

STEFAN DEDOVIĆ

European Union Digital Integration:  
Exploring the development and  
governance of cross-border  
digital public services





**STEFAN DEDOVIĆ**

European Union Digital Integration:  
Exploring the development and governance  
of cross-border digital public services



UNIVERSITY OF TARTU

Press

Johan Skytte Institute of Political Studies, University of Tartu

Dissertation has been accepted for the commencement of the degree of Doctor of Philosophy (in Political Science) on 2 February 2026 by the Council of the Johan Skytte Institute of Political Studies.

Supervisors:       Mihkel Solvak  
Associate Professor of Technology Research  
Johan Skytte Institute of Political Studies, University of Tartu,  
Estonia.

Joep Crompvoets  
Professor of Information Management in the Public  
Public Governance Institute, KU Leuven, Belgium.

Vincent Homburg  
Associate Professor in Public Administration, Erasmus  
University of Rotterdam, the Netherlands  
Visiting Professor of E-Governance and Digital Public  
Services, Johan Skytte Institute of Political Studies,  
University of Tartu, Estonia.

Opponent:       Alex Ingrams  
Associate Professor  
Institute of Public Administration, University of Leiden, the  
Netherlands.

Commencement: 18 March 2026 at 14:30 at the Senate Hall of the University of  
Tartu.

The research work of this doctoral dissertation and the included publications were supported by ECePS ERA Chair of e-governance and digital public services, and by the mGOV4EU project funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 857622 and No. 959072, respectively. Views and opinions expressed are, however, those of the author only.



**Funded by  
the European Union**

ISSN 1736-4205 (print)  
ISBN 978-9908-57-141-6 (print)  
ISSN 2806-2558 (pdf)  
ISBN 978-9908-57-142-3 (pdf)

Copyright: Stefan Dedović, 2026

University of Tartu Press  
[www.tyk.ee](http://www.tyk.ee)

## TABLE OF CONTENTS

LIST OF ORIGINAL PUBLICATIONS .....	6
ACKNOWLEDGEMENTS .....	8
1. INTRODUCTION.....	10
2. BACKGROUND.....	17
2.1. State of the art .....	17
2.2. Macro-level: European integration in the European Union .....	20
2.3. Meso-level: The (EU) Governance Models .....	23
2.3.1. Governance models and arrangements.....	24
2.3.2. EU Governance .....	26
2.4. Micro-level: Digital governance and interoperability .....	29
2.4.1. Cross-border digital public services and maturity models .....	34
2.4.2. Interoperability .....	35
3. METHODOLOGICAL APPROACH .....	39
3.1. Methods and data .....	39
3.2. Limitations .....	45
4. MAIN FINDINGS AND DISCUSSION .....	47
4.1. Characteristics and complexities of cross-border digital public services in the EU .....	47
4.2. Governance mechanisms and arrangements .....	50
4.3. Factors affecting the sustainability and governance of interoperability solutions .....	52
4.4. Discussion and future research suggestions .....	55
5. CONCLUSION .....	61
REFERENCES.....	65
SUMMARY IN ESTONIAN .....	77
PUBLICATIONS .....	81
CURRICULUM VITAE .....	156
ELULOOKIRJELDUS.....	158

## LIST OF ORIGINAL PUBLICATIONS

This dissertation is based on the following three original publications referred to by Roman numerals:

- I. **Dedović, S.**; Homburg, V. (2024). Cross-border digital public services in the European Union: a systematic literature review. *International Journal of Electronic Governance*, 16 (1), 4–28.  
<https://doi.org/10.1504/IJEG.2024.138457>. **ETIS 1.1**
- II. Schmidt, C.; **Dedovic, S.** (2025). Sustainability and Governance of the mGov4EU Project. In: Homburg, V., Lampoltshammer, T.J., Solvak, M. (eds) *From Electronic to Mobile Government*. Springer, Cham.  
[https://doi.org/10.1007/978-3-031-64471-9\\_10](https://doi.org/10.1007/978-3-031-64471-9_10) **ETIS 3.1**
- III. **Dedović, S.**; Cromptvoets, J. (2025). Delving into the governance of cross-border interoperability solutions in the EU. *JeDEM – EJournal of Edemocracy and Open Government*, 17(2), 65–89.  
<https://doi.org/10.29379/jedem.v17i2.981> **ETIS 1.1**

Other publications in the scope of the dissertation:

- IV. Lampoltshammer, T.J., Sellung, R., **Dedovic, S.** (2025). Cross-Border Mobile Government Services: Exploring Business Model Dynamics in mGov4EU. In: Homburg, V., Lampoltshammer, T.J., Solvak, M. (eds) *From Electronic to Mobile Government*. Springer, Cham.  
[https://doi.org/10.1007/978-3-031-64471-9\\_11](https://doi.org/10.1007/978-3-031-64471-9_11) **ETIS 3.1**
- V. Krimmer, R., **Dedovic, S.**, Schmidt, C., Corici, AA. (2021). Developing Cross-border E-Governance: Exploring Interoperability and Cross-border Integration. In: Edelmann, N., et al. *Electronic Participation. ePart 2021. Lecture Notes in Computer Science*, vol 12849. Springer, Cham.  
[https://doi.org/10.1007/978-3-030-82824-0\\_9](https://doi.org/10.1007/978-3-030-82824-0_9). **ETIS 3.1**
- VI. Corici, Andreea Ancuta; Podgorelec, Blaz; Zefferer, Thomas; Hühnlein, Detlef; Cucurull, Jordi; Graux, Hans; **Dedovic, Stefan**; Romanov, Bogdan; Schmidt, Carsten; Krimmer, Robert (2022). Enhancing European Interoperability Frameworks to Leverage Mobile Cross-Border Services in Europe. *DG.O 2022: The 23rd Annual International Conference on Digital Government Research*. Association for Computing Machinery New York, NY, United States, 41–53. <https://doi.org/10.1145/3543434.3543638>. **ETIS 3.1**
- VII. Eibl, Gregor; Temple, Lucy; Sellung, Rachele; **Dedovic, Stefan**; Alishani, Art; Schmidt, Carsten; (2022). Towards a Transdisciplinary Evaluation Framework for Mobile Cross-Border Government Services. *Electronic Government: 21st IFIP WG 8.5 International Conference, EGOV 2022, Linköping, Sweden, September 6–8, 2022*. Ed. Janssen, Marijn; Csiki,

Csaba; Lindgren, Ida; Loukis, Euripidis; Melin, Ulf; Viale Pereira, Gabriela; Rodriguez Bolivar, Manuel Pedro; Tambouris, Efthimios;. Cham: Springer International Publishing, 543–562. (Lecture Notes in Computer Science; 13391). [https://doi.org/10.1007/978-3-031-15086-9\\_35](https://doi.org/10.1007/978-3-031-15086-9_35). **ETIS 3.1**

## **AUTHOR'S CONTRIBUTIONS**

- STUDY I: Lead author; contributed to Conceptualisation, Methodology, Data Collection, Data Analysis, Writing, and Revisions.
- STUDY II: Co-lead author; supported the lead author and contributed to Conceptualisation, Data Collection, and Writing and Revisions.
- STUDY III: Lead author; contributed to Conceptualisation, Methodology, Data Collection, Data Analysis, Writing, and Revisions.
- STUDY IV: Co-author; supported co-authors by contributing to Conceptualisation, Data collection, Data analysis, and Writing.
- STUDY V: Co-lead author; contributed to Conceptualisation, Methodology, Data Collection, Data Analysis, Writing, and Revisions.
- STUDY VI: Co-author; contributed to Data Analysis and Writing, specifically the IVoting Use-Case and Sustainability Aspects sections
- STUDY VII: Co-author: Contributed to Data Analysis, Writing, specifically contributed to the Introduction and Practical Background sections

## ACKNOWLEDGEMENTS

I would like to invite the reader to spend a few minutes reading these acknowledgements and learning about the people who encouraged, supported, and inspired me enormously during my doctoral studies and beyond, and without whom I wouldn't have achieved my goals.

I will start with my supervisor Professor Mihkel Solvak, whose support, scientific guidance and generous sharing of expertise have been essential throughout my doctoral journey, from the first day to this final stage. From the very beginning, he believed in my work and encouraged me to keep going, even when the direction was not yet fully clear. His mentorship helped me strengthen this doctoral dissertation through detailed feedback and many substantive discussions. Beyond the academic work, he also supported me in important personal decisions along the way, which made a real difference during demanding periods. I am deeply grateful for the long exchanges on various topics and for his significant support, guidance, and consistent mentorship, without which this dissertation would not have been possible.

I would also like to thank Professor Vincent Homburg for sharing his valuable scholarly rigour, vast knowledge, and expertise in public administration and e-governance with me. His advice consistently helped me think more clearly, be more precise in my arguments, and improve the overall quality of my work. My research and analytical thinking have been significantly improved thanks to his guidance, especially through the way he challenged me to sharpen my reasoning and strengthen how I present and justify my reasoning. I am sincerely grateful for our extensive exchanges on key topics and for his valuable intellectual contributions as a supervisor and co-author.

I would like to express my sincere gratitude to Professor Joep Crompvoets for his long-standing guidance and support throughout my academic, professional, and personal development. Having known him since 2019 and having had him supervise my master's thesis, his role in my academic and professional career has been truly indispensable. He introduced me to his network and involved me in numerous projects that strengthened my expertise and shaped my path. Scientifically, his vast knowledge on e-governance and interoperability, together with his practical methodological guidance, helped me stay focused on what matters and improved this dissertation. Also, the long exchanges we had about work, life, and especially sports are something I truly value, and above all, I thank him for sharing his passion for the champions – Royal Union Saint-Gilloise – *Allez l'Union!*

I would also like to thank Dr Robert Krimmer, who entrusted me with the initial opportunity to begin this doctoral journey, inspired me to select this relevant topic, and laid a solid foundation for my research from the outset. I would like to say special thanks to Carsten Schmidt for being the key person who encouraged me to begin this doctoral journey. I am also grateful for our numerous

exchanges on cross-border digital public services and for his contribution as a co-author on several publications that strengthened this dissertation.

I would like to thank my colleagues from the Johan Skytte Institute at the University of Tartu and the Public Governance Institute at KU Leuven. I want to thank my friends and colleagues, Art Alishani, Kerli Klock, Logan Charmichael, Bogdan Romanov, Biao He, Peeter Leets, Salina Castle, Stefano Braghiroli, Anna Beitane, Varje Kuut, and David Duenas-Cid, whose support, friendship and continuous feedback on my doctoral research were invaluable during my years in Estonia. I would also like to express my special thanks to my colleagues at the Public Governance Institute at KU Leuven, with whom I had many valuable exchanges on various matters and who contributed to my work through their insights, discussions, and support.

I am equally grateful to my co-authors and project partners in the mGov4EU project, as well as to all interviewees, for the fruitful collaborations and meaningful exchanges that enriched this dissertation. Additionally, I would like to express my deep gratitude to my friends Vuk Vuković, Thomas Balbach, Matthias Keller, Colin van Noordt, and Stanislav Mahula. Their consistent support throughout my doctoral studies, especially their willingness to read my work, offer thoughtful comments, and challenge my ideas, played a crucial role in shaping this dissertation.

I would also like to thank my friends from all around the world for their support and encouragement during this doctoral journey. I equally thank, at the risk of forgetting someone, Petar Lečić, Filip Blagojević, Nikola Koprivica, Ilija Jovančević, Božidar Miković, Aleksandar Dragović, Boško Golubović, Veljko Branović, Igor Škiljević, Nikola Dobrota, Stefan Konstantinović, Miloš Rakić, Đorđe Tomašević, Vladimir Zdravković, Aleksandar Polovina, Katarina Manojlović, Maria Claudia Bodino, Pablo Hartill Montalvo, Nia Chigogidze, Grace Milne, Charlene Hinton, Juliette Dumas, Lukas Volkmer and Viktor De Naeyer.

At the end, I dedicate this dissertation to my family, to my father, Slavoljub Dedović, who sadly is no longer with us, and who instilled the values and strength that have guided me throughout my life, and to my mother, Ilinka Dedović, whose unconditional love and support have carried me through every step of this journey and beyond, without whom this achievement would not have been possible. This dedication also extends to my sister Ljubica, my brother Božidar, my sister-in-law Aleksandra, and my favourite nephew, Tadija, whose constant love and support have been a real source of strength throughout this journey. Finally, I dedicate this dissertation to my wife Fidan, whose love, support, and steady encouragement carried me through every stage of this doctoral journey. Her belief in me never wavered, from the first idea to the final submission, and in many ways, this dissertation belongs to her as well.

# 1. INTRODUCTION

*“When Belgian-based multinational Umicore ships rubbish within the European Union, it has to send through the authorisation documents via a fax machine in one EU country and ensure signatures are in blue ink instead of black in another.”* (Hancock & Moens, 2025). While the ambitions of the European Union (EU) aim to guarantee the free movement of services across its internal borders, citizens and businesses continue to encounter substantial hurdles when operating in more than one Member State. As highlighted by the quote above, the contrast between managing business activities domestically and navigating cross-border processes within the EU exposes persistent difficulties. Citizens also face similar challenges when interacting with public services across borders. For example, despite Estonia’s advanced digital health system, an Estonian traveller cannot obtain prescribed medicine at a local pharmacy in Hungary using a digital prescription issued in Estonia, and vice versa. This illustrates the persistent limitations in cross-border digital public services within the EU, where nationally valid digital solutions often cannot be used beyond national borders. The ongoing inconsistency underscores that, among the four fundamental freedoms, the freedom to provide services remains the least developed within the broader context of European integration (Egan, 2020). These challenges not only complicate daily life and business operations but also reveal the enduring complexities of realising seamless cross-border services through digital solutions in practice.

While the aim for free movement of services within the EU began in 1957, the establishment of the four fundamental freedoms, the free movement of capital, goods, people, and services (Harcourt & Radaelli, 2023), became a reality with the European Single Market in 1993. These fundamental freedoms are widely considered among the greatest achievements of European integration (Egan, 2020; Pelkmans, 2016). Often described as the EU’s “core business” (Pelkmans, 2016) and a cornerstone of European integration (Harcourt & Radaelli, 2023), the EU single market has delivered significant benefits. These benefits include increased economic growth, job creation, and enhanced access to goods and services (European Commission, 2023). Alongside the benefits of the EU Single Market initiatives, the Member States have relied upon the new role of information and communication technology (ICT). ICT has become increasingly significant for businesses and citizens, seeing an increase in adoption for business and government processes (Dunleavy, 2006; Tan & Cromptvoets, 2022), highlighting its transformative potential and the benefits it promises. These benefits include enhanced infrastructures, processes, and services through improved efficiency, effectiveness, and cost savings in both time and finances, which are especially emphasised in the public sector (see Bekkers and Homburg, 2007). Thus, public administrations in recent decades have increasingly leveraged ICT to improve the processes, services, and infrastructures (Tan & Cromptvoets, 2022).

The development of the European Single Market and the digital transformation of public government services have unfolded in parallel with ongoing European integration. The notion has been put forward that policy spillovers and shared governance have progressively enhanced collaboration among Member States, indicating a trend of increasing integration within the EU through these processes (Nicoli, 2020; Ramiro Troitiño, 2022). At the same time, governments have made notable progress in expanding and improving their national digital public services, as evidenced by various benchmarking efforts, such as the EU benchmarks (Capgemini et al., 2025). Research has played an important role in explaining these trends, especially when it comes to understanding the political dynamics of pooling sovereignty (Deleixhe & Duez, 2021), the factors driving the success of national digital service initiatives (Escobar et al., 2022), and the challenges that come with them (Charalabidis et al., 2022). However, the relationship between these two processes, European integration and the advancement of digital public services, remains underexplored (Ramiro Troitiño, 2024), particularly in terms of how cross-border digital public services are developed and governed within the EU.

In this doctoral dissertation, cross-border digital public services are understood as the provision of digital public services to users across the EU. This implies that users (citizens, businesses, or a public administrations) from Member State A can interact digitally with a national service in Member State B and obtain a legally valid service outcome. The legally valid outcome here refers to enrolment or registration as a student in a higher education institution, registration or change of residence, vehicle registration, or the exchange of a driver's license, rather than merely providing digital access to information or online forms. Cross-border digital public services, therefore, aim to enable seamless access to and use of public services across national borders, regardless of the user's country of origin. This understanding is consistent with the EU legal framework, in particular the Interoperable Europe Act (2024) which defines cross-border (trans-European) digital public services as *“digital services provided by Union entities or public sector bodies to one another or to natural or legal persons in the Union, and requiring interaction across Member State borders, among Union entities or between Union entities and public sector bodies, by means of their network and information systems”* (p. 11).

The significance and impact of cross-border digital public services within the Union is becoming increasingly evident, contributing to overall economic growth and job creation (Campmas et al., 2022; Fritsch & Bartenrath, 2019). Approximately 10 million jobs, about 5% of all employment within the EU, depend on cross-border services, a notable increase since the early 2000s (Fritsch & Bartenrath, 2019). Recent data indicates that, as of April 2024, around 1.8 million workers were regularly commuting across EU or EFTA borders for employment, while by early 2025 nearly 10 million working-age citizens (aged 20–64) were living in another EU or EFTA country for work purposes (Capgemini et al., 2025; European Commission. Directorate General for Communications Networks, Content and Technology. et al., 2024a). Moreover,

close to 150 million people, almost 30% of the EU's population, reside in internal border regions and are potential beneficiaries of improved integration (Halmos, 2018). Despite longstanding recognition of the need to develop cross-border digital public services, current data and the latest digital government benchmarks in the EU indicate that these services are still significantly lacking compared to national digital service delivery (Capgemini et al., 2025). Cross-border digital public services continue to lag behind in terms of maturity, coverage, and user experience compared to national digital public services (Capgemini et al., 2025). For example, digital public service delivery within countries like Estonia and Denmark now exceeds 99%, while cross-border digital public service provision remains around 50% (Capgemini et al., 2025).

