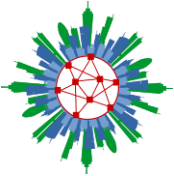


Towards a system for data transparency to support data subjects

PhD project first year

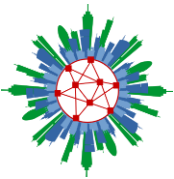
Christian Janßen

christian.janssen@uni-oldenburg.de



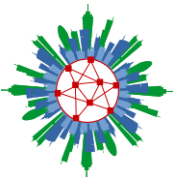
Agenda

| No. | Topic |
|-----|-------------------------------|
| 1. | Introduction & research focus |
| 2. | Motivation |
| 3. | Common understanding |
| 4. | Problem statement |
| 5. | Goal and research questions |
| 6. | Impacts for Smart Cities |
| 7. | Further steps |



Christian Janßen

- Since 11/2016 – Research assistant
University of Oldenburg /VLBA
 - Lecturer IT-Controlling, ERP-Systems, Digital Transformation, Data Management
- 04/2014 – 10/2016 Master of Science
University of Oldenburg
- 10/2010 – 03/2014 Bachelor of Science
University of Oldenburg



Sustainability



Environmental Reporting



Mobility



Energy

Data Science



Data Integration

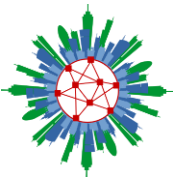


Artificial Intelligence



Data Ownership

Transfer & Capacity Building



Sustainability



Environmental Reporting



Mobility



Energy

Data Science



Data Integration

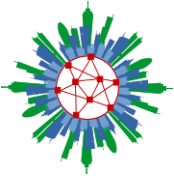


Artificial Intelligence

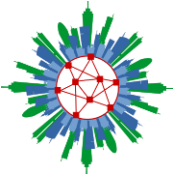


Data Ownership

Transfer & Capacity Building



- The amount of data is constantly growing in the age of Digital Transformation. The global data traffic will increase to 163 Zettabytes by 2025. [1] [6]
- Industrial processes and tasks are influenced by new data driven technologies/concepts (e.g. IoT, AI)
- New legal frameworks (e.g. GDPR) provides tougher rules on the protection of individuals data and enhance rights regarding to data transparency, data sovereignty and data ownership [7, Art. 12-15]
[7, Art. 16-22]
- Data protection takes over as a cross-sectional task and attempts to act as a connecting component between data controller and data subjects [5]



■ Data Transparency

- Data Transparency ensures that all privacy related data processing including the legal, technical, organizational and procedural settings and can be understood and reproduced at any time. Information's must be available before, during and after processing

[10]

■ Data Ownership

- Data Ownership is defined as the legal right and complete control over a single piece or set of data elements

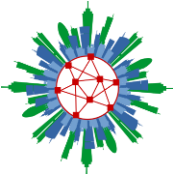
[9]

■ Data Sovereignty

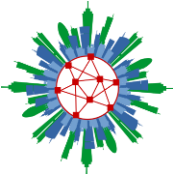
- Legal: Data Sovereignty is the states ability to control data orginating and passing through their territory
- Individual: Data sovereignty in general is to be understood as an ethical and fundamental right-based informational self-determination. Users should be able to make independent and autonomous decisions about their data

[11]

[12]

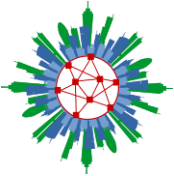


- General Data Protection Regulation (GDPR) Roles:
 - Data Subject
 - (I.e. Individual) who's personal data are regulated by the GDPR [10]
 - Data Controller
 - (Person or legal entity) controls both purpose and means of personal data processing [11]
 - Data Processor
 - (Person or legal entity) processes personal data on behalf of the Data Controller [10]
 - Supervisory Authority
 - The independent public authority responsible for monitoring regulated entities compliance with GDPR [10]
 - Data Protection Officer
 - (Person or legal entity) manages and supervises all data protection activities [11]



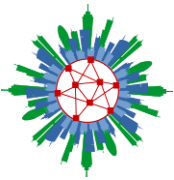
Problem statement

- Despite more precise legal regulations, it is often unclear how the stored data is processed or used for further purposes, such as sharing with third parties [5]
- The lack of monitoring/transparency for the data subjects makes it difficult to ensure e.g. the purpose limitation [7, Art. 7]
- Data subjects have limited/tenacious opportunities to interact with companies if his opinion in the use of data changed
- Company compliance and safeguarding regarding to the processing and use of data will increase [8]

