existing assets.** Only looking at terminology is not enough

Thank you

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