In alignment with these developments, over the past decades, EU public administrations have made significant strides in digitalising their operations and transforming national service delivery within and across EU countries (Campmas et al., 2022; Criado, 2012). Although the goal to utilise ICT within the single market dates back to 1994 (Bangemann Group, 1994), the EU has prioritised the Digital Single Market (DSM) strategy over the past decade (Savrul, 2023). This strategy serves as an essential extension of the broader Single Market programme (Harcourt & Radaelli, 2023). The DSM envisions a digital landscape where information, services, and procedures can be exchanged seamlessly across borders, regardless of a user's physical location or country of residence (Cini & Czulno, 2022; Schmidt & Krimmer, 2022). Significant financial investments have been made to realise the DSM, including the recent Digital Europe Programme, which has allocated, at the time of writing, €7.59 billion, with €1.3 billion specifically allocated to improve the efficiency of public administration (Commission, 2025), and the programme's critical element is the advancement of cross-border digital public services (Schmidt & Krimmer, 2022).

Furthermore, the need for cross-border digital public services became more pronounced in 2020, in the context of the COVID-19 pandemic. The pandemic prompted governments around the world, including those in the EU, to implement strict measures to mitigate the health crisis, such as lockdowns and curfews, which disrupted public services within the EU (Alvarez-Rodriguez et al., 2021). The pandemic significantly impacted the mobility and operations of citizens and businesses across borders within the EU. As a result, many EU citizens faced challenges carrying out their usual activities across different Member States, while the requirement for physical presence and the need for certified paper documents made it difficult for them to access public services while operating internationally. Throughout the COVID-19 pandemic, it became evident that the goals for providing cross-border digital public services had not yet been met (Alonso et al., 2020). In particular, it was evident that digital public services were highly beneficial for citizens and businesses operating solely within their national contexts, and that the use of digital public services across national borders showed certain complexities and challenges (Alvarez-Rodriguez et al., 2021).

The methodologies used to measure the prevalence and functionality of cross-border digital public services in the EU remain somewhat limited. For example,

current EU digital government benchmarks often assess such services by checking whether information is available in a foreign language (such as English) or if users can authenticate with their national ID on a service provider's platform in another country, as required by the eIDAS 2014 regulation (European Commission. Directorate General for Communications Networks, Content and Technology. et al., 2024b). However, while these criteria may serve as useful indicators, they do not necessarily guarantee that citizens or businesses can fully complete procedures and receive services, such as obtaining an official certificate or accessing a public service, across borders. This operational gap illustrates the intricate reality of developing cross-border digital public services. The complexity arises not only from the technical requirements but also from the involvement of multiple actors across different jurisdictions (Velicogna et al., 2020). Typically, a public authority in Country A acts as the primary data provider, supplying information that should be reliably transferred and interpreted by a service provider or government agency in Country B. If these entities are unable to seamlessly exchange, understand, and use the data they exchange, the digital service cannot be delivered to those who use it, whether they are citizens, businesses, or administrations within the EU. The challenge lies not only in achieving technical objectives but also in establishing effective governance arrangements and cooperation between national administrations. This underscores the need for a more nuanced approach to the governance of cross-border digital public services, one that acknowledges the full spectrum of technical, organisational, semantic, and legal interdependencies required to make such services operational and meaningful in practice.

Consequently, developing and governing cross-border digital public services is potentially more complex than national-level initiatives, requiring the establishment of multiple conditions and frameworks, as well as effective coordination across all EU administrations, which has yet to be accomplished.

While existing research has made significant contributions to understanding the technical developments for cross-border digital public services (e.g., Sadeghi et al., 2024; Schwalm and Alamillo-Domingo, 2022), the non-technical aspects, particularly the governance of these efforts, remain challenging and are often understudied (Velicogna et al., 2020). Although significant investments are made towards technological solutions, simply developing solutions or adopting legal instruments does not necessarily mean success in delivering digital public services across borders (Velicogna et al., 2020). Research on digital era governance has extensively analysed the transformation of public services in national contexts (Charalabidis et al., 2022; Ravšelj et al., 2022), but it rarely addresses the unique complexities of cross-border digital service provision or the institutional characteristics of supranational governance (Dawes et al., 2009). Instead, governance of those solutions remains a primary concern and a crucial determinant (Klievink et al., 2012; Velicogna et al., 2020). Furthermore, the governance aspect aside, the sustainability of cross-border digital public services and interoperability solutions remains largely unexplored. Sustainability is a crucial aspect of digital governance (Larsson & Grönlund, 2014), as many

transformation projects often fail (Van Cauter, 2016). Sustainability contains numerous definitions (Larsson & Grönlund, 2014), and research often focuses on the relation with the maturity of the digital government initiatives (Feleke & Lessa, 2024). Larsson and Grönlund (2014) provide a synthesis of the digital governance research discussion on sustainability. However, they argue that sustainability cannot be achieved once and for all; rather, it is a dynamic process that adapts to ongoing changes across four dimensions: social, economic, environmental, and technological. Therefore, sustainability is defined here as the future-oriented capacity of infrastructures and services to sustain operations and adapt to fundamental challenges in social, economic, environmental, and technological contexts. In this dissertation, sustainability refers to the preservation of the development of cross-border digital public services amid ongoing challenges in complex political, economic, environmental, and technological contexts. Moreover, since interoperability solutions and infrastructures are essential for cross-border digital public services, their economic aspects, such as dependence on government funding, and socio-technical aspects, including standards and architectural decisions, are crucial for ensuring the continued operation of these services in the future.

Scholars argue that governance arrangements, the structured governance frameworks that outline how organisations define actors' roles and responsibilities, coordinate their activities, manage resources, and achieve objectives, are fundamental prerequisites for the success of complex, networked public service ecosystems (Gil-Garcia et al., 2019; Pardo et al., 2012), such as in the case of cross-border digital public services. It is particularly relevant in supranational contexts, where cross-border digital public services are not merely a technical problem but involve contextual differences that influence information sharing and collaboration (Dawes et al., 2012). More specifically, in the EU context, this refers to the existing political dynamics of the relationships between the supranational entities and national sovereign states, which are characterised by their multi-level nature. Although the EU has made considerable strides in lowering border barriers and enabling the seamless movement of goods and capital, significant obstacles persist in the provision of services (Egan, 2020), particularly in the digital domain (Mărcuț, 2020; Troitiño et al., 2024). This can potentially be seen as contradictory, given that digital services inherently do not have physical borders, yet barriers still exist between these nations in the digital realm. Cross-border digital public services represent the pinnacle of EU integration, as they effectively federalise the access to and delivery of a national public service across the whole EU. This federalisation goes beyond merely enabling technical capacities to exchange data or permitting the legal use of the service; it involves a joint governance of digital public services that needs to be better understood to grasp the characteristics and complexities of why such services are not being developed and implemented on a larger scale, and why their governance and development are so challenging.

At the heart of this challenge lies a critical and underexplored research gap: it is not merely technological capacity or legal frameworks that determine the

success of cross-border digital public services, but the complex web of governance arrangements, the interplay of diverse actors, and the factors that facilitate or hinder service delivery among them. Understanding who governs, how decision-making and ownership are shared, and the ways in which national public authorities and supranational bodies interact is essential for advancing European integration in the digital era. The sustainability of cross-border digital public services depends fundamentally on these governance arrangements, yet the literature remains fragmented, and the practical realities are insufficiently mapped (Schmidt & Krimmer, 2022). The investigation into the governance and sustainability of cross-border digital public services, particularly regarding specific governance approaches across the EU, remains largely unresolved.

Accordingly, the primary objective of this dissertation is to enhance the understanding of the development and governance of cross-border digital public services within the supranational context, specifically the EU. More specifically, this dissertation seeks to address the identified research gap by advancing understanding of the multifaceted characteristics, inherent complexities, and governance dimensions of the development and sustainability of cross-border digital public services in the EU context.

This dissertation is based on the following publications: A systematic synthesis of the literature on cross-border digital public services (STUDY I); The governance and sustainability of interoperability solutions development (STUDY II); An investigation of the governance arrangements employed (STUDY III). Furthermore, the findings of this dissertation are supported by the author's additional publications (STUDY IV, V, VI, VII). While these additional studies are not integral to the dissertation itself, they provide valuable supporting arguments for the findings presented.

This dissertation investigates the following research questions:

**How are cross-border digital public services in the European Union developed, governed, and shaped, given their inherent complexities and multifaceted characteristics?**

RQ1.1: What are the characteristics and complexities of cross-border digital public services development and implementation in the EU?

RQ1.2: What governance mechanisms and arrangements are adopted concerning cross-border digital public services?

RQ1.3: What factors affect the sustainability and governance of newly developed interoperability solutions?

The originality and novelty of this dissertation lie in its integrated approach to understanding the complexities and characteristics of cross-border digital public services, as well as their governance and sustainability within the EU. Unlike previous studies that often examine technical, organisational, or governance

aspects in isolation and within national, local, and regional contexts, this research synthesises thematic insights from the literature (STUDY I), through direct engagement in the interoperability of solutions development (STUDY II), with empirical observations from a targeted analysis of cross-border interoperability solutions (STUDY III).

Study I adopts a thematic synthesis approach, utilising the PRISMA methodology to systematically investigate analytical themes and future research gaps within the body of scientific knowledge on cross-border digital public services. It identifies key themes that explain the characteristics, challenges, and dynamics of the development and governance of cross-border digital public services in the EU. The study also suggests areas for future research that could further clarify these complexities.

Study II employs an action research methodology, in which the author was actively engaged in a digital government research project focused on developing interoperability solutions for cross-border digital public services within the EU. This research integrated various requirements stemming from EU regulations, such as eIDAS and the Once-Only Technical System (OOTS). Notably, the author was not directly involved in the technical development of the solution, his primary contribution centred on examining the governance and sustainability factors associated with developing a new interoperability solution for cross-border digital public services within the EU. Study II examines the requirements for the sustainable governance of interoperability solutions. It highlights the key factors related to legal frameworks, stakeholder engagement, and the development of effective governance models, all of which are crucial for achieving sustainability.

Study III utilises a qualitative case study research design, analysing three cases of interoperability solution governance arrangements, thereby improving the understanding of governance arrangements for cross-border digital public services in the EU. Moreover, Study III addresses a notable gap in the research concerning how these solutions are governed within the supranational context. To achieve this the study employs a multi-case study approach, specifically examining the European Car and Driving Licence Information System (EUCARIS), the Once-Only Technical System (OOTS), and the Pan-European Public Procurement Online (Peppol), to determine the governance structures that are employed and to understand the influence of the EU's broader regulatory and political framework on these structures.

## **2. BACKGROUND**

This section provides a theoretical and policy background for the dissertation. Cross-border digital public services represent a phenomenon that requires transdisciplinary approaches (see STUDY VII). As a result, there is no single theoretical framework that can fully capture the complexities involved in the development of cross-border digital public services within the EU.

The objective is not to consolidate various theoretical frameworks into a singular approach or analytical framework for exploring the development and governance of cross-border digital public services in the EU. Rather, it is valuable to acknowledge that each of these theoretical explanations possesses distinct value, and their application can facilitate understanding of the characteristics, complexities, and arrangements of the development and governance of cross-border digital public services at an abstract level. Consequently, the theoretical underpinnings of this dissertation lie within a multi-layered approach to analysis, encompassing macro- (European integration), meso- (European governance), and micro-level (Digital governance and interoperability) theoretical explanations.

This section begins by examining the current landscape of policies and regulatory developments concerning cross-border digital public services. Its objective is to provide readers with a clearer understanding of the context and frameworks that shape cross-border digital public services in the EU. This section subsequently introduces the three macro-level theories of European integration. As cross-border digital public services operate within a framework of political and policy integration dynamics, these theories offer valuable insights, albeit with some limitations, into the potential political dynamics shaping their development. The meso-level explanations focus on the models of EU governance employed within the governance arrangements related to the implementation of specific policies and services in the EU. Moreover, this section delves into micro-level explanations of digital governance and interoperability, presenting different perspectives on the complexities of managing digital services. It underscores significant existing research on interoperability and information exchange.

### **2.1. State of the art**

Over the past decades, the European Union has prioritised the development of cross-border digital public services and interoperability as a cornerstone of its digital government strategy (Campmas et al., 2022; Criado, 2012; Peristeras et al., 2007). This ambition has been pursued through a combination of political commitments, legal instruments, and dedicated funding mechanisms. Since the early 1990s, the EU has launched several programmes to enhance the interconnection of public sector information systems and to enable data exchange, called interoperability, which is a crucial requirement for cross-border digital public services (Kalvet et al., 2018). Notably, the Interoperability Solutions for

European Public Administrations (ISA and ISA<sup>2</sup>) programmes and the ongoing Interoperable Europe initiative have focused on supporting the establishment of data exchange across Member States (Campmas et al., 2022). Complementing these efforts, the Connecting Europe Facility has supported the development and deployment of key digital building blocks, including eDelivery, eIdentification, and eInvoicing, which serve as foundational interoperability enablers for cross-border services (STUDY V). Politically, cross-border digital public services and interoperability have been endorsed at the highest levels as a strategic priority. Declarations such as the Tallinn Declaration on eGovernment (2017) and the Berlin Declaration on Digital Society (2020) have reaffirmed the collective commitment of EU Member States to strengthen cooperation and interoperability in delivering seamless digital public services. In parallel, the EU has adopted several horizontal and sectoral regulatory instruments that legally mandate or facilitate cross-border digital public services and the interoperability thereof. Among the most significant are the Interoperable Europe Act (Regulation 2024/903), the Single Digital Gateway Regulation (EU) 2018/1724, the revised eIDAS Regulation (EU) 2024/1183, the Data Governance Act (Regulation (EU) 2022/868), and the Data Act (Regulation (EU) 2023/2854), which together aim to institutionalise interoperability and provide legal certainty for the provision of cross-border digital public services. In recent years, the EU strategy has primarily focused on establishing better data accessibility and reuse across the EU for public and private purposes, with a particular emphasis on developing the Common European Data Spaces (*Common European Data Spaces | Shaping Europe's Digital Future*, n.d.).

In the context of cross-border digital public services, the most notable legal framework is the Interoperable Europe Act (Regulation (EU) 2024/903), which specifically aims to establish interoperability conditions and thereby improve the development and adoption of such services. The IEA (2024/903) establishes a framework through several key mechanisms, inter alia, a new governance structure, mandatory interoperability assessments, and the sharing and reuse of common cross-border interoperability solutions (CBIS). The new governance structure has been developed through establishing the Interoperable Europe Board, comprising high-level national representatives and led by the European Commission. The role of the Board is to drive and guide the further development of interoperability, including the European Interoperability Framework (EIF) and other CBIS. Another mechanism aimed at supporting the development and governance of cross-border interoperability is the mandatory interoperability assessment. This mechanism requires that any new or amended binding requirement in laws, regulations, administrative provisions, contracts, tenders, or other official documents undergo the process of interoperability assessments. These interoperability assessments aim to identify and evaluate any effects of planned requirements for cross-border digital public services. Additionally, the act also promotes the sharing and reuse of CBIS, enabling national representatives to leverage existing interoperability solutions.

While these political, legal, and financial instruments lay the foundation for fostering cross-border data exchange, they need to be supported by the existing technical infrastructure that enables it, namely CBIS. CBIS are the standards-based information systems that are shared among members to enable interoperability across national boundaries (Cavaye, 1997). These solutions are an integral part of the cross-border digital public services, as their usage enables services to be delivered across borders. For example, the Schengen Information Systems (SIS) in the area of security and border control represent the CBIS, which allow police and border control to exchange data and alerts between police, border, and judicial authorities across the EU (*Schengen Information System – European Commission*, n.d.). Similarly, in the area of transport and mobility, the European Car and Driving Licence Information System (EUCARIS) facilitates real-time data exchange related to traffic offences, vehicle registration, and driver licensing among national authorities (*EUCARIS – EUCARIS Is the European CAR and Driving License Information System.*, n.d.). Another example, in the general public administration area, is the Once-Only Technical System (OOTS), which enables public administrations to reuse data already collected in one Member State for administrative procedures in another, introduced under the Single Digital Gateway Regulation (*About OOTS – OOTSHUB –*, n.d.). These solutions are built primarily to enable technical interconnection between diverse information systems within Member States, as the digital transformation evolution has been different between the Member States in the EU (Janowski, 2015).

Cross-border digital public services are being implemented across various public sector domains, including healthcare, public safety, education, and environmental protection. For citizens, one example in healthcare is the availability of cross-border digital public services, which allow individuals to access electronic prescriptions and medical records while travelling, working, or residing in another EU country (European Commission, 2025). From an administrative standpoint, in the public safety domain, these services facilitate the online exchange of information regarding speeding violations and traffic rule infringements in different countries (*EUCARIS – EUCARIS Is the European CAR and Driving License Information System.*, n.d.). From a business perspective, these services enable companies to digitally establish, operate, and provide services in countries other than where they were originally founded (Graux, 2021), by interconnecting business registries beyond national borders for accessing information on companies in a cross-border context (*Business Register Interconnection System (BRIS)*, n.d.).

## 2.2. Macro-level: European integration in the European Union

European integration theories examine the process of integration within the framework of the European Union, focusing on the distribution of political power and the roles of Member States and European institutions, as well as how policy domains become integrated. This section does not intend to provide a comprehensive analysis of these theories; instead, it presents a brief overview of how the key theories of European integration may or may not support the understanding of the development and governance of cross-border digital public services in the EU.

The first school of thought explaining European integration is neofunctionalism, introduced in 1958 (Haas, 2004). Neofunctionalism perceives the state as an aggregation of diverse actors, conceptualised as a platform where various societal actors pursue their interests (Hooghe & Marks, 2019). A central argument of neofunctionalism is that the integration process is driven by mutually reinforcing mechanisms. These mechanisms include policy spillover effects, an increased dependence on non-state actors for implementation, stronger citizen attachments to supranational institutions, and the intensified exploitation of developed interdependences (Hooghe & Marks, 2019). National actors often delegate authority to the EU level to bypass domestic opposition related to the loss of national sovereignty, which is necessary for opening up national markets (T. A. Börzel & Risse, 2018). At the same time, supranational actors play a crucial role as policy entrepreneurs by facilitating policy spillovers. They do this by brokering agreements and engaging national bureaucrats as well as leaders of interest groups (Hooghe & Marks, 2019). Neofunctionalists generally anticipate continuous progress in the integration process (Haas, 2004), positing that the integration of policies in one area can lead to spillovers into other areas. This dynamic occurs either by creating new opportunities for cooperation or by generating new challenges that necessitate further integration and interdependence (Hooghe & Marks, 2019). Consequently, the neofunctionalist theory offers a framework for comprehending the integration process by positing assumptions that facilitate the eventual convergence of policies, alongside recognising the significant role of supranational institutions as policy architects. Recently, most researchers utilise neofunctionalist theory in contexts that are particularly affected by acute crises, elucidating more integration or disintegration dynamics during periods of turmoil, such as financial or migration crises (Börzel and Risse, 2018; Nicoli, 2020; Vilpišauskas, 2013).