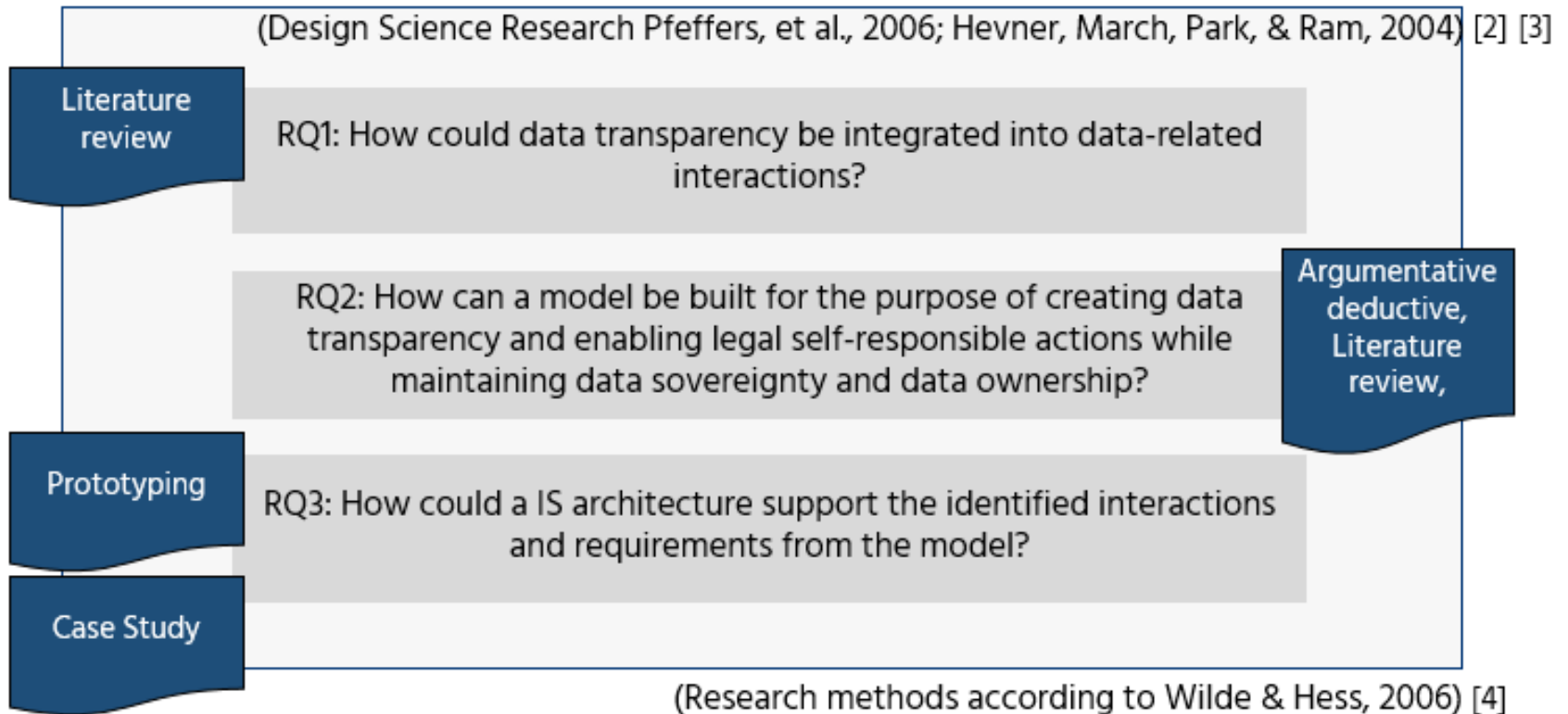


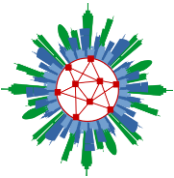
Goals and research questions

- The goal is to design a data transparency system with the following key objectives:
 - A data subject is supported and encouraged to make independent decisions regarding to his data-basis which he generates
 - On the basis of data-related interaction processes between data controller and data subjects, the participating interaction partners are provided with transparent ways of collecting, processing, using and passing on data for the purpose of traceability
 - Through the use of Data Sharing Agreements and a better interaction with the data owner, companies could simplify their Data Governance/ Data Compliance Policies