The second school of thought on European integration is intergovernmentalism, which emerged as a response to the limitations of neofunctionalism, such as overemphasis on supranational organisations and the deterministic role of spillover mechanisms (Köpping Athanasopoulos, 2020). Intergovernmentalism posits that European integration is the result of cooperation and competition among sovereign states that act as rational actors, guided by principles of hierarchy and authority (Saurugger, 2023). This theory suggests that when national interests conflict with international interests, national interests will prevail (Hooghe &

Marks, 2019), thereby preserving the sovereignty of nation states (Hooghe & Marks, 2019). Intergovernmentalism explains European integration as a series of intergovernmental bargains shaped by the constellations of state preferences and power dynamics (Schimmelfennig, 2019). According to this perspective, outcomes are functional responses to cooperation challenges, leading to the pooling of authority towards supranational institutions, but only to the extent that it serves national interests. The typical result of intergovernmental bargaining is the lowest common denominator, with the level of integration varying depending on the nature of the cooperation issue (Hooghe & Marks, 2019). Bickerton (2015) introduces new intergovernmentalism as a result of the post-Maastricht treaty era, which emphasises the strategic role of the supranational institution of the European Commission and the development of the new delegated authorities in the form of new bodies such as the European Central Bank. Consequently, intergovernmentalism explains European integration as a process in which sovereign national states cooperate and negotiate among themselves as an outcome of inter-institutional bargaining.

Postfunctionalism, emerged as a response to neofunctionalism and intergovernmentalism, which perceive progressive integration within the European Union as driven by different causes (Hodson & Puetter, 2019). It offers a challenging perspective by emphasising the uncertainties surrounding future integration. Within this theoretical understanding, the emphasis lies in the politisation and mobilisation of mass public opinion regarding EU institutions and policies (Hooghe & Marks, 2019). The key argument lies in the explanation of Euro scepticism, led by the mass mobilisation of public opinion and the divide between elites favouring EU integration and the masses resistant to it (Schmitter, 2009). Postfunctionalism argues that, while neofunctionalist approaches such as transnational interdependencies and spillover effects may advance European integration, integration faces challenges due to increased public opposition and political backlash (Hooghe & Marks, 2019). More specifically, postfunctionalism understands the causes and effects of politicisation as resulting from the clash between functional pressures and identity, which unfolds in three steps. First, it identifies a mismatch between institutional structures and the demands for multilevel governance linked to interdependence. Second, it examines how the arena for decision-making can influence the nature of political conflict, and third, it analyses how European integration affects party systems and voter behaviour, often leading to polarisation along cultural lines and an increase in Eurosceptic sentiment among those with strong national identities.

In summary, these grand theories and schools aim to explain the ongoing developments in international relations and the process of European integration. Specifically, neofunctionalism emphasises policy interdependence and supranational activism, highlighting the spillover effects primarily driven by path dependence. Intergovernmentalism, on the other hand, focuses on government preferences and existing asymmetric interdependence, often resulting in the lowest common denominator as the main outcome. Lastly, postfunctionalism examines the structure of political conflict, with its central concern revolving

around the concept of identity and the role of the media in raising concerns over European Integration.

The applicability of these macro-level theories of European integration is somewhat limited when it comes to understanding the characteristics, complexities, and arrangements that enable or hinder the development and governance of cross-border digital public services in the EU. While these theories can effectively explain high-level processes, such as the dynamics between different actors and the causes of and responses to political integration, particularly regarding power division and the emergence of supranationalism, they fall short in addressing the practical challenges involved in developing cross-border digital public services. Each of these theoretical perspectives may offer valuable insights into specific aspects of cross-border digital public service development, including the reasons for pooling national public services towards supranational service delivery. They provide a valuable lens for understanding the political decisions and dynamics that exist between supranational and national institutions. For example, the most notable usage is of the neofunctionalism approach, which has been used to explain digital policy development and digital integration in the EU, suggesting that through the development of the digital single market, new barriers will evolve, which would result in the spillover effect (Mazur & Ramiro Troitiño, 2024). Furthermore, the neofunctionalist approach is used to explain the evolving role of the European Commission in the digital policy realm, by influencing national policies through supranational regulations and mechanisms (Heidebrecht, 2025). Consequently, European integration theories may contribute to explanations of the macro-level dynamics within the EU and of the institutional roles of the European Commission and Member States in the digital policy domain. However, given the focus on exploring how cross-border digital public services are technically developed, governed, and sustained in practice after adopting the regulations, these macro-level theories have certain limitations. The integration theories simply don't allow for detailed explanations when certain operational policies, such as governing decisions for the development of cross-border interoperability solutions, need to be agreed upon and implemented across the EU. While the cross-border digital public services research has emphasised the important role of the European integration dynamics (STUDY I), the often cited factors affecting the development of cross-border digital public services lie within the meso-level, or the governing level, and the operational level of the implementing actors and public organisations such as data quality, data ownership, heterogeneous technical systems (Prentza et al., 2021; Williams et al., 2018).

In conclusion, while neofunctionalism, intergovernmentalism, and post-functionalism help to situate cross-border digital public services within the broader narrative of European integration, and the initial political agreements showcase the importance of cross-border digital public services, they are somewhat limited in analysing the factors shaping the development and governance of cross-border digital public services in practice. These theories explain the macro-political context, including the functional spillovers that drive demand for digital integration, the bargaining dynamics that constrain supranational ambitions, and

the politicisation that affects public legitimacy. However, they may not address the specific governance arrangements that transform these political dynamics into operational cross-border digital public services. The reality is that cross-border digital public service outcomes rely less on high-level dynamics and more on the everyday coordination of multiple, multi-level actors. The development of cross-border digital public services serves as a practical illustration of the multiple levels of cooperation that are required and appropriate for governance arrangements. This includes not only the roles of various actors but also the influence of governance arrangements that align the different components of the technical, organisational, semantic, and legal frameworks necessary for effective implementation. This is where the literature on European governance may contribute. The European governance literature shifts the focus from abstract integration dynamics to the institutional architectures and instruments that facilitate cooperation and coordination of public organisations in the EU. In the following section, these governance perspectives are applied to better understand the meso-level processes and arrangements that may be applied for the development and governance of cross-border digital public services.

### **2.3. Meso-level: The (EU) Governance Models**

It is important to understand the difference between European integration theories and governance models. Neofunctionalism, intergovernmentalism, and post-functionalism are “grand theories” that explain why and how integration occurs over time (T. A. Börzel, 2019). On the other hand, governance models are not competing theories of European integration explanations. Instead, they provide tools to analyse the processes and structures that support coordination once integration has progressed. Simply put, integration theories focus on the reasons for integration, while governance models examine how coordination occurs during interdependence (T. A. Börzel, 2019; Piattoni, 2009; Stephenson, 2013). For example, when examining cross-border digital public services, grand integration theories can explain the political reasons behind transferring authority to the EU level or the pushback from Member States. However, they are limited in explaining how different administrative bodies, regulatory agencies, and European institutions collaborate to establish frameworks and deliver public services across borders. Governance models may enhance our understanding of these coordination processes in supranational contexts. The goal of this dissertation is not to determine whether governance models explain cross-border digital public service development better than neofunctionalism or intergovernmentalism. Instead, governance models are used as tools to analyse the specific arrangements employed that shape cross-border digital public services.

Debates among scholars on EU integration often focus on whether Member States have lost influence over other actors and on understanding the nature of development and power dynamics within European integration. Although the phenomenon of European integration has been extensively studied, particularly in political science and public administration, much of the existing research

emphasises the integration processes and the delegation of authority among various political actors (Hooghe & Marks, 2019). International relations theories, mainly neo-functionalism, intergovernmentalism, and postfunctionalism, attempt to explain the integration process and the motivations behind actors seeking to delegate authority at the European level (Hooghe & Marks, 2019). Consequently, debates often centre around whether integration results from a cooperative process among societal actors (as suggested by neo-functionalism and intergovernmentalism) or whether it is driven by conflicting interests that lead to divergent outcomes and potential disintegration (Webber, 2019). As Börzel (2019) argues, governance approaches to European integration show that, “*the dichotomy of intergovernmentalism and supranationalism does not fully capture the ways in which the dynamics of European integration are shifting*” (p. 5). By contrast, governance-oriented frameworks offer a more nuanced analytical lens for examining the dynamics of European societal challenges and solutions, particularly in relation to the coordination and implementation of complex policy initiatives within the EU context.

### 2.3.1. Governance models and arrangements

Governance is a concept frequently discussed in the fields of political science, public administration, law, and information systems (Kjær, 2010; Stoker, 2018). However, there is no single comprehensive theory of governance (Ansell & Torfing, 2022), and various definitions exist to describe and explain the concept (Kjær, 2010). In this dissertation, governance is defined as the “*institutionalised coordination through which collectively binding decisions are adopted and implemented*” (T. A. Börzel, 2019, p. 7). Governance can be understood as both a structured framework and a normative process of governing. The governance structure pertains to the institutions and constellations of actors, while the normative process of governing refers to the modes of social coordination through which actors adjust their behaviour (T. A. Börzel, 2019). However, these structures and processes are inherently linked since the structures do not determine the modes of coordination, and ideal types of governance are rare in the empirical environment (T. A. Börzel, 2019). Similarly, in the discussion of defining digital governance, Bannister and Connolly (2012) make a distinction between normative and structural digital governance. In their work, they first define e-governance as the use of ICT in government in ways that either alter governance structures, create new governance structures or processes, or reify existing theoretical ideas or issues in normative governance. Thus, Bannister and Connolly (2012) define structural governance as the “how” of government processes, while normative governance is the set of value-related features of structural governance, which include, among others, values such as transparency, accountability, integrity, honesty, and efficiency, so that the governance is desired to enable, possess, or deliver. As there are two distinct aspects of the governance concept, it is essential to note that the main focus of this dissertation is on structural governance, hereafter conceptualised as governance arrangements, which refers to the structures, lines of authority, and mechanisms employed in

governing cross-border digital public services. However, a brief discussion on normative digital governance will be introduced in the following sub-section.

A useful starting point for that examination is the typology of governance models and arrangements applied in the public sector, including hierarchy, market, and network (Bouckaert, 2023; van Gestel, 2024). The distinction of structures on hierarchy, markets, and networks (Börzel, 2019), is the most commonly and widely used typology of governance modes and structures, making it an analytically powerful framework for governance analysis (Bouckaert, 2015; Bouckaert et al., 2010b).

In hierarchical governance actors have limited autonomy, with authority and supervision concentrated at the top, enabling standardised routines (Martinez, 2024). Power and authority are the core resources (Chantillon et al., 2017), and control is maintained through top-down norms, standards, and oversight, including supervision, inspection, and intervention (Bouckaert et al., 2010a). In a hierarchical governance structure, the primary mode of interaction is authority. This authority is enacted through administrative orders, rules, and planning, with dominance serving as the primary control mechanism over other actors. In this arrangement, the government's key role is to act as a top-down ruler and manager, controlling independent actors through established rules. Ownership of the system is centralised under one authority (Chatterjee & Ravichandran, 2013).

By contrast, the market model grants greater autonomy to actors, using contracts as the main basis for cooperation (van den Broek & van Veenstra, 2018). In a market-based governance mode, the government's role is to create and uphold market conditions, as well as to serve as a partner in economic transactions. In this model, negotiation and bargaining serve as the main processes, and guidance relies on supply and demand, price mechanisms, and evaluations based on profit and loss (Bouckaert et al., 2010b; Grant & Tan, 2013). These elements are implemented through managing supply and demand, price mechanisms, and profit-and-loss considerations, which facilitate the coordination of actors towards market development. Systems ownership is individual rather than shared (Chatterjee & Ravichandran, 2004).

In the network model, actors have moderate autonomy within the system. The foundation of this arrangement is mutual co-optation and social trust among participants (Bouckaert, 2015). Governance is guided by shared values, joint analyses of problems, consensus-building, and voluntary information sharing (Chantillon et al., 2017). The foundation of cooperation is mutual interdependencies, trust, and shared responsibilities. Ownership is collective, with resources and governance responsibilities distributed among members (Chatterjee & Ravichandran, 2004; van den Broek & van Veenstra, 2018). In a network governance model, the essential pattern of coordination is cooperation and solidarity among actors. Guidance in this arrangement comes from shared values, consensus, loyalty, and informal evaluations based on reputation. The government acts as an enabler, manager, and participant within the network. The resources required for coordination in a network context are mutual co-optation and trust.

Another influential perspective is the typology of inter-organisational governance forms developed by Provan and Kenis (2008), which has informed studies on governance (Markus & Bui, 2012). This theory asserts that the efficiency and effectiveness of a network depend on its governance structure, particularly whether relationships are brokered or not. Three main governance types are identified: shared (member-led) governance, lead-organisation governance, and network administrative organisation (NAO) governance (Provan & Kenis, 2008).

In the shared governance model, there is no single lead actor or third-party; all members participate in decision-making (Kenis et al., 2019). This arrangement is best in settings with a high level of trust, few participants, and strong goal consensus. Lead-organisation governance, on the other hand, is structured around a central actor who coordinates the network and maintains significant autonomy (Kenis et al., 2019; Provan & Kenis, 2008). This model features centralised trust and a moderate number of participants with somewhat lower goal consensus. Network-administrative organisation (NAO) governance involves delegating authority to a third-party body responsible for coordination, decision-making, and taking specific actions (Kenis et al., 2019; Provan & Kenis, 2008). This model is suited to contexts with a high number of participants, relatively high goal consensus, and a strong need for specialised network competencies, with trust managed by the administrative body rather than directly by the network members.

### 2.3.2. EU Governance

The cross-border digital public services in the EU are characterised by multinational and supranational involvement. Thus, the existing scholarship on EU governance provides a valuable lens and discussion that could partially contribute to understanding the development and governance of cross-border digital public services. The EU governance scholarship aims to explain and provide a problem-oriented analysis of institutionalised coordination of goods and services in the EU, by investigating who is coordinated, by whom, and to what effect (Börzel, 2019).

In political science, within studies on European governance and policy-making, there is no concept that is more widely utilised than multi-level governance (MLG) (Stephenson, 2013). MLG has emerged as a critique of state-centric theories of European Integration, which have neglected the significant role of non-state actors within the EU policy-making arena (Börzel, 2019). More specifically, MLG was initially developed as a concept to overcome the limitations of integration theories, by providing a concept to understand the increasing role of sub-national and local authorities in the implementation of policies in the EU (Benz et al., 2021a). It is referred to as the “*continuous negotiation among nested governments at several territorial tiers*’ and describes how ‘*supranational, national, regional and local governments are enmeshed in territorially overarching policy networks*” (Marks, 1993, pp. 402–403). MLG refers to a variety of arrangements and systems for coordination and negotiation among formally independent yet functionally interdependent entities. These entities have complex relationships with one another and continuously redefine

their interconnections through coordinated efforts and negotiations (Piattoni, 2009). With the increased complexity of the EU polity, there was an increased need for a common and coordinated solution, which MLG represents, as an explanation of such coordination at multiple levels (Ansell & Torfing, 2022). One key feature of MLG is the delineation of the levels attribute, which refers to the territorially different jurisdictions at different scales, which not only refers to territorial levels, but also to the boundaries of communities, such as government and the citizens (Benz et al., 2021a). The attribute multi- refers to the number of levels, and it depends on the empirical case analysed (Ansell and Torfing, 2022). However, the defining feature of MLG is its sequential compartmentalisation of decision-making, referring to the different phases of the policy-making cycle that unfold in distinct arenas and involve different types of actors (Benz et al., 2021b). Therefore, MLG primarily aims to overcome the challenge of interdependency and the coordination across different levels (Benz et al., 2021b). MLG proponents emphasise the reduction of the state's role in EU policy-making, with a focus on subnational actors' influence within the EU, grounded in shared norms among multi-level actors (Ansell & Torfing, 2022).

Similar to MLG, the network governance approach provides explanations for how EU governance operates. This model has been developed to overcome the limitations of the existing hierarchical and market-based governance structures (Kapucu, 2014). The reality of living in a globalised and interconnected society has led to the emergence of various forms of networks, including policy networks, service delivery networks, and global or virtual networks (Ansell & Torfing, 2022; Keast et al., 2013; Nowell & Milward, 2022; Provan & Kenis, 2008). Network governance has resulted from the increased interdependencies among the actors and the increased role of non-state actors within the EU policy-making process. A defining feature of network governance is its reliance on coordination mechanisms, specifically the trust and cooperation that develop among network members (Nowell & Milward, 2022; Powell, 1990). Additionally, this model is characterised by enhanced communication, knowledge exchange, and dialogue among participants, which include government organisations, non-governmental organisations, and the private sector (Keast et al., 2013). Over time, the interpersonal relationships built on trust, reciprocity, and mutual benefit strengthen interactions, serving as a key mechanism for resolving conflicts and overcoming challenges (Powell, 1990). With diverse network purposes, the various types of governance arrangements are discussed in the literature for network governance (Keast et al., 2013). These include the modes of governance in the form of participant-governed, lead-organisation or network administrative organisation (Provan & Kenis, 2008). Network governance is not static; thus, it changes due to the changing goals and contexts, as well as the actions of the individual actors (Lowndes & Skelcher, 1998; Provan & Kenis, 2008). However, Börzel (2019) argues that there is insufficient empirical evidence to claim that EU governance is shaped by network governance approaches, due to the lack of involvement of private and interest group actors in EU policymaking.

Börzel et al. (2010; 2009; 2019) offer a detailed explanation of the processes involved in European integration and governance. The central argument they

present is that EU governance is primarily shaped by joint decision-making through negotiation and political competition, all operating under the concept of the “*shadow of hierarchy*”. This concept highlights the significant role of supranational institutions, such as the European Council and the European Commission, which are influenced by the supremacy and direct effect of European law. In contrast to classic network governance, which typically includes participation from private and civil society organisations, EU governance is characterised by negotiations and competition among Member States and subnational authorities, with a hierarchy led by supranational institutions. The mechanisms that enable the governance process under the shadow of hierarchy include trans-governmental negotiation systems and comitology structures, and procedures (T. Börzel, 2010). More specifically, these governance negotiation arrangements are embedded within and through trans-governmental networks (Eberlein & Newman, 2008). These networks span multiple levels of government and comprise national regulatory authorities. The main objective of trans-governmental networks is to support the supranational, national, and subnational actors to informally coordinate their interests and reach agreements through the exchange of resources and arguments (T. A. Börzel & Risse, 2019).

However, the focus of research on digital governance policies in the EU, according to Troitino (2021), is limited. Nonetheless, some studies address the implementation of digital policy in the EU and examine the role of EU institutions in digital governance. Troitino and Mazut (2024) outline several components of digital governance in the EU: 1) common standards and regulations, 2) shared digital infrastructure, 3) joint research and innovation, and 4) digital skills and collaboration. These elements reflect the EU’s approach to digital governance, where the European Commission serves as a central supranational body, consistent with the neo-functionalist perspective that independent institutions can promote integration beyond national interests (Mazur & Ramiro Troitiño, 2024). Several authors have noted that EU governance of digital policy, in particular related to interoperability, uses the soft mechanisms employed through the open method of coordination and the voluntary mechanisms for adoption of suggested guidelines, frameworks, and best practices (Mărcuț, 2020; Ramiro Troitiño, 2024). The main role is within the European Commission, which enables and supports the sharing of best practices and coordinates activities of benchmarking digital government developments.

In summary, European governance is characterised by a variety of concepts and explanations regarding the structures and processes used to coordinate multiple actors towards a common EU objective. The insights from the European governance literature contribute to this dissertation by clarifying the roles and structures employed at the political EU level to coordinate and manage agreements, as well as the development and adoption of policies. Governance approaches contribute to answering the research question by providing a meso-level lens to analyse *how* cross-border digital public services are developed and coordinated across multiple levels of government and diverse actors. The governance frameworks reveal the distribution of authority, decision-making processes, and coordination mechanisms that enable or constrain cooperation

between supranational, national, and subnational actors (Marks, 1993; Piattoni, 2009; Ansell & Torfing, 2022). They allow the identification of governance instruments, such as hierarchical regulations, market-based incentives, or collaborative networks, and show how these shape policy implementation, compliance, and sustainability outcomes (Bouckaert et al., 2010; Börzel, 2019). While governance approaches illuminate the structures and processes employed in developing the cross-border digital public services, they are insufficient for understanding the micro-level mechanisms and factors that translate these arrangements into functioning digital public services at the national level. While the cross-border digital public services depend on the national public services delivery and the roles of the national and local actors, this limitation highlights the need to use digital governance and interoperability literature, which focuses on the micro-level processes essential for cross-border service operation, such as data exchange standards, system integration, and inter-organisational relationships (Dawes et al., 2012; Gil-Garcia et al., 2019; Ramiro Troitiño & Mazur, 2024).

## **2.4. Micro-level: Digital governance and interoperability**

The structure of this sub-section is organised to move from broader conceptual understandings of digital governance to the specific development models of digital governance and a characteristic that underpins cross-border digital public services, interoperability. It begins with the Digital Era Governance (DEG) perspective, to situate the research within the context of how ICT has transformed public administration, highlighting reintegration, needs-based holism, and digitisation as overarching shifts in public governance (Dunleavy, 2006; Tan & Cromptoets, 2022). Following this, the discussion of digital public service concepts and maturity models provides a bridge between high-level governance ideas and the practical mechanisms through which digital services are developed, assessed, and incrementally integrated (Layne & Lee, 2001; Klievink & Janssen, 2009; Nielsen, 2020). The inclusion of maturity models and digital government projects illustrates applied instances of cross-border digital service development, demonstrating the translation of governance principles into concrete organisational and infrastructural practices (Schmidt & Krimmer, 2021). This progression reflects the analytical path from macro-level institutional dynamics to meso-level governance structures and processes, and finally to micro-level operational enablers.

Governance approaches, as discussed in the previous sections, clarify who coordinates and how, highlighting multi-level and networked arrangements that shape policy decisions and organisational collaboration across borders (Marks, 1993; Piattoni, 2009; Börzel, 2019). Maturity models and digital government projects exemplify the practical application of these governance mechanisms, showing the stages of integration, service delivery, and institutional learning that facilitate coordination in complex, multi-actor environments (Scholta et al., 2019; Layne & Lee, 2001; Schmidt & Krimmer, 2021). Interoperability, positioned last,

represents the core requirement that enables cross-border digital public services to function effectively; it operationalises the governance and project-level arrangements by ensuring that distinct national systems can communicate, exchange data, and provide seamless services to citizens (Gil-Garcia et al., 2009; Leosk et al., 2021; Wimmer et al., 2018).

Within the field of public administration, the seminal work of Dunleavy et al. (2006) marks a significant shift in the understanding of the role of ICT in the public sector. The authors introduced the notion of DEG as a new governance practice that leverages ICT for government processes. They argue that DEG has emerged in response to the influences of New Public Management, which has largely led to the disintegration of public services, increased competition, and the use of incentives. The transformation of public services has occurred alongside the transition from paper-based processes to digital services, accompanied by infrastructural, administrative, and cultural shifts within public administration (Tan & Cromptoets, 2022). Under DEG, public administration and services have utilised ICT, resulting in processes of reintegration, needs-based holistic approaches, and changes due to digitisation (Dunleavy et al., 2006). Firstly, reintegration refers to the effort to consolidate functions within the public sector, particularly through joined-up governance and integrated public services. This can be seen in practices such as reengineering back-office procedures and reinstating central processes. Secondly, needs-based holism signifies a cultural and administrative shift towards a client-centric public sector. This shift is facilitated by the introduction of a one-stop provision of public services, which involves co-located staff delivering multiple administrative services together. Additionally, needs-based holism is achieved through the end-to-end reengineering of back-office services, which blurs the boundaries between existing agencies and promotes comprehensive service delivery processes. Lastly, digitisation, as discussed by Dunleavy (2006), primarily concerns the delivery of electronic (digital) services, emphasising the impact of ICT on public agencies. However, these broad analyses focus on changing the governance and pay little or no attention to the changes in the core technologies of governance, such as the systems for processing information and communication (Meijer et al., 2018) and, for example, interoperability solutions.

Although the new notion of digital era governance was introduced in the mid-2000s, the scientific investigation of ICT changes within the public sector has been long researched within the digital government and digital governance research field (Dawes, 2009). Digital governance research is considered an interdisciplinary field (Scholl, 2015) and can be distinguished from traditional scientific domains such as public administration, international relations, and political science (Engvall & Flak, 2022). Bannister and Connolly (2012) state that digital governance differs from traditional governance debates in its potential to alter both structures and norms of traditional governance. According to Bannister and Connolly (2012), digital governance is defined as “*the use of ICT in government in ways that lead to genuinely different structures or processes, a consequence of which may be the greater effectuation of or changes in norms and public values*” (p. 21).

Debates within this field of research often centre on the role and impact of ICT in existing governance frameworks, processes, services, performance, and norms, particularly at national and local levels. It addresses three primary areas: management, focusing on the implications of technology for services, processes, and performance; the effects of ICT on transparency, accountability, and democracy; and the legal implications related to human rights, privacy, and access to information (Gil-Garcia et al., 2018). The literature on digital governance primarily emphasises the digitalisation of governmental processes and services (Scholl, 2020), citizen engagement, and participation (Distel & Lindgren, 2019), and technology adoption and usage (Lyytinen & Damsgaard, 2001; Savoldelli et al., 2014). Beyond the primary focus of this dissertation on structural governance, the normative dimensions of digital governance require careful examination. Bannister and Connolly (2012) demonstrate that information and communication technologies (ICT) fundamentally reshape existing governance norms across multiple dimensions. Through their seminal contributions (2012, 2014), they establish a comprehensive taxonomy of digital governance values organised into three principal categories: duty-oriented, service-oriented, and socially oriented values.

The duty-oriented dimension encompasses core values including responsibility, integrity, adherence to democratic will, and parsimony in resource allocation. Service-oriented values emphasise citizen-centricity, responsiveness, effectiveness, efficiency, and transparency in public service delivery. The socially oriented category prioritises inclusiveness, accountability, fairness, impartiality, and the protection of security and privacy rights. Building upon this foundational framework, Twizeyimana et al. (2019) align their conceptualisation of public value dimensions with Bannister and Connolly's taxonomy, categorising digital governance impacts into improved administration (duty-oriented), enhanced public services (service-oriented), and augmented social value and well-being (socially-oriented). Furthermore, Engvall and Flak (2022) identify and summarise digital normative governance as primarily associated with values such as efficiency, transparency, participation, effectiveness, and responsiveness, while also contributing to enhanced democracy and good governance more broadly. Table 1 represents these value dimensions, providing operational definitions and examining their manifestation in digital governance transformations alongside anticipated impacts.

Table 1: ICT impact on normative governance. Adapted from Bannister and Connolly (2012, 2014), Twizeyimana et al. (2019), and Engvall and Flak (2022)

Value Pillar	Focus	Key Values	Expected impact
Duty-Oriented (Improved administration)	Obligations of the government structure.	Responsibility, Integrity, Democratic Will, Parsimony	Enhanced accountability, ethical governance, democratic legitimacy, and resource optimisation
Service-oriented (Improved public services)	The service outcomes of digitalisation.	Citizen-centricity, Responsiveness, Effectiveness, Efficiency, Transparency	Higher satisfaction, faster delivery, better outcomes, lower costs, increased trust
Socially oriented (Improved social value and well-being)	The broader societal good.	Inclusiveness, Accountability, Fairness, Impartiality, and Security and privacy protection	Reduced digital divide, stronger oversight, equitable treatment, and enhanced trust and safety
Cross-Cutting	The general values of democracy.	Participation, Enhanced Democracy, Good Governance	Deeper engagement, revitalised democracy, improved institutional quality

It is important to recognise that most research on digital governance either highlights its positive effects or neglects the potential negative impacts on ICT transformation norms (Bannister & Connolly, 2012, 2014; Twizeyimana & Andersson, 2019). Nonetheless, trade-offs exist within governance norms, particularly concerning accountability, inclusiveness, and legitimacy, that are evident in multi-level and interactive governance (Edelenbos & Van Meerkerk, 2016), especially as they pertain to cross-border digital public services. However, as Bannister and Connolly (2012) argue, it is essential to distinguish between the capability of ICT and its actual usage, in which the capability may be used for the wrong purposes as well. In the context of this dissertation, these values help explain the normative basis on which the need for cross-border digital public services is built. As discussed, cross-border digital public services are not purely technically driven, but rather value-driven initiatives that aim to influence citizens, businesses, and administrations across the whole of the EU. More specifically, these values serve as a framework for understanding why cross-border digital public services are important and what they are expected to accomplish normatively.

The investigation of studies on digital governance and digital government research have been the focus of several studies (Dawes, 2009; Meijer et al., 2018; Ravšelj et al., 2022). While significant growth has been included in digital governance research (Ravšelj et al., 2022), most of the studies focus on the advancement of online services development while neglecting the complex or

fundamental questions of governance (Dawes, 2008), and practical applications of technologies within digital governance (Charalabidis et al., 2022). Engvall and Flak (2022) analysed digital governance research as a scientific concept and assessed that structural transformations of digital governance involve service delivery, regulation, policymaking, governance mechanisms, relationships, coordination, and decision-making. More specifically, an important stream of research and focus lies in the use of technology for networked management and sharing information between governments, citizens, and businesses (Engvall & Flak, 2022; Gil-Garcia et al., 2018; Pardo et al., 2012). Consequently, one noticeable theme or topic that is investigated is the use of technology for information and data sharing, integration, and interoperability between and among governments, citizens, and businesses. More specifically, there is a long-term need for future research focusing on cross-border governance capabilities that includes research on issues beyond local, regional, or national borders within diverse political, technical, and cultural contexts (Dawes, 2009).

One of the main goals of digital era governance is the digitalisation of public services (Dunleavy et al., 2006; Ravšelj et al., 2022). The digitalisation of public services has been the biggest focus of the reform of the public sector and is considered the main means to its end (Lindgren & van Veenstra, 2018). According to Lindgren and Jansson (2013), a digital public service can be distinguished based on its three dimensions:

- 1) Digital, which refers to the technical artefacts (interoperability issues) and user experiences (the user adoption and experiences);
- 2) The public, which refers to the public ethos (fairness and availability of public service provisioning), the lack of exit (public dominance in relationships), and the users as citizens rather than consumers (the focus and changes of public culture);
- 3) The services, which refer to services as a process (process in which value is co-created by the consumer and supplier) and service quality (consumer experiences of the service).

Furthermore, due to Lindgren and Jansson's (2013) limited focus on the administrative level of digital public service delivery, this dissertation introduces an additional administrative level dimension. This dimension refers to the locality and functionality of the services provided, which can occur at local, national, or cross-border levels. In this dissertation, the emphasis is specifically on the cross-border level, which refers to services delivered to users across national borders or outside the confines of national legal jurisdictions.

### 2.4.1. Cross-border digital public services and maturity models

Research on cross-border digital public services is still limited (STUDY I), but existing studies on digital public services highlight key requirements and conditions for their development. This development relies on several technical and non-technical factors. Researchers emphasise the inter-organisational nature of developing digital public services. Effective digital public services require collaboration among various stakeholders, including public agencies, private companies, and non-profit organisations (Bertot et al., 2016; Christiansson et al., 2015; Lindgren & van Veenstra, 2018). Furthermore, research indicates that developing digital public services should involve co-creation and a user-centric approach (Christiansson et al., 2015; Lindgren & van Veenstra, 2018). Because of its inter-organisational nature, building partnership capacities is essential, supported by partner matching (Christiansson et al., 2015) and stakeholder management (Wouters et al., 2023). Other important factors include the availability of resources, digital skills, and enabling legal frameworks (Christiansson et al., 2015). On the technical side, researchers underscore the need for infrastructure that facilitates data exchange and digital service delivery, along with secure authentication mechanisms, as well as considerations for security and privacy (Bertot et al., 2016; Christiansson et al., 2015). However, significant challenges hinder the development of digital public services, stemming from the negative aspects of the aforementioned factors and conditions. These challenges include inadequate identification of service needs, insufficiently secure authentication mechanisms, poor project and stakeholder management, and a lack of co-ordination during development (Bertot et al., 2016; Christiansson et al., 2015; Wouters et al., 2021).

The progression of digital public service development within digital governance frameworks is frequently evaluated through the application of stage or maturity models. These models are instrumental in assessing the sophistication and integration of public administrations, providing a basis for analysing the advancement of digital governance initiatives and the overall effectiveness of digital public services (Nielsen, 2020; Scholta et al., 2019). Notably, such evaluations are often referenced in benchmarking reports, including those produced by European Union institutions. A widely cited research model in this context is the four-stage framework introduced by Layne and Lee (2001). This model articulates a continuum beginning with the establishment of a basic online presence, characterised by the availability of service catalogues and downloadable forms, and advancing to the implementation of transactional capabilities that enable users to complete forms and access services electronically with the support of functional databases. The third stage, vertical integration, emphasises the connection of local systems with higher-level systems, thereby broadening the scope and coherence of functionalities and transaction options. The fourth and final stage, horizontal integration, is marked by the interconnection of systems across different functions, culminating in the creation of comprehensive “one-stop shop” portals for citizens and businesses. Collectively, these stages exemplify the incremental movement toward a more

integrated and effective digital governance structure. Subsequent research has expanded upon and critiqued this foundational model. Studies such as those by Klievink and Janssen (2009), Nielsen (2020), and Scholta et al., (2019) have contributed to the refinement of maturity stage models. Empirical investigations, by Klievink and Janssen (2009), for example, concerning national services in the Netherlands, have validated elements of the model while also highlighting its limitations, emphasising the need to look above the national level of service delivery. Moreover, critics argue that the linear and rigid character of stage models often fails to accommodate the dynamic and context-dependent nature of technological advancement and changing governance requirements (Lynn et al., 2022; Nielsen, 2020). In the context of cross-border digital public services, these limitations become particularly evident. The development of such services is strongly shaped by infrastructural requirements arising from EU regulations, particularly the need to develop and connect cross-border interoperability solutions (such as OOTS) within national systems (such as Estonian X-Road), which influence the trajectory of national service development at multiple levels, requiring organisational change (Leosk et al., 2021). Accordingly, the transformation of public services often exhibits varying levels of advancement, with higher levels typically achieved for national users and comparatively lower levels for cross-border users, reflecting the complexity and gradual evolution of the underlying digital infrastructure.

Additionally, cross-border digital public services are greatly influenced by digital government projects, which act as a mechanism of the European Union for developing interoperability solutions for these services (Schmidt and Krimmer, 2021). More specifically, several EU-funded digital government research projects have been studied and have later been taken up by the European Commission for implementation across the whole EU, such as TOOP, eCODEX, and eSENS (Schmidt and Krimmer, 2021). The digital government project instrument serves as a way to identify and develop a common interoperability solution to be shared among all Member States of the EU. Consequently, these projects have been instrumental in digital public service developments (Schmidt and Krimmer, 2021), and in particular in capabilities development for seamless data exchange and cooperation between public organisations (Gil-Garcia et al., 2009; Luna-Reyes et al., 2021; Yadav et al., 2022). While digital government research projects are receiving attention in general, ensuring long-term sustainability and governance remains a significant challenge, especially in complex, inter-organisational, and supranational environments (Anthopoulos et al., 2016; Janssen and van der Voort, 2020), such as cross-border digital public services.