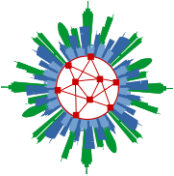
Goals and research questions





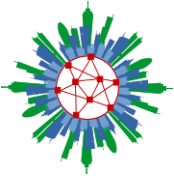
„Smart Cities are socio-technical systems that cover a wide range of different interconnected applications and require multiple technical support.“

- Through the System:
 - Connecting Data Subjects and e.g. Data Controllers
 - Communication and interaction, “Bring everything together”
 - Providing transparency of collected (personal) data use
 - Check for consent
 - Strength subject rights
 - Visualization
 - Combination of different technologies

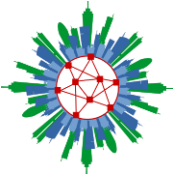


Further steps

| Step | Status |
|--|--------|
| Problem identification and Motivation | 100% |
| Objectives of a solution and Design of the model | 50% |
| Demonstration (Prototype) | 10% |
| Evaluation | 5% |
| Communication of research | 40% |
| Thesis writing | 25% |



- [1] Reinsel, D., Gantz, J., Rydning, J.: Data Age 2025: The Evolution of Data to LifeCritical. Don't Focus on Big Data; Focus on the Data That's Big. IDC White Paper (2017)
- [2] Hevner, A., March, S., Park, J., Ram, S.: Design Science in Information Systems Research. MIS Quarterly: Jg. 28 Nr.1, S. 75-105 (2004)
- [3] Pfeffers, K., Gengler, T., Ross, C., Hui, W., Virtanen, V., Bragge, J.: The DesignScience Research Process: A Model For Producing and Presenting Information Systems. In: Proceedings of DESRIST. Claremont (2006)
- [4] Wilde, T., & Hess, T. (30. April 2007). Forschungsmethoden der Wirtschaftsinformatik - Eine empirische Untersuchung.
- [5] Plath, K.U., Becker, T., Von Braunmühl, A., Frey, A.M., Grages, J.M.: BDSG/DSGVO: Kommentar zum BDSG und zur DSGVO sowie den Datenschutzbestimmungen von TMG und TKG. Otto Schmidt Verlag, Köln (2018)
- [6] Abdolhassan, F.: Was treibt die Digitalisierung? Warum an der Cloud kein Weg vorbei führt. Springer Fachmedien (2016)
- [7] REGULATION (EU) 2016/ 679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 27 April 2016 - on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/ 46/ EC (General Data Protection Regulation)



- [8] S. Kirrane u. a., „A Scalable Consent, Transparency and Compliance Architecture“, in *The Semantic Web: ESWC 2018 Satellite Events*, Bd. 11155, A. Gangemi, A. L. Gentile, A. G. Nuzzolese, S. Rudolph, M. Maleshkova, H. Paulheim, J. Z. Pan, und M. Alam, Hrsg. Cham: Springer International Publishing, 2018, S. 131–136.
- [9] J. Tapsell, R. N. Akram, und K. Markantonakis, „Consumer Centric Data Control, Tracking and Transparency – A Position Paper“, ArXiv180504747 Cs, Mai 2018
- [10] E. Mougiakou und M. Virvou, „Based on GDPR privacy in UML: Case of e-learning program“, in *2017 8th International Conference on Information, Intelligence, Systems & Applications (IISA)*, Larnaca, 2017, S. 1–8.
- [11] M. Baezner und P. Robin, „Cyber Sovereignty and Data Sovereignty“, ETH Zurich, 2018
- [12] Wittpahl, V.: *Digitale Souveränität: Bürger, Unternehmen, Staat*. Springer-Vieweg-Verlag, Berlin, 2017
- [13] Cato, P. (2016). *Einflüsse auf den Implementierungserfolg von Big Data Systemen (Dissertation)*.
- [14] Krippendorff, K. (2004), *Reliability in Content Analysis*. *Human Communication Research*, 30: 411-433.
- [15] R. Matulevicius, (2018) „Privacy Enhanced Secure Tropos: A Privacy Modeling Language for GDPR Compliance“