### **2.4.2. Interoperability**

The inherent characteristic and requirement for the highest level of digital public service delivery development across borders is the need for the exchange and use of information and data between public administrations in the EU, often referred to as interoperability. The research on interoperability highlights its significance in digital government transformation (Akbar et al., 2022; Campmas et al., 2022;

Hodapp & Hanelt, 2022), especially concerning governance mechanisms within the EU interoperability policy (Campmas et al., 2022; Criado, 2012). Information and data exchange are crucial for delivering cross-border digital public services; however, the lack of data exchange among public administrations poses a significant barrier to this process. Interoperability, as defined by the European Interoperability Framework (EIF), refers to the ability of organisations and systems to exchange data, services, and knowledge towards common objectives through ICT. The interoperability of digital public services has been a key focus of scientific research and practice for several decades (Akbar et al., 2022; Benamou et al., 2004; Hodapp & Hanelt, 2022). Interoperability is a multifaceted concept and consists of different meanings within different fields (Hodapp & Hanelt, 2022; Wimmer et al., 2018). In the technical field, interoperability refers to the ability of independent systems to communicate and exchange data (Tolk, 2013), while in organisational terms, interoperability is the ability that allows organisations to accept and use services from other organisations (Gottschalk, 2009). Consequently, the EIF operationalise interoperability within layers, encompassing technical, organisational, semantic, and legal aspects. These layers are coordinated under the umbrella of interoperability governance, which *“supports public service provisioning by providing and managing generic interoperability enablers (i.e. the concepts such as ‘regulation’, ‘collaborative business process’, ‘semantic data model’) and artefacts (the concrete instantiations of enablers that can be applied to / employed in public service provisioning) at the different interoperability layers (legal, organizational, semantic and technical) according to the EIF”* (Wimmer et al., 2018, p. 4). Researchers have underscored the immense importance of interoperability for advancing digital government, identifying it as a crucial requirement for progress (Allen et al., 2014; Campmas et al., 2022; Hodapp & Hanelt, 2022).

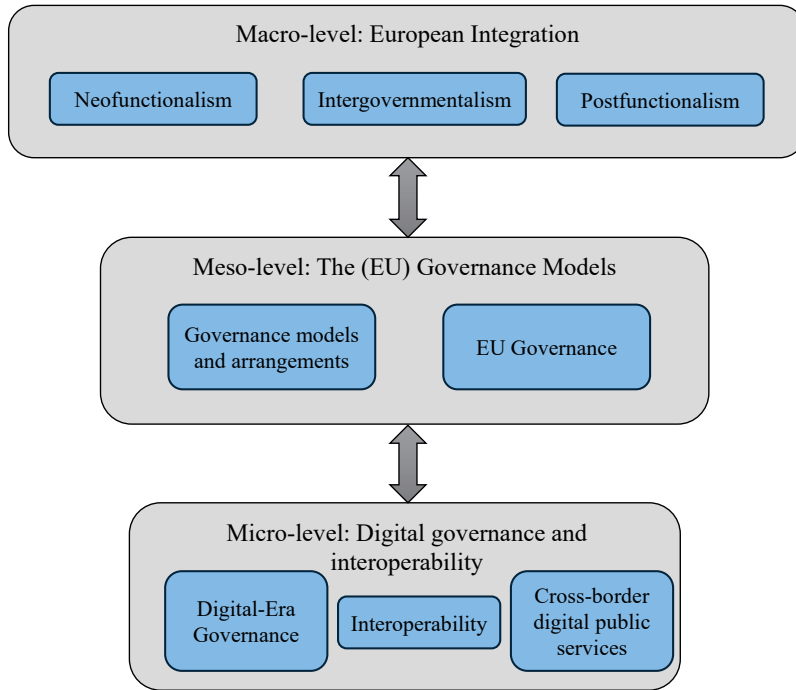
Interoperability is often represented and discussed as the capability of systems to share information across boundaries. In the context of the increased interdependencies in governance, no single organisation has the resources to run activities and services without inputs from other organisations (Dawes et al., 2009). Interoperability is a complex socio-technical phenomenon that involves multiple theoretical perspectives, disciplinary approaches, and practical applications (Yang et al., 2014), and consists of the four key components (Gil-Garcia et al., 2009):

- a) trusted social networks,
- b) shared information,
- c) integrated data, and
- d) interoperable technical infrastructure.

Trusted social networks are groups of people or organisations that share information and data. This encompasses both established facts and knowledge acquired through experience. Integrated data refers to combining data according to specific standards, such as XML. Interoperable infrastructure refers to systems that can communicate with each other, both in terms of hardware and software

(Gil-Garcia et al., 2009). It is this interoperability infrastructure that materialises and enables interoperability and data exchange between organisations (Janssen et al., 2011). Researchers emphasise that the capabilities of systems within national Member States to interoperate and exchange data across borders, commonly known as interoperability, pose the most significant barrier to cross-border digital public services (Leosk et al., 2021; Prentza et al., 2021). In this dissertation, the concept of cross-border interoperability solution (CBIS) is employed to illustrate the similarities between interoperability infrastructure and digital infrastructure. Therefore, a CBIS primarily refers to the infrastructure developed to facilitate data exchange between distinct and heterogeneous systems at the cross-border level.

Research on CBIS is gaining considerable attention (Markus & Bui, 2012; Mulder, 2024; Prentza et al., 2021; Rukanova et al., 2015), with much attention going to architectural design, technical factors, and implementation experiences (Boldrin et al., 2021; Carretero et al., 2018; Schwalm & Alamillo-Domingo, 2022). However, governance is also essential for aligning technical developments with policy objectives, coordinating actors across jurisdictions, and sustaining solutions over time. Exploring governance arrangements is therefore important for understanding the role of non-technical aspects in the development and implementation of digital public services in cross-border settings for long-term sustainability (Loukis et al., 2016; Rukanova et al., 2015). While structural governance receives significant attention, the normative governance of interoperability remains under-researched. Despite this gap, the European Interoperability Framework (EIF) provides a critical set of principles that guide designers and policymakers in developing cross-border digital public services. Rather than viewing these as a simple checklist, they can be understood through the lens of public value theory (Bannister & Connolly, 2014; Twizeyimana & Andersson, 2019). First, the EIF emphasises duty-oriented values, which focus on administrative obligations and economy; these include subsidiarity and proportionality, reusability, and the preservation of information. Second, it promotes service-oriented values that prioritise the user experience, specifically user-centricity, transparency, administrative simplification, and the assessment of effectiveness and efficiency. Finally, the framework safeguards socially oriented values to ensure broader rights and fairness, defined by principles such as openness, technological neutrality, inclusion and accessibility, multilingualism, and security and privacy.



*Figure 1: Theoretical development*

Finally, the cumulative aspects of the presented theoretical discussions are presented in Figure 1: Theoretical development. The starting point is the discussion on macro-level governance, which is produced through the interaction of institutions; these interactions produce patterns of governing that cut across multiple levels of policies (Guy Peters, 2022). In the context of cross-border digital public services, interactions between EU institutions and Member States, with the objective of enabling cross-border digital public services, influence the approaches towards governance arrangements found at the meso-level of governance. Consequently, the interactions between institutions shape the structured governance in the form of coordinating mechanisms and agreed-upon rules and procedures (Guy Peters, 2022). These structured governance arrangements shape micro-level governance through required organisational changes and the implementation of EU-level policies. In terms of cross-border digital public services, the meso-level mode of structural governance, such as network governance based on trust, influences organisations in adapting and changing their standards and business processes to achieve the high-level goals of cross-border digital public services. These operational decisions and implementation result in the micro-level organisational environment providing feedback to meso- and macro-level governance decisions (Guy Peters, 2022).

### **3. METHODOLOGICAL APPROACH**

This section outlines the methodological approaches employed in this dissertation. First, it presents an overview of the methodology, and second, it elaborates on the data collection and analysis methods for each publication. The basis of this dissertation is three main studies published in academic journals (STUDY I, STUDY III) and a book chapter (STUDY II), together with additional contributions from four publications (STUDY IV, STUDY V, STUDY VI, STUDY VII).

#### **3.1. Methods and data**

This dissertation focuses on phenomenon-driven research, which seeks to identify, capture, document, and conceptualise a specific phenomenon to enhance and advance knowledge (Lumineau et al., 2024; Schwarz & Stensaker, 2016, p. 2). Phenomenon-driven research emphasises gaining a deeper, more nuanced understanding of the phenomenon itself (Lumineau et al., 2024; Schwarz & Stensaker, 2016). Additionally, phenomenon-based research necessitates a real-world context and relevance, addressing the challenges and problems organisations and individuals face (Lumineau et al., 2024). Multiple concepts can exist to illustrate the same phenomenon, and each concept encompasses unique aspects that are valuable for understanding the phenomenon and its exploration (Alvesson & Sandberg, 2023).

The focus of this dissertation is on cross-border digital public services and the main requirements for interoperability solutions. It is important to note that phenomena differ from their specific object of study, which is generally narrower than the broader field of research, such as political, organisational, or administrative sciences (Alvesson & Sandberg, 2023).

To enhance the transparency and replicability of this dissertation, the arguments related to the research design are presented using the research onion framework proposed by Saunders et al. (2016). This approach systematically provides a comprehensive understanding of the research philosophy and methodologies used in this dissertation (see Figure 2). Following this framework, each choice made in the dissertation will be explained, along with the reasoning behind these selections.

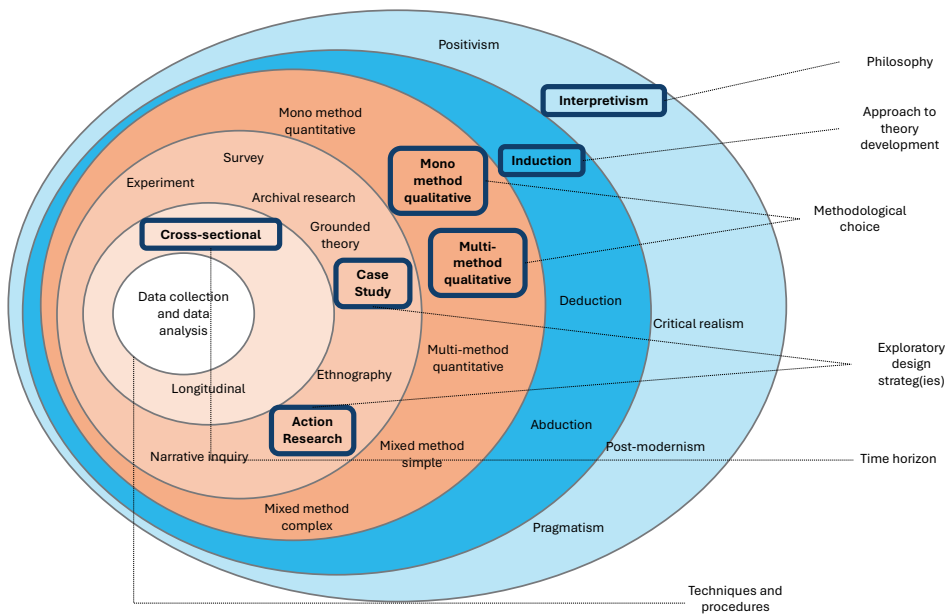


Figure 2: Research onion framework by Saunders et al (2016).

This dissertation aims to improve the understanding of the development of cross-border digital public services and the governance of interoperability solutions within European digital integration. The research design employs an exploratory design research strategy, which is particularly useful for clarifying and providing an understanding of a problem or phenomenon (Saunders et al., 2016). As suggested by Saunders, exploratory studies often begin with a broad focus, which is indeed the case for this author’s dissertation. The need for a broad focus and comprehensive understanding of the literature on cross-border digital public services led to the publication of the first paper (STUDY I).

This dissertation is grounded in the philosophical framework of interpretivism. Interpretivism views the world as subjective, in contrast to the positivist approach, which sees it as an objective reality. The publications in this dissertation adhere to the principles of interpretivism, focusing on exploratory analysis and aiming to gain a deeper understanding of complex phenomena, rather than predicting outcomes or establishing causal relationships (Chowdhury, 2014; Gregor, 2006). The primary research gap addressed in this dissertation is the limited understanding of the development and governance of cross-border digital public services. Thus, an interpretive approach is well-suited for gaining insights into both the development process of these e-services and the governance of interoperability solutions (McBride et al., 2021).

The research methodology employed in the publications follows an inductive reasoning framework. This choice is based on the characteristics of the phenomena being studied and the exploratory nature of the research, which often necessitates an inductive approach (Azungah, 2018; Gioia et al., 2013; McBride et al., 2021; Saunders et al., 2016). Moreover, within the context of interpretive philosophy, inductive reasoning is essential as it facilitates the enhancement of

theory through the empirical data collected. This dissertation reflects the characteristics of an inductive approach; the publications did not begin with a clearly defined theoretical framework. Instead, they identified relationships between the collected data and observations, allowing for theory to emerge organically from the processes of data collection, analysis, and interpretation (see Saunders et al. 2016, 570).

As such, all of the publications that form the basis of this dissertation follow a qualitative research methodology that is in line with the interpretative approach. Qualitative research is associated with the interpretive philosophy (Klein & Myers, 1999; McBride et al., 2021), and it may include single data collection techniques such as interviews (mono-method), or it may include multiple data collection techniques (multi-method). The publications included in this dissertation followed a qualitative approach, with a mono-method approach (STUDY I) and multi-method approaches (STUDY II, STUDY III).

This dissertation's methodological contribution lies in integrating the systematic analysis and synthesis of the literature, together with empirical case study research and action research methodology. The studies forming the basis of this research utilise a systematic literature review (Xiao & Watson, 2019), an exploratory low-n case study (Baxter & Jack, 2015; Yin, 2018), and an action research methodology (Cohen et al., 2017; McNiff, 2017) within the mGOV4EU project, focused on the development of mobile cross-border digital public services through the development of an interoperability solution. The initial systematic literature review helped identify core themes and research gaps in cross-border digital public services. This was followed by action research within the development of an interoperability solution artefact (STUDY II) and case study research on developed interoperability solutions (STUDY III). The research strategies employed in the publications are as follows: STUDY I utilised a thematic synthesis approach in its systematic literature review, while STUDY II implemented an action research strategy, and STUDY III adopted a case study approach.

Exploratory case study research, utilising purposive sampling, was implemented to ensure that the selected cases provided valuable insights into the research question (Neuman, 2008). Case study research strategies are particularly suited for in-depth investigations into "why" and "how" questions (Yin, 2018). Alongside case study research, action research emerged as the primary strategy employed throughout the papers. This approach was applied within the participation of the digital government research project, which focused on developing an interoperability solution on a mobile platform by integrating the interoperability frameworks of eIDAS and OOTS. The project effectively addressed the collaborative and participatory elements inherent in action research (McNiff, 2017). Participation in the action research encompassed transdisciplinary aspects and expertise, highlighting the necessity for innovative interoperability solutions (STUDY II). In action research, the researcher plays a crucial role in contributing to academic literature by generating new knowledge (McNiff, 2017).

Following Saunders et al. (2016), the time horizon defines the temporal scope of a research design and indicates whether data is collected at a single point in time, cross-sectionally, or longitudinally across multiple points. A cross-sectional time horizon captures a snapshot of phenomena as they exist at a given moment, making it appropriate when the primary aim is to explore current relationships, compare cases at the same time, or examine associations between variables without tracking change over time. Accordingly, this study employs a cross-sectional time horizon (Saunders et al., 2016). The empirical data were gathered within a bounded period from 2021 to 2024 so that the findings of this dissertation reflect the state of the phenomenon during that window. This approach permits efficient collection and comparison of data across cases and actors, and it aligns with the study's focus on understanding governance arrangements and interoperability practices as they are observed now, rather than how they evolve.

The data collection for this dissertation utilised various sources, including a systematic literature analysis, document and report analyses, semi-structured interviews, workshops, and observations, ensuring comprehensive coverage and triangulation of findings.

Specifically, STUDY I conducted a systematic literature review focused on published scholarly works related to cross-border digital public services. This review followed a structured protocol to ensure transparency, replicability, and thoroughness. The analysis employed thematic synthesis as the primary analytical method, systematically identifying, coding, and synthesising key themes emerging from the existing literature. This approach provided a structured overview of the current academic understanding and identified critical knowledge gaps relevant to cross-border digital public services. STUDY I's systematic literature review approach was necessary, as at the time of the study there was no synthesised knowledge of cross-border digital public services. Moreover, as cross-border digital public services constitute a fragmented research domain spanning multiple literatures, the systematic literature review provides foundational knowledge of what is known, what remains contested, and which research gaps remain. Consequently, the thematic synthesis was chosen over meta-analysis or narrative review because it enables the identification of patterns across predominantly qualitative and conceptual studies while preserving the interpretive richness of the phenomena (Thomas & Harden, 2008). Hence, a systematic literature review comprehensively mapped the fragmented field, systematically identified knowledge gaps, and established conceptual foundations and analytical themes surrounding the development of cross-border digital public services. As a result of STUDY I, the research gaps identified, particularly the complexities involved (RQ1.1) and the governance challenges (RQ1.2), provided a gap foundation for the subsequent studies.

In STUDY II, a mixed-methods approach was adopted to assess sustainability and governance. The analysis was structured around several steps to ensure systematic evaluation. First, the authors identified drivers and barriers affecting mobile government services, drawing on existing typologies and scholarly literature to categorise technological, organisational, institutional, and actor-related factors. Second, the research conducted a two-phase piloting impact

assessment. The design phase focused on integrating transdisciplinary principles, such as interdisciplinarity, stakeholder engagement, and real-world relevance. The execution phase evaluated pilot scenarios and building blocks across domains, including e-signatures, smart mobility, and i-voting. The STUDY II approach of employing action research was chosen, in particular, because of the benefits of direct participation in socio-technological system development over retrospective observation. As cross-border digital public services are not static solutions but rather a phenomenon shaped by ongoing negotiations among multiple stakeholders, their dynamics and challenges cannot be fully captured through document analysis or ex post interviews. Therefore, the participatory workshops and multi-domain pilot implementations enabled the co-creation of knowledge, revealed drivers and barriers, and identified relevant factors influencing the sustainability of the development of interoperability solutions. This methodological choice aligns with the interpretivist stance that reality is socially constructed through actors' interactions and sense-making processes (Walsham, 2006).

STUDY III expanded the methodological scope by adopting qualitative research methods, specifically semi-structured expert interviews complemented by desk research involving detailed analyses of official documents and reports. The semi-structured interviews allowed flexibility in exploring experts' perceptions, experiences, and insights on interoperability governance frameworks. The collected data was analysed using a combination of thematic and content analysis methods, enabling systematic extraction and interpretation of relevant patterns and themes, enriched and validated by insights from authoritative documentary sources. STUDY III's case study approach, with semi-structured expert interviews and desk research, was necessary to address the governance complexities revealed in STUDY I. Expert interviews provide access to tacit knowledge that is rarely codified in official documents, but that is essential for understanding the reasons behind the employed governance arrangements and associated challenges. Similarly, the complementary document analysis contextualised the expert perspectives within the employed governance arrangements and validated the interview claims.

Taken together, the research design constitutes a multiple-method qualitative study in which the selected methods are deliberately complementary and mutually reinforcing. As illustrated in Table 2, the systematic literature review (STUDY I) establishes the conceptual and analytical foundations, the action research (STUDY II) enables in-depth engagement with the socio-technical dynamics of interoperability development, and the case study research (STUDY III) provides contextualised insights into governance arrangements as they operate in practice. The coherence of this design lies in the way each method addresses different but interrelated dimensions of the same phenomenon, allowing insights generated through one method to inform, refine, and validate findings from the others, thereby strengthening the overall analytical rigour of the dissertation (Saunders et al., 2016; Yin, 2018).

Table 2: Summary of methodological approaches

<b>Publications</b>	<b>Philosophy</b>	<b>Approach to theory development</b>	<b>Methodological choice</b>	<b>Research strategy</b>	<b>Time horizon</b>	<b>Techniques and procedures</b>	<b>Main analytical insights generated</b>
<b>STUDY I</b>	Interpretivism	Induction	Mono-method qualitative	Systematic literature review	Cross-sectional	Thematic synthesis; PRISMA	Conceptual and analytical insights into cross-border digital public services; identification of core complexities, governance challenges, and research gaps in a fragmented literature
<b>STUDY II</b>	Interpretivism	Induction	Multi-method qualitative	Action research with premises of a case study	Cross-sectional	Participation; workshops; content analysis	Process-oriented and socio-technical insights into the development of interoperability solutions; identification of drivers, barriers, and sustainability challenges through direct participation
<b>STUDY III</b>	Interpretivism	Induction	Multi-method qualitative	Case study research	Cross-sectional	Desk research; semi-structured interviews	Contextualised governance insights; explanation of why specific governance arrangements emerge and how cross-border interoperability is governed in practice
<b>Supporting studies (STUDY IV–VII)</b>	Interpretivism	Induction	Mono/multi-method qualitative	Action research; case studies	Cross-sectional	Interviews; desk research; literature review; workshops	Additional empirical validation and refinement of findings; extension of insights across domains and contexts

## 3.2. Limitations

The limitation of this dissertation lies in its scope and the exploratory nature of its research design. Employing an interpretive approach and engaging a relatively small sample of cases in the action research restricts the generalisability of the findings (Yin, 2018). The conclusions drawn are tailored specifically to the European Union context and, as such, may not seamlessly translate to other supra-national environments involved in cross-border digital public service collaborations, for example, those within the OECD or other regional alliances. Furthermore, the study's analytical focus remains at the supranational and macro-level, meaning that the dynamics of inter-organisational relationships, decision-making, or the unique perspectives of individual Member States are not thoroughly explored. Collaborations between specific nations, bilateral or multi-lateral collaborations, such as the digital public service development and delivery between, for example, Estonia and Finland, are relevant but fall outside the primary lens of this research due to its supranational focus.

Another limitation arises from the dissertation's interdisciplinary approach. While this breadth allows for a richer, more holistic understanding, it also means that the analysis is not anchored in a single theoretical tradition. Consequently, the contributions made by this research are dispersed across multiple theoretical domains rather than advancing a unified theoretical framework. This multi-dimensional perspective, while valuable, may limit the consolidation of insights within any one academic discipline.

In terms of internal validity, the interpretive approach employed is based on a deeper understanding of cross-border digital public services as phenomena (Elbardan & Kholeif, 2017). Insights about cross-border digital public services and their governance within the EU are included in the cases studied. External validity represents another limitation of low-number case studies (Gomm et al., 2000). The relatively limited number of case studies and the specificity of the EU context mean that the findings cannot be transferred with certainty to fundamentally different settings and should be approached with caution. However, the main objective of case study research does not lie within external validity, nor was the objective to provide generalisable statements to various settings, but rather it was to provide a deeper understanding of the development and implementation of cross-border digital public services in the EU. Moreover, the exploratory nature of the work provides a strong foundation for further investigation, but additional research featuring a wider array of cases, varied contexts, and possibly longitudinal data would be necessary to improve the robustness and generalisability of findings within this dissertation. A further methodological limitation is the focus on a cross-sectional time horizon. This approach does not readily allow for strong assertions about causal relationships over time or the evolution of phenomena (Miller, 1999). Therefore, the political environment during the time horizon may shape and influence the findings and interpretations of the author (Maier et al., 2023).

Another limitation lies in its theoretical framing, which emphasises the dissertation's analytical and exploratory objectives over its prescriptive objectives. The limitation exists within the lack of specific normative considerations of this dissertation, due to the research design choices made. More specifically, the prescriptive normative discussions related to cross-border digital public services have not been the main focus of the dissertation, although they would provide a valuable contribution. While the findings of this dissertation provide an improved understanding, they are limited in their immediate application to measuring current success or guiding future interventions and practical actions, thereby restricting the potential to prescribe how interoperability should be achieved and what cross-border digital public services should look like. However, the prescriptive ideal models of cross-border digital public services could be made by employing design-science research methodology (Hevner & Chatterjee, 2010) to develop a governance framework artefact that could provide a normative and structural ideal base model for governing complex cross-border digital public services. This could be complemented by action research and participatory approaches, which would enable a better understanding of practical decision-making processes and of how normative values more directly shape the development and governance of cross-border digital public services.

Future studies could address these limitations by incorporating longitudinal approaches that track the evolution and causality of governance mechanisms and interoperability solutions on cross-border digital public services over time. Expanding research to include additional supranational contexts, along with deeper explorations of inter-organisational and inter-state dynamics, would further advance the field. Additionally, efforts to develop or apply unified theoretical frameworks could help consolidate fragmented insights and enhance the explanatory power of future research on cross-border digital public services. In summary, while this dissertation offers important and original insights into a complex and evolving domain, its limitations highlight rich opportunities for future scholarly research.

## **4. MAIN FINDINGS AND DISCUSSION**

This section presents a synthesis of the main findings of the dissertation, emphasising the key insights and answers obtained from the included studies. The findings are discussed in relation to the earlier-established theoretical framework and their implications.

The synthesis draws on three complementary sources: a systematic literature review (STUDY I) that maps the existing scholarly knowledge while identifying themes and gaps related to cross-border digital public services; an in-depth analysis of the governance and sustainability aspects of the interoperability solutions for these services (STUDY II); and a comparative multi-case study of current cross-border interoperability solutions, specifically EUCARIS, Peppol, and OOTS (STUDY III).

This section begins with subsection 4.1, which outlines the descriptive findings of the systematic literature review and examines the evolution of scholarly focus on cross-border digital public services. It also presents the identified analytical themes. Next, subsection 4.2 explores the governance mechanisms and arrangements used in the development of cross-border digital public services, including their interoperability solutions. Subsection 4.3 investigates the factors influencing the development of these interoperability solutions, as well as aspects of governance and sustainability.

Finally, subsection 4.4 discusses the synthesised findings in relation to the macro-, meso-, and micro-levels of theoretical background. It also presents suggestions for future research based on the findings from the included studies.

### **4.1. Characteristics and complexities of cross-border digital public services in the EU**

The scholarly landscape surrounding cross-border digital public services within the European Union reveals a field that is both evolving and fundamentally fragmented across multiple disciplines (STUDY I). The systematic literature review conducted within STUDY I demonstrates that research in this domain spans diverse academic fields, with information systems accounting for approximately 44% of contributions, followed by digital governance studies at 24%, legal scholarship at 16%, public administration at 12%, and political science at 4% (STUDY I). This multidisciplinary distribution reflects the inherently complex nature of cross-border digital public services, which not only require technical, but also legal, administrative, and political perspectives to understand digital service delivery across national boundaries.

The methodological approaches employed in existing research reveal significant patterns that illuminate the current state of knowledge development. Most studies, approximately 56%, utilise empirical case study methods, with an overwhelming 92% employing inductive reasoning approaches (STUDY I). This

methodological preference indicates that the field remains in its early stages of theoretical development, with researchers primarily focused on describing and analysing specific instances rather than developing comprehensive and single theoretical frameworks (STUDY I). The prevalence of inductive approaches suggests that knowledge of cross-border digital public services is still in the process of exploring and identifying patterns and building foundational understanding, rather than testing established theories or models.

Besides the descriptive statistics, STUDY I has identified several key themes that emerged from the existing body of research, which define the characteristics and complexities of cross-border digital public services. These themes include the focus on governance, inter-organisational relationships, and the interoperability and integration of cross-border digital public services.

Governance structures and processes are consistently highlighted as central concerns, particularly due to the complex interactions that occur across multiple levels and among various stakeholders in cross-border digital public services (STUDY I, STUDY III). The main driving factors for the development and implementation of cross-border digital public services are the aim to reduce administrative burden, the abstract level of EU values, and the improvement of digital maturity across the whole EU level (STUDY I, STUDY III). Moreover, multiple existing cross-border interoperability solutions showcase the need for federalised governing and implementation approaches (STUDY V). The multi-actor environment primarily includes public organisations operating at various levels, focusing on the role of the European Commission as an agenda setter and national domain organisations as the implementers of initiatives (STUDY I, STUDY III). Moreover, complexity arises from the need to balance the evolving needs of diverse stakeholders (STUDY II), for whom the added value of cross-border digital public services is often unclear (STUDY I).

Inter-organisational relationship attributes are another prevalent theme, representing the challenges and complexities associated with cross-border digital public services. These inter-organisational relationships refer to trust and cooperation among participating organisations and emerge as fundamental elements that enable or constrain the effectiveness of cross-border initiatives (STUDY I; STUDY II). These relational factors are particularly critical given that cross-border digital public services often function without the traditional hierarchical authority structures that typically govern domestic public services (STUDY III). Moreover, the willingness to cooperate transnationally and to adapt to the changes, thus the flexibility among the implementing organisations, is considered critical (STUDY I, STUDY II, STUDY III). While institutional heterogeneity is considered the main determinant of faltering implementation (STUDY I), the national level organisations are pressured with concerns over required organisational change, and lack of financial and human resources (STUDY I, STUDY II, STUDY V).

The third theme, showcasing the complexities and challenges of cross-border digital public services, relates to interoperability and integration. Findings demonstrate that achieving interoperability extends far beyond technical

compatibility to encompass organisational processes, legal frameworks, and cultural practices (STUDY II). The challenge lies within the existing heterogeneous developments of national states as implementors, which require the flexibility, additional developments, and implementation of interoperability solutions on the side of implementors (STUDY I, STUDY III, STUDY V, STUDY VI). Also, the multiple legal supranational requirements and developments of the legal frameworks for the particular solution to a legal problem, like OOTS from SDGR and eIDAS from the eIDAS regulation, present a challenge in integrating those solutions for seamless interoperable cross-border digital public services (STUDY VI), requiring additional effort in finding synergies between those initiatives. Furthermore, due to the varied legal, technical, organisational, and semantic approaches of national Member States, users of cross-border digital public services face existing service quality gaps and a lack of understanding of the added value (STUDY I). The characteristics and their related complexities are illustrated in Figure 3: Cross-border digital public services characteristics and complexities.

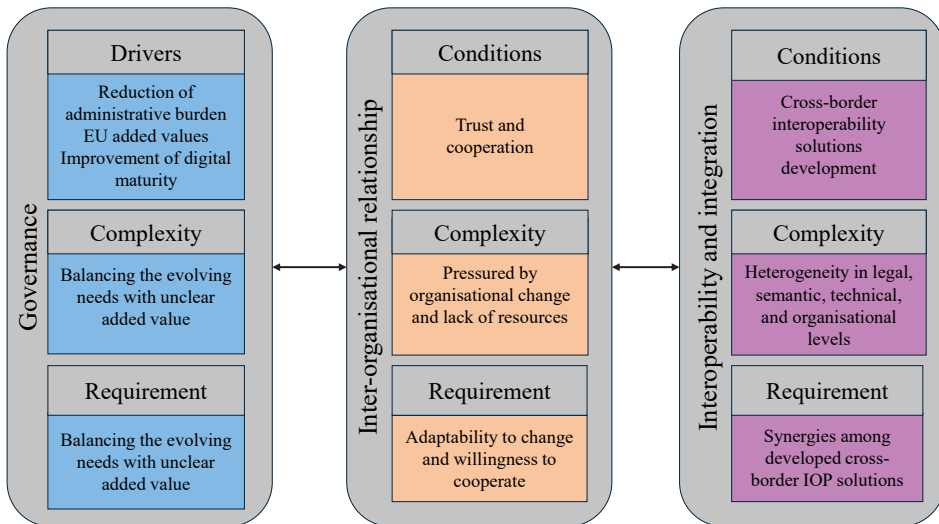


Figure 3: Cross-border digital public services characteristics and complexities

Despite the growing body of research, significant gaps remain that limit both theoretical understanding and practical implementation of cross-border digital public services. The most fundamental gap identified across all three studies is the lack of robust theoretical underpinnings that could provide explanatory depth beyond symptom identification (STUDY I). Current research tends to focus on describing the symptoms of faltering development and implementation in cross-border digital public service initiatives, rather than explaining why certain approaches succeed or fail.

User experience and citizen-centric perspectives represent another critical research gap that has received insufficient attention in the literature. While the technical and administrative aspects of cross-border services have been

extensively documented, the actual experiences of citizens and businesses using these services remain largely unexplored (STUDY I), despite being considered a significant factor (STUDY II). This gap is particularly problematic, given that the ultimate outcome of cross-border digital services, and thus European integration, depends on their adoption and effective use by end-users.

## **4.2. Governance mechanisms and arrangements**

The governance of cross-border digital public services within the European Union operates through complex arrangements that reflect the fundamental tension between national sovereignty and supranational coordination (see Figure 4: Governance arrangements and mechanisms). The multi-case analysis of cross-border interoperability systems reveals that governance mechanisms have either evolved from national treaty agreements, large-scale projects, or from regulatory requirements, which accommodate diverse stakeholder interests while maintaining operational effectiveness (STUDY III). These findings demonstrate that cross-border digital services require governance structures that simultaneously allow for national autonomy and enable collective action across borders.

Network governance emerges as the predominant governance mode for cross-border digital services, characterised by mechanisms based on relational trust and voluntary cooperation rather than hierarchical authority within cross-border digital public services (STUDY III). This governance mode reflects the practical reality that no single entity possesses the legal authority, technical resources, or political legitimacy to unilaterally govern cross-border digital services (STUDY I, STUDY III). Instead, cross-border digital public services are developed through collaborative processes that bring together multi-level actors, primarily national governments and European Union institutions, and to some extent, the private sector organisations in various configurations (STUDY I, STUDY III).

Specific governance arrangements identified reveal distinct approaches to cross-border digital public services. The hybrid-network model, exemplified by the Once Only Technical System (OOTS), involves a single entity (EC) taking coordinating responsibility for system development, maintenance and operation while engaging other stakeholders (National contact points) as co-governors (STUDY III). In contrast, the network-administrative organisation (NAO) model, towards which EUCARIS and OpenPeppol have evolved, distributes governance responsibilities among multiple stakeholders while maintaining coordination mechanisms in the forms of relational trust and agreements (STUDY III).

The development of cross-border digital public services is highly influenced by legal frameworks, which represent a critical dimension of cross-border digital service governance. Different governance arrangements employ varying degrees of legal foundation, from international treaties (EUCARIS) to formal consortium agreements (Peppol) to European Union regulations (SDGR, OOTS) (STUDY III). These legal frameworks serve multiple functions: they establish legitimate authority for government collaboration and coordination and define roles and

responsibilities among stakeholders. The foundation of the legal frameworks significantly influences the governance arrangements, with a more significant role of the supranational frameworks in shaping the governance and the development of cross-border digital public services. The national legal frameworks, in contrast, are often considered as the main barrier, as well as the enabler of the cross-border digital public services (STUDY II).

Institutional factors play a crucial role in shaping governance arrangements for cross-border digital services (STUDY II). European Union directives and regulations provide the overarching legal framework within which cross-border data exchange and services operate, establishing both opportunities and constraints for governance innovation (STUDY III). The European Commission's dual role as both regulator and coordinator creates unique dynamics, as it balances its regulatory position and responsibilities with its facilitative functions in supporting cross-border digital public service development (STUDY I, STUDY III). National legal frameworks and administrative traditions employed within different service providers across national borders further complicate the institutional landscape, as diverse legal frameworks across the EU complicate effective governance mechanisms for the implementation of cross-border digital public services.

Ownership and control structures in cross-border digital services reflect the fundamental principle of national sovereignty while enabling collaboration towards service delivery. Distributed ownership models predominate, with national states typically retaining ownership of system services and data while participating in network or hybrid governance arrangements (STUDY III). This approach enables countries to maintain control over sensitive information while complying with national legal requirements, and to benefit from cross-border cooperation. Data control and ownership, particularly in this context, remain with national governments, supporting system autonomy while enabling interoperability through cross-border interoperability solutions.

Coordination mechanisms employed within cross-border digital public services are as follows. National contact points emerge as a common coordination structure, serving as intermediaries between domestic service delivery organisations and cross-border networks (STUDY III). These entities typically combine technical functions (managing system interfaces and data flows) with governance functions (representing national interests in collective decision-making). The European Union often serves as an overarching coordinator, providing strategic direction, facilitating stakeholder engagement, and ensuring compliance with European legal frameworks (STUDY I). However, the effectiveness of these coordination mechanisms depends heavily on the trust, resources, expertise, and political support available to the coordinating entities.