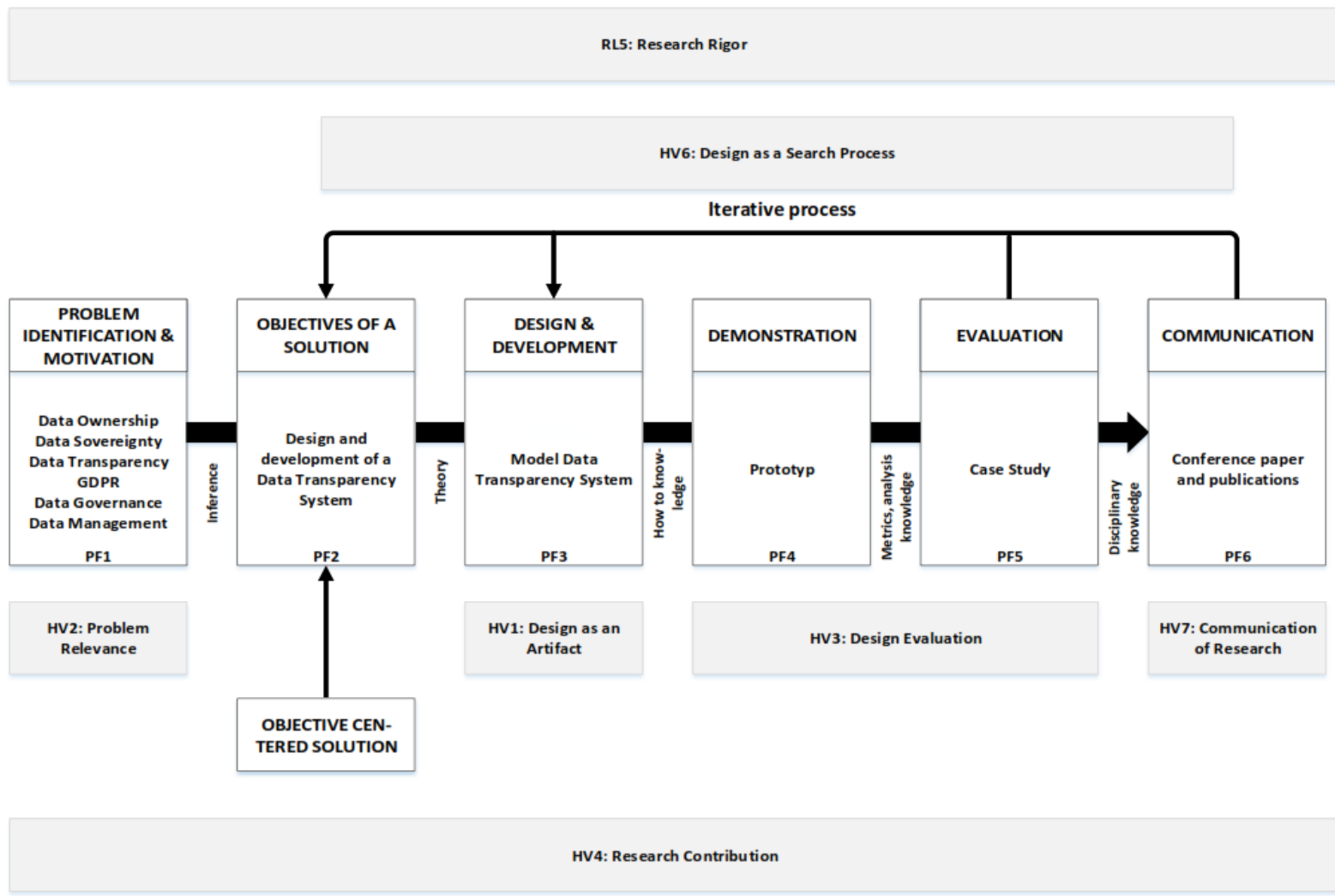
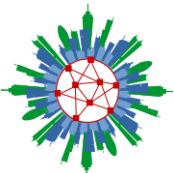
M.Sc. Christian Janßen

University of Oldenburg

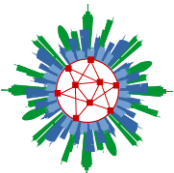
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26129 Oldenburg

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<https://uol.de/vlba/personen/mitarbeiterinnen/christian-janssen>



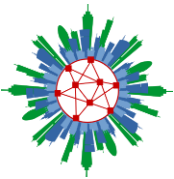
PF1-6 = Process steps regarding to Pfeffers et al. HV1-6 = Guidelines regarding to Hevner et al.