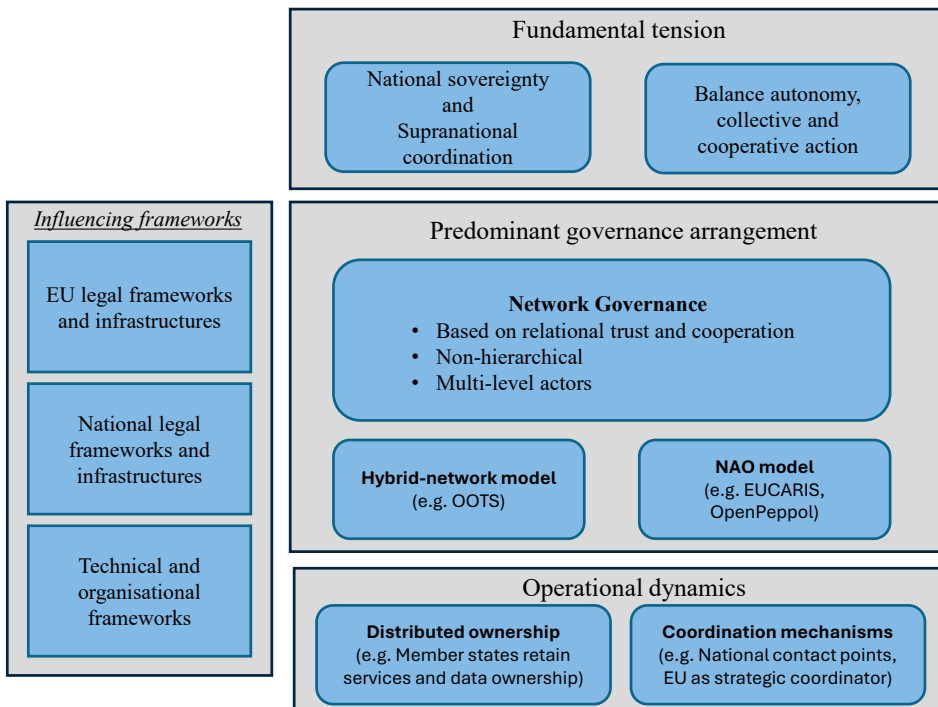


Figure 4: Governance arrangements and mechanisms

The evolution of governance arrangements over time reveals important patterns in how cross-border digital services adapt to changing circumstances. Governance structures are not static but evolve in response to technical developments, stakeholder feedback, policy changes, and operational experience (STUDY III). While cross-border digital public services often evolve from the initial project collaboration, which begins with simple governance arrangements, they often develop more sophisticated structures as they mature and face contextual changes and adaptations (STUDY II, STUDY III). This evolutionary process suggests that governance arrangements for cross-border digital public services would preferably be designed with adaptability in mind, incorporating mechanisms for flexibility and innovation while maintaining sufficient stability to ensure reliable service delivery (STUDY II).

### 4.3. Factors affecting the sustainability and governance of interoperability solutions

The sustainability of cross-border digital public services depends on a complex interplay of technical, organisational, financial, and political factors that would need to be balanced to ensure long-term and effective governance (STUDY II) (see Figure 5: Sustainability aspects of cross-border digital public services).

Sustainability challenges extend well beyond the initial stages of system development and implementation for cross-border digital public services; they also include ongoing operations, stakeholder engagement, and the ability to adapt to changing circumstances (STUDY II; STUDY III). Understanding these factors is essential for designing cross-border digital services that can remain effective and relevant over time while continuing to fulfil their intended purposes.

The analysis of cross-border interoperability solutions reveals that while many projects achieve initial technical success, maintaining operations and ensuring continued relevance over time presents significant challenges (STUDY II; STUDY III, STUDY IV, STUDY V). Sustainability requires more than technical maintenance; it demands ongoing stakeholder engagement, financial viability, legal compliance, and adaptive capacity to respond to changing circumstances (STUDY II).

Stakeholder involvement is a crucial factor for achieving sustainability. The extent, depth, and quality of stakeholder engagement greatly impact long-term success (STUDY II). Effective stakeholder engagement goes beyond mere consultation; it requires genuine participation in governance processes, shared ownership of outcomes, and a continuous commitment to system maintenance and development (STUDY II, STUDY III).

Legal frameworks represent both challenges and opportunities for the sustainability of cross-border digital services. The complex legal landscape of the European Union, with its multiple layers of supranational, national, and subnational law, creates significant compliance burdens that can increase and threaten solution implementation and adoption (STUDY II; STUDY III). Changes in legal frameworks, whether through new European regulations or national legislation, can significantly impact how the services are being implemented and to what extent they are being used (STUDY I, STUDY III, STUDY V, STUDY VI). However, legal frameworks also provide essential foundations for sustainability by establishing legitimate authority, defining stakeholder rights and obligations, and creating predictable operating environments that enable long-term planning and investment (STUDY II, STUDY III, STUDY IV, STUDY VI).

Interoperability presents multifaceted challenges that extend beyond technical compatibility and encompass the organisational, semantic, and legal dimensions as well. The research demonstrates that governing interoperability solutions requires ongoing coordination among multiple stakeholders with different priorities, capabilities, and constraints (STUDY II; STUDY III). Technical interoperability, while necessary, is insufficient for sustainability; systems would also need to achieve organisational interoperability (aligned processes and procedures), semantic interoperability (shared understanding of data and information), and legal interoperability (compatible legal frameworks and compliance requirements) (STUDY II). Maintaining these multiple dimensions of interoperability over time requires continuous effort and resources, making it a significant aspect of governance.

Financial sustainability models represent perhaps the most significant challenge facing the sustainability of cross-border digital public services, as traditional public

sector funding reliance is often uncertain for cross-border initiatives that serve multiple jurisdictions, and thus it typically comes from EU funding (STUDY II, STUDY III, STUDY IV). The research reveals that many cross-border projects begin with temporary funding from European Union programs or national governments but struggle to establish sustainable financing mechanisms for long-term operations (STUDY II, STUDY IV). Successful sustainability requires developing funding models that can accommodate the interests and capabilities of multiple stakeholders while ensuring adequate resources for system maintenance, updates, and expansion (STUDY II, STUDY IV).

Trust emerges as a fundamental factor influencing both governance effectiveness and solution sustainability. Cross-border digital public services require high levels of trust among participating organisations, as they involve sharing sensitive information, coordinating critical processes, and relying on partners' systems and capabilities (STUDY I, STUDY II, STUDY III). Building and maintaining trust requires transparency in governance processes, reliability in system operations, and consistency in stakeholder behaviour over time. Trust can be particularly fragile in cross-border contexts where cultural differences, language barriers, and varying administrative traditions can create misunderstandings or conflicts.

The governance modes showcase important patterns in how successful systems adapt to changing circumstances while maintaining their core functions. Interoperability solutions also employ lead-organisation models, which provide clear accountability and efficient decision-making, but may evolve toward network-administrative organisations that distribute governance responsibilities and enhance stakeholder ownership (STUDY III). This evolutionary process suggests that sustainability requires governance arrangements that can adapt to changing stakeholder needs, technical capabilities, and political circumstances.

Technical factors, while not determinative, significantly influence sustainability by affecting system performance, maintenance requirements, and adaptation capacity. Technical decisions made during system development can have long-term consequences for sustainability, as they determine the resources required for ongoing operations, the ease with which systems can be implemented in diverse legal and organisational environments, and the degree to which systems can integrate with evolving technical environments (STUDY II).

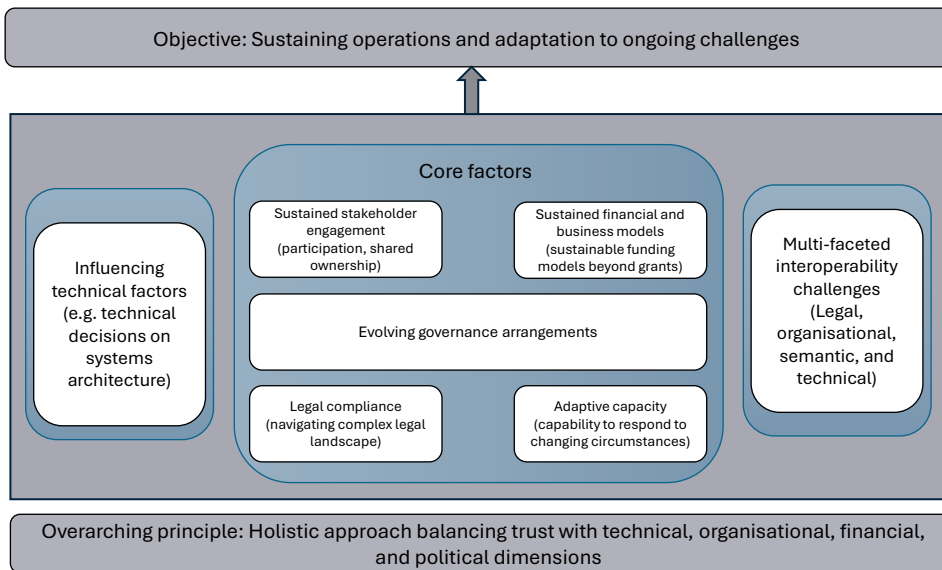


Figure 5: Sustainability aspects of cross-border digital public services

The implications for practice derived from STUDY II’s research suggest that sustainable cross-border digital services require holistic approaches that address technical, organisational, financial, and political dimensions simultaneously. Governance arrangements should incorporate flexible, trust-based mechanisms that can adapt to changing circumstances while maintaining sufficient stability to ensure reliable service delivery (STUDY II, STUDY III). Most importantly, the sustainability of developed systems for cross-border digital public services could be considered from the earliest stages of system design rather than treated as an afterthought, with explicit strategies for addressing the various factors that influence long-term viability (STUDY II).

#### 4.4. Discussion and future research suggestions

Building on the presentation of the synthesised findings from the studies included in this dissertation, this subsection discusses the findings and suggests future research avenues in relation to the dissertation’s theoretical background. It also reflects on how these findings contribute to the broader discourse on European integration and digital governance literatures. In doing so, it validates the applicability of the multi-layered theoretical approach to the study of cross-border digital public services.

On the macro-level, this dissertation has validated the neofunctionalist approach, which posits that integration in one area can lead to spillover effects and that supranational actors primarily serve as policy entrepreneurs. This dissertation demonstrates the European Commission (EC) acting as an “agenda setter” and an overarching coordinator, providing strategic direction and ensuring compliance with legal frameworks for cross-border digital public services. This

empirical evidence supports the neofunctionalist view that supranational institutions drive digital integration and influence national policies through regulatory mechanisms, confirming existing findings by Mazur and Ramiro Troitiño (2024) and Heidebrecht (2025). The aim to reduce administrative burden by establishing the freedom of services as a basis for EU values can be seen as a functional pressure that drives further integration, consistent with neofunctionalist arguments. Intergovernmentalism, on the other hand, emphasises the role of sovereign states, national interests, and intergovernmental bargaining. The findings reflect this by highlighting the fundamental tension between national sovereignty over public service delivery and supranational coordination in EU governance. The prevalence of distributed ownership models, where national states retain control over system resources and data, along with the sovereign development of national states in implementation, concerns over required organisational change, and a lack of financial and human resources at the national level, reinforces the intergovernmentalist perspective. These elements suggest that national interests and capacities significantly shape the extent of cross-border digital public services maturity and value, often resulting in negotiated outcomes that accommodate national priorities, similar to the lowest common denominator outcome suggested by the intergovernmentalism approach. Postfunctionalism focuses on politicisation, public opposition, and the clash between functional pressures and identity. While the findings do not directly address mass public opinion, the identified gap regarding user experience and citizen-centric perspectives, as well as the fact that the added value of cross-border digital public services is often unclear to stakeholders, carry significant postfunctionalist implications. The findings empirically confirm the theory section's assertion that macro-level theories effectively explain high-level political dynamics and the drivers of integration, but are less well-equipped to address the practical, day-to-day challenges of developing cross-border digital public services.

As for the meso-level underpinnings, this dissertation has several implications. The theory section identifies hierarchy, market, and network as key governance models. The findings show that network governance emerges as the predominant organisational form for cross-border digital services, characterised by relational trust and voluntary cooperation rather than hierarchical authority. This provides strong empirical validation for the theoretical proposition of network governance being suitable for complex, multi-actor environments where no single entity holds unilateral authority. The identification of specific governance arrangements, the hybrid-network model (e.g., OOTS with the EC taking primary responsibility and other national stakeholders as co-governors) and the network-administrative organisation (NAO) model (e.g., EUCARIS and Peppol, distributing responsibilities among multiple stakeholders) directly maps onto and empirically enriches Provan and Kenis's (2008) typology of inter-organisational governance forms. This demonstrates how these theoretical constructs manifest in real-world cross-border digital public services solutions. The crucial role of trust and cooperation among participating organisations as fundamental elements that enable or constrain the effectiveness of cross-border initiatives, and as a fundamental factor influencing both governance effectiveness and solution

sustainability, underscores and validates the theoretical emphasis on “mutual co-optation and social trust” (Bouckaert, 2015) as the foundation of network governance.

While network governance predominates, the findings also reveal the EC’s dual role as regulator and coordinator, through its position as an agenda-setter, and its primary responsibility for managing and maintaining cross-border interoperability solutions. This contributes to the understanding and empirical confirmation of the concept “shadow of hierarchy” (T. Börzel, 2010). It implies that even within seemingly voluntary network arrangements, supranational institutions (such as the EC) exert significant influence through legal frameworks, coordination efforts, and the leadership of specific cross-border interoperability solutions. This role of the EC also comes from its role within European integration, given the lack of commitment by a single Member State to manage and govern the wide range of EU-level cross-border digital public services. This suggests that EU governance for cross-border digital public services operates as a hybrid form, combining network characteristics (trust and voluntary cooperation among national actors) with a latent or explicit influence from the supranational level (the EC and EU law).

On the micro-level, theoretical levels define interoperability as multifaceted, encompassing technical, organisational, semantic, and legal layers. The findings powerfully reinforce and expand upon this definition, stating that achieving interoperability extends far beyond technical compatibility to encompass organisational processes, legal frameworks, and cultural practices. Crucially, it finds that technical interoperability, while necessary, is insufficient for sustainability; systems should also achieve organisational, semantic, and legal interoperability, followed by the adequate governance of interoperability. This contribution to micro-level theory emphasises that the effective digital governance and long-term viability of cross-border digital public services depend on national service providers successfully managing all these interoperability dimensions, not just the technical ones. The findings, moreover, demonstrate that the digital governance of nation-states, along with their heterogeneous approaches and diverse developments of digital services, is the most significant negative factor in the implementation of cross-border digital public services. Furthermore, interoperability is a crucial requirement for implementing cross-border digital public services. While interoperability is sometimes viewed negatively due to concerns about the potential misuse of shared information (Akkaya & Krcmar, 2018), it is often understood as an inherently positive capability to possess (Campmas et al., 2022). At the same time, the outcomes of its use may be negative depending on how and by whom it is applied. The optimistic vision of cross-border interoperability is thus tempered by concerns related to security and privacy protection. Conceptualising cross-border interoperability as a process raises important questions about its potential misuse, which could undermine the principles of accountability and legitimacy that underpin public administration. Nonetheless, it is certainly beneficial to be able to share information and access and utilise diverse data across the EU for positive purposes, rather than limiting the potential for innovation and services due to a

lack of this capability. Thus, in public administration, it is preferable to have the capability to deliver services at a cross-border and trans-European level rather than lacking it.

An implicit assumption continues to shape the development of cross-border digital public services: that the organisational need for development is explicit. As identified, the organisational needs and benefits on the implementation side are often unclear, resulting in varying levels of implementation for cross-border interoperability solutions and a lack of the required organisational changes. As cross-border digital public services are often evaluated primarily from the perspective of visible service outcomes, namely when a citizen or business receives a service or legally valid outcome in another Member State. This output-oriented perspective leads to the assumption that administrations with limited incoming cross-border users do not require cross-border interoperability. However, cross-border digital public services inherently involve both an input dimension, in which data and information are provided by authorities in one Member State, and an output dimension, in which a service outcome is delivered in another Member State. From this perspective of collaborative data exchange, the process of cross-border data provision and use should be understood as a digital public service in its own right. To date, digital public services have been largely discussed in terms of output dimension and value creation (Lindgren, 2013; Lindgren et al., 2019; Scholta et al., 2019). Consequently, it is assumed that local administrations with little or no direct cross-border service demand may not play a crucial role in cross-border digital public services. However, the provider dimension positions local administrations as cross-border data providers for their residents who may need access to national digital public services abroad. For example, when residents of small or rural municipalities move abroad to study, enrolling or registering through a digital service can only work if their local administration can exchange the required official evidence with the authorities in the destination country. Assessing the need for cross-border digital public services solely on the basis of the number of direct cross-border users, therefore, overlooks these essential input-side responsibilities. Therefore, careful attention should be paid to who is required to develop cross-border digital public services, the benefits and requirements for implementing cross-border interoperability, and the changes required to achieve cross-border digital public service delivery.

The development of cross-border digital public services has largely followed a top-down approach. The European Commission plays a central role in shaping agendas, steering digitalisation priorities, and mandating initiatives to achieve EU harmonisation and inclusiveness. At the same time, parallel initiatives are emerging at the regional level, particularly among countries sharing borders, which focus on establishing interoperable cross-border digital public services. A prominent example can be found in the Nordic region, where countries such as Denmark, Finland, Estonia, Sweden, and Norway cooperate in order to enable seamless mobility and integration in the region (*Cross Border Digital Services | Nordic Cooperation*, n.d.). These efforts include building a common approach to enabling cross-border digital public services while complying with EU initiatives (such as OOTS and EU semantic models). This represents a viable model that the

EU could replicate and support, particularly by fostering bottom-up initiatives to develop specific use cases for cross-border digital public services in border regions where they are most used. By endorsing and leveraging EU-designed interoperability standards and specifications, lagging administrations can catch up with frontrunners when the need arises, illustrating the dynamic between Europeanisation leaders and laggards and the associated lessons learned (T. A. Börzel, 2002). Achieving this will require not only network governance at the EU level, but also the establishment of cross-border digital public services governance frameworks at national and local levels.