Text analysis of the GDPR

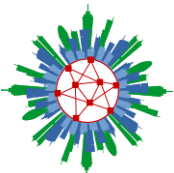
- MAXQDA (MAXDictio)
- Approach according to Krippendorff [14]

| Article | Title | Relations |
|---|--|----------------|
| Transparency | | |
| <i>Ex ante specific Transparency</i> | | |
| 13 | Information to be provided where personal data are collected from the data subject | DC→DS |
| 14 | Information to be provided where personal data have not been obtained from the data subject | DC→DS |
| <i>Ex post specific Transparency</i> | | |
| 15 | Rights of access by the data subject | DS→DC |
| <i>Transparency in general</i> | | |
| 12 | Transparent information, communication and modalities for the exercise of the rights of the data subject | DC→DS |
| 19 | Notification and obligation regarding rectification or erasure of personal data or restriction of processing | DS DC |
| 5 (1)a. | Principles relation to processing of personal data | Aggregation DC |
| 21 (4) | Clear and separately presentation of informations | DS DC |
| 25 | Data protection by design and default | Aggregation DC |
| 30 | Records of processing activities | Aggregation DC |
| 32 | Security of processing | Aggregation DC |
| 33 | Notification of a personal data breach to the supervisory authority | DC→SA |
| 34 | Communication of a personal data breach to the data subject | DC→DS |
| 40 | Codes of conduct | Aggregation DC |
| 42 | Certification | Aggregation DC |
| <i>Recitals with focus on Transparency</i> | | |
| | 32,39, 42, 58, 60,61,63,74,78, 84,85,86,87,90,91,100 | Legend |
| Ownership and Sovereignty (Self-Control) | | |
| 16 | Right to rectification | DS→DC |
| 17 | Right to erasure | DS→DC |
| 18 | Right to restriction of processing | DS→DC |
| 19 | Notification and obligation regarding rectification or erasure of personal data or restriction of processing | DS DC |
| 20 | Right to data portability | DS→DC |
| 21 | Right to object | DS DC |
| 22 | Automated individual decision making include profiling | DS→DC |

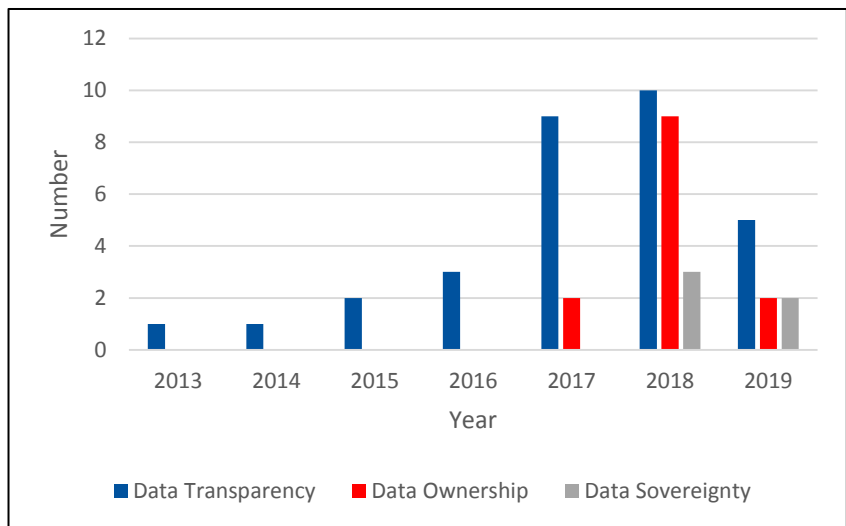


- Approach according to Cato (Webster and Watson)
- 1417 publications in total
- 62 relevant papers

| Database | Search String |
|--|--|
| 1) Google Scholar, 2) ORBIS, 3) IEEE, 4) ScienceDirect, 5) Jstore, 6) SpringerLink, 7) ACM Digital Library, 8) Web of Science | 1) GDPR AND (Data Transparency OR Data Sovereignty OR DataOwnership) 2) GDPR AND (Model OR Framework OR Architecture) AND (Interoperability or Data or Consent or Information or Provenance or Agreement) |



Structured literature review



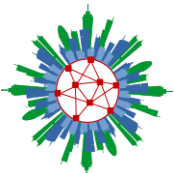
(13 papers with focus on a mixture)

➔

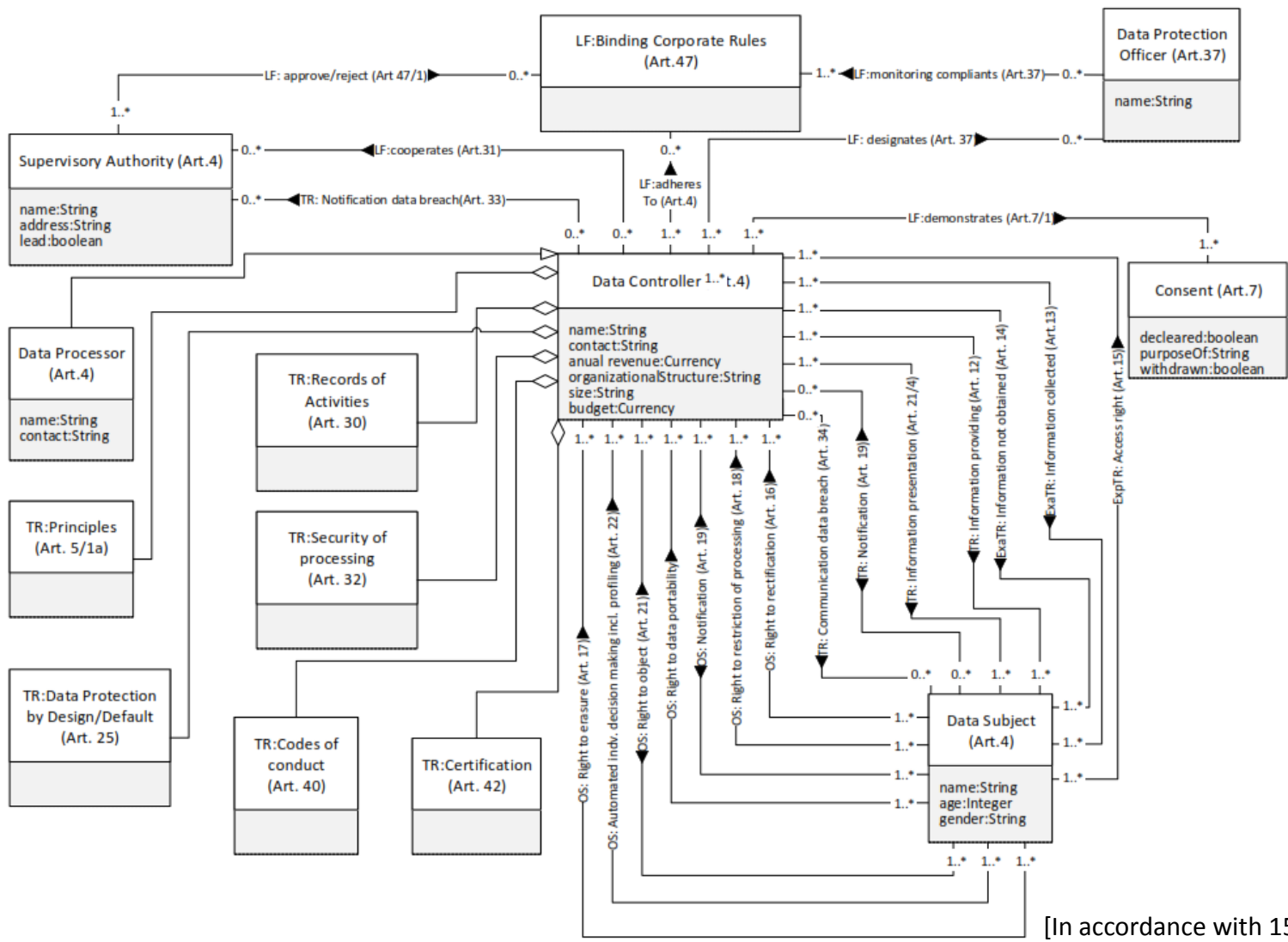
| Mentioned Solutions in the Papers | |
|-----------------------------------|-----------------------|
| Problem-based solutions | Legal-based solutions |
| 13 | 15 |

↓

| Specific problem and legal based solutions | |
|--|---|
| Architecture | 4 |
| DataFlow-Model | 3 |
| Meta Model | 3 |
| Framework | 3 |
| Blockchain | 3 |
| LPL Model and Framework | 2 |
| System | 2 |
| Consent and Data Management Model | 1 |
| FlowChart | 1 |
| Data Model | 1 |
| Design Model | 1 |
| Data Interoperability Model | 1 |
| Graph Model | 1 |
| DataLifecycle-Model | 1 |
| Knowledge-based Model | 1 |



First draft of a Meta Model



- Legend:
- LF = Legal Framework Roles and Basics
 - TR = Transparency
 - ExaTR = Ex ante Transparency
 - ExpTR = Ex post Transparency
 - OS = Ownership and Sovereignty

[In accordance with 15]