From a normative perspective, the implementation of cross-border digital public services presents a complex landscape characterised by a tension between accountability and legitimacy within development and implementation processes. This tension is well-documented in the literature, as the characteristics of multi-level governance highlight its relevance to normative values (Piattoni, 2009). It is particularly visible in the differing roles assumed by the European Commission and individual Member States. While the European Commission functions as both architect and coordinator of cross-border digital public services, Member States often adopt a reactive and participatory stance towards these developments. The primary normative objectives of cross-border digital public services include inclusiveness, non-discrimination in service provision based on residence and citizenship, and efficiency, with the aim of reducing administrative burden and enabling seamless mobility of citizens and businesses within the European Single Market. Cross-border digital public services are therefore central to advancing both service-oriented and socially oriented public values. Proponents argue that these services support inclusiveness, facilitate citizen mobility, and contribute to the development of a shared European identity, while promoting more effective and efficient public administration across the EU. This alignment with citizen-centric service development underscores the importance of prioritising user experience in digital public services.

A further important challenge concerns ownership and accountability. While the need for cross-border digital public services is driven by EU-level objectives such as inclusiveness and free movement, EU institutions primarily assume a coordinating role in their development. Member States are responsible for implementation and for undertaking the necessary organisational and technical changes, often without clearly identifiable benefits for certain organisations, such as small local administrations. As a result, coordination costs tend to be borne at the EU level, while implementation and organisational change costs fall on national and local administrations. Although ownership of cross-border digital public services is formally shared between EU institutions and Member States, the expected benefits for the organisational units implementing change frequently remain unclear. These multi-level dynamics highlight a persistent gap between EU-level added value and national and local implementation requirements, underscoring the need for governance arrangements that better align responsibilities, costs, and benefits across levels of governance.

For future research, several suggestions emerge from this dissertation. There is a pressing need to move beyond the exploratory analysis and inductive reasoning

that currently characterise much of the research, including this dissertation. Instead, it is crucial to develop comprehensive theoretical frameworks that explain why and under what conditions certain cross-border digital public services succeed or fail, rather than merely describing the symptoms of inadequate development and implementation. This theoretical gap limits the field's ability to offer general explanations for the phenomenon's intriguing, transdisciplinary elements. Depending on the analytical focus, different strands of literature may offer valuable insights. At the macro-level, frameworks such as multi-level governance and Europeanisation can provide valuable explanations of the dynamics and decision-making processes involved in the development of cross-border digital public services. Moreover, the prescriptive normative governance theoretical development would bring a highly valuable contribution in assessing the ideal governing mode of cross-border digital public services in a more a priori way. At the meso-level, theories of collaborative governance and activity theory may provide a valuable lens for examining the relational and collaborative dimensions of cross-border cooperation. At the micro-level, focusing on the organisational analytical level, institutional theory, and change management theory could provide a valuable lens on how individual administrations and organisations adapt to, or resist, the needs for cross-border digital public services.

Regarding European Integration, an inherent contradiction has been found between the aspiration for seamless, integrated cross-border digital public services and the reality of governance primarily established through network models and the shadow of hierarchy that relies on inter-organisational relationships, where national states maintain control. Future research could examine how this fundamental tension between national sovereignty and supranational coordination affects the depth of European digital integration. This includes analysing how the outcomes characterised by the lowest common denominator, typical of intergovernmentalism, manifest in the design and functionality of cross-border digital public services and how this impacts the overall trajectory of European integration in the digital arena.

Despite being considered an integral part of digital era governance, the actual experiences of citizens and businesses using these services remain largely unexplored, representing a critical research gap. Therefore, researchers could investigate user needs, preferences, barriers to adoption, and the perceived added value of cross-border digital public services from the end-user perspective. This could be achieved using quantitative methods to measure and assess the added value and impact on citizens after implementation (*ex post*), as well as qualitative methods to evaluate user needs and experiences related to cross-border digital public services. By utilising phenomenological approaches to capture and theorise the real-life experiences of citizens who interact with these cross-border services, we can gain valuable insights into the actual added value of cross-border digital public services. The ultimate success of these services and, by extension, European integration, hinges on their effective adoption and usage of cross-border digital public services.

## 5. CONCLUSION

This final section of the dissertation brings together the presented research problem, the methodological approach, key findings, and discussion derived from the studies. This section synthesises major insights regarding the development and governance of cross-border digital public services within the EU. In this way, the conclusion summarises the core research problem and research question and summarises the implications and contributions of this dissertation.

Cross-border digital public services development in the EU has been a priority for policymakers over the past few decades. However, the progress and effectiveness of these services still fall short compared to national digital public service delivery. While they play a crucial role in shaping the practical aspects of European integration, the development and governance of cross-border digital public services have not been thoroughly explored. While often considered and investigated from technical perspectives, a socio-technical overview of the inherent complexities and multifaceted characteristics, particularly through a governance lens, is often missing. The main objective of this dissertation is to enhance understanding of the development of cross-border digital public services and their governance within the supranational context of the EU. Consequently, this dissertation aims to fill in this gap through the three main studies (STUDY I, STUDY II, STUDY III), and supporting publications (STUDY IV, V, VI, VII), and tries to answer the following research questions:

### **How are cross-border digital public services in the European Union shaped by their inherent complexities and multifaceted characteristics?**

RQ1.1: What are the characteristics and complexities of cross-border digital public services development and implementation in the EU?

RQ1.2: What governance mechanisms and arrangements are adopted concerning cross-border digital public services?

RQ1.3: What factors affect the sustainability and governance of newly developed interoperability solutions?

The cross-border digital public services in the EU are shaped by the complexities of its political, technological, and inter-organisational aspects at the macro-, meso-, and micro-levels. The simple definition of cross-border digital public services is the provision of digital public services to users across the EU. This implies that users (citizens, businesses, or public administrations) from Member State A can digitally interact with a national service in Member State B and obtain a legally valid service outcome. The legally valid outcome here refers to enrolment or registration as a student in a higher education institution, registration or change of residence, vehicle registration, or the exchange of a driver's license, rather than merely providing digital access to information or online forms. Therefore, the inherent characteristics of cross-border digital public services are multi-level and multi-actor cooperation across multiple national jurisdictions, as

well as the requirement to exchange and utilise data, evidence, and information across national borders, which occurs behind the scenes. It is this requirement for cooperation and the exchange of data between service delivery organisations that poses significant challenges and inherent complexity.

Cross-border digital public services face significant challenges in governing service delivery across national borders, managing inter-organisational relationships, and establishing cross-border interoperability, as well as the capabilities for data exchange and its use across national borders. Their development and long-term sustainability are strongly shaped by the EU's political and institutional environment. Governance arrangements are shaped by the interaction between EU-level institutions and Member States, in which responsibilities are shared rather than centralised. In this context, the European Commission plays a key role in governance, coordination, and facilitation by setting policy directions, establishing common frameworks and digital infrastructures, and supporting cooperation. This confirms that the development of cross-border digital public services has largely followed a top-down approach, aimed at promoting harmonisation, inclusiveness, and the functioning of the internal market. At the same time, Member States retain sovereignty over the delivery of public services. National public administrations are therefore responsible for implementing and delivering cross-border digital public services, including cooperating and exchanging data with other national public administrations. However, the multi-level nature of these services requires effective governance not only at the EU level, but also at national, regional, and local levels.

Although cross-border digital public services development is largely driven by the aim of reducing administrative burden, strengthening EU added value, and improving digital maturity, the concrete organisational benefits for the service delivery organisations involved remain insufficiently acknowledged. Much of the complexity of cross-border digital public services therefore emerges at the meso-level, where interorganisational cooperation and data exchange occur. A key characteristic at this level is the need to coordinate relationships between multiple organisations through agreed governance arrangements. In practice, governance often takes the form of network-based arrangements, which seek to manage the fundamental tension between national sovereignty and supranational coordination. These arrangements can be hybrid network models, where the European Commission assumes a central coordinating role (for example, in OOTS), to network-administrative organisations, where responsibilities are distributed among multiple domain-specific stakeholders (such as EUCARIS and Peppol). Such models depend heavily on both relational trust and legally mandated or diverse forms of cooperation. Legal frameworks, including international agreements and EU regulations, function as key enablers of cross-border service delivery, while national legal frameworks are often considered obstacles.

An additional source of complexity relates to unclear service ownership and accountability within these arrangements. While service delivery and legally valid outcomes materialise at the receiving end of the process, the organisations providing the data (the provider side) often remain less visible. As a result,

responsibilities for service ownership, costs, and benefits are frequently ambiguous, and implementing organisations tend to perceive participation primarily in terms of incurred costs rather than tangible organisational gains. This underscores the need for more adequate governance mechanisms that further clarify ownership, roles, and value distribution across participating organisations. Further complexity arises from the need to balance diverse stakeholder interests, the often-unclear organisational added value of cross-border digital public services, and national-level challenges such as uneven levels of digital development, organisational change requirements, and limited financial and human resources. In light of diverse organisational needs and uneven levels of digital development, value creation through cross-border digital public services ultimately materialises at the micro-level, where citizens and businesses experience concrete service outcomes.

The significance of developing cross-border digital public services lies in their potential to enhance the digital maturity of national public services by enabling cross-border interoperability. Realising this potential, however, requires organisational change within service-providing administrations, including the adaptation of business processes, technological infrastructures, and, where necessary, legal frameworks. The development and effective delivery of cross-border digital public services are therefore shaped by organisations' readiness to undertake such changes, their willingness to cooperate, and their existing levels of digital advancement. At the same time, the need for cross-border interoperability is often assessed narrowly from the perspective of service outcomes alone. This leads to the assumption that administrations with limited incoming cross-border users do not require cross-border interoperability. However, cross-border digital public services inherently involve both an output dimension, where a service outcome is delivered in one Member State, and an input dimension, where data and information are provided by authorities in another Member State. From this perspective, data exchange itself constitutes a form of public service, even when no immediate service outcome is produced domestically. Local administrations with low levels of cross-border user demand may play a crucial role as data providers as well. Consequently, cross-border interoperability should not be understood solely as an outcome or as service delivery, but also as the capability of public administrations to provide reliable, interoperable data as a service. This calls for a more systemic and coordinated approach to interoperability, recognising that not all organisations deliver cross-border services directly, but many are nonetheless essential contributors to cross-border digital public service delivery in the EU.

Based on the findings and discussions of this dissertation, several recommendations can be formulated for the practical aspects of developing and sustaining cross-border digital public services.

- First, greater priority should be given to identifying organisational benefits for the implementing public administrations and to improving understanding of what incentivises or nudges these organisations to implement the changes required to establish cross-border digital public services.

- Second, bottom-up and regional cooperation initiatives should be more supported, particularly in areas where there is a clear and practical need for cross-border interoperability, such as emergency services or other context-specific cross-border activities.
- Third, conceptually, cross-border digital public services should be understood and promoted as an organisational and technical capability rather than a fully new digital service. This also includes acknowledging the organisational changes necessary to deliver cross-border digital public services and clearly articulating the benefits to participating organisations.
- Finally, greater emphasis should be placed on strengthening both the capacity of public administrations to provide data and their capacity to deliver service value to users. While service value and outcomes are what ultimately matter to citizens and businesses, achieving these outcomes depends on cross-border interoperability for sharing information and data across borders.

This dissertation makes several interdisciplinary contributions to the study of cross-border digital public services by integrating perspectives from public administration, information systems, and political science. By drawing on European integration theories, EU governance and public administration frameworks, IT governance, interoperability theory, maturity models, and digital-era governance, the study offers a comprehensive analytical lens for understanding the development and governance of cross-border digital public services in the European Union. A central contribution lies in the application of a macro–meso–micro analytical framework to assess cross-border digital public services as multi-level socio-technical systems. At the macro-level, the dissertation shows how cross-border digital public services are shaped by a predominantly top-down integration logic, in which the European Commission sets policy directions, coordination mechanisms, and interoperability frameworks, while Member States retain sovereignty over service delivery. At the meso-level, the study advances governance theory by analysing how inter-organisational networks, hybrid coordination arrangements, and distributed accountability structures shape implementation dynamics and organisational incentives. At the micro-level, it contributes to interoperability and digital governance literature by conceptualising interoperability as a multi-dimensional organisational capability and by introducing an input–output logic that recognises data exchange itself as a form of public service.

Finally, to the best of the author’s knowledge, this dissertation represents the first comprehensive study dedicated specifically to cross-border digital public services at the EU level. It provides a systematic and integrated understanding of their defining characteristics, governance arrangements, and inherent complexities across multiple levels. By doing so, the dissertation moves beyond outcome-oriented, technically focused studies, offering a theoretically grounded foundation for future research on cross-border digital public services and interoperability within the European Union.

## REFERENCES

- About OOTS – OOTSHUB* –. (n.d.). Retrieved September 11, 2025, from <https://ec.europa.eu/digital-building-blocks/sites/spaces/OOTS/pages/610468075/About+OOTS>
- Akbar, P., Nurmandi, A., Irawan, B., & Loilatu, M. J. (2022). Research Trends in E-Government Interoperability: Mapping Themes and Concepts Based on The Scopus Database. *JeDEM – eJournal of eDemocracy and Open Government*, 14(2), Article 2. <https://doi.org/10.29379/jedem.v14i2.707>
- Akkaya, C., & Krcmar, H. (2018). Towards the Implementation of the EU-Wide “Once-Only Principle”: Perceptions of Citizens in the DACH-Region. In P. Parycek, O. Glassey, M. Janssen, H. J. Scholl, E. Tambouris, E. Kalampokis, & S. Virkar (Eds.), *Electronic Government* (pp. 155–166). Springer International Publishing. [https://doi.org/10.1007/978-3-319-98690-6\\_14](https://doi.org/10.1007/978-3-319-98690-6_14)
- Allen, D. K., Karanasios, S., & Norman, A. (2014). Information sharing and interoperability: The case of major incident management. *European Journal of Information Systems*, 23(4), 418–432. <https://doi.org/10.1057/ejis.2013.8>
- Alonso, Á., Pozo, A., Gordillo, A., López-Pernas, S., Muñoz-Arcentales, A., Marco, L., & Barra, E. (2020). Enhancing University Services by Extending the eIDAS European Specification with Academic Attributes. *Sustainability*, 12(3), Article 3. <https://doi.org/10.3390/su12030770>
- Alvarez-Rodriguez, M., Crahay, A., Di Giacomo, D., Dussutour, C., Ennadif, G., & Talpo, S. (2021). Public administrations’ digital response to COVID-19 in the European Union: A closer look at the enabling factors. *14th International Conference on Theory and Practice of Electronic Governance*, 494–496. <https://doi.org/10.1145/3494193.3494314>
- Alvesson, M., & Sandberg, J. (2023). The Art of Phenomena Construction: A Framework for Coming Up with Research Phenomena beyond ‘the Usual Suspects.’ *Journal of Management Studies*, joms.12969. <https://doi.org/10.1111/joms.12969>
- Ansell, C., & Torfing, J. (Eds.). (2022). *Handbook on Theories of Governance*. Edward Elgar Publishing. <https://doi.org/10.4337/9781800371972>
- Azungah, T. (2018). Qualitative research: Deductive and inductive approaches to data analysis. *Qualitative Research Journal*, 18(4), 383–400. <https://doi.org/10.1108/QRJ-D-18-00035>
- Bangemann Group. (1994). *Report on Europe and Global information society*. [https://aei.pitt.edu/1199/1/info\\_society\\_bangeman\\_report.pdf](https://aei.pitt.edu/1199/1/info_society_bangeman_report.pdf)
- Bannister & Connolly. (2012). Defining e-Governance. *E-Service Journal*, 8(2), 3. <https://doi.org/10.2979/eservicej.8.2.3>
- Bannister, F., & Connolly, R. (2014). ICT, public values and transformative government: A framework and programme for research. *Government Information Quarterly*, 31(1), 119–128. <https://doi.org/10.1016/j.giq.2013.06.002>
- Baxter, P., & Jack, S. (2015). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report*. <https://doi.org/10.46743/2160-3715/2008.1573>
- Bekkers, V., & Homburg, V. (2007). The Myths of E-Government: Looking Beyond the Assumptions of a New and Better Government. *The Information Society*, 23(5), 373–382. <https://doi.org/10.1080/01972240701572913>

- Benamou, N., Busson, A., & Kavel, A. (2004). Impact of e-Government Interoperability in Local Governments. In R. Traummüller (Ed.), *Electronic Government* (pp. 82–87). Springer. [https://doi.org/10.1007/978-3-540-30078-6\\_13](https://doi.org/10.1007/978-3-540-30078-6_13)
- Benz, A., Broschek, J., & Lederer, M. (Eds.). (2021a). *A Research Agenda for Multilevel Governance*. Edward Elgar Publishing. <https://doi.org/10.4337/9781789908374>
- Benz, A., Broschek, J., & Lederer, M. (2021b). Introduction: What is multilevel governance? In A. Benz, J. Broschek, & M. Lederer (Eds.), *A Research Agenda for Multilevel Governance*. Edward Elgar Publishing. <https://doi.org/10.4337/9781789908374.00006>
- Bertot, J., Estevez, E., & Janowski, T. (2016). Universal and contextualized public services: Digital public service innovation framework. *Government Information Quarterly*, 33(2), 211–222. <https://doi.org/10.1016/j.giq.2016.05.004>
- Bickerton, C. J., Hodson, D., & Puetter, U. (2015). The New Intergovernmentalism: European Integration in the Post-Maastricht Era. *JCMS: Journal of Common Market Studies*, 53(4), 703–722. <https://doi.org/10.1111/jcms.12212>
- Boldrin, L., Sellitto, G. P., & Tepandi, J. (2021). TOOP Trust Architecture. In R. Krimmer, A. Prentza, & S. Mamrot (Eds.), *The Once-Only Principle: The TOOP Project* (pp. 126–140). Springer International Publishing. [https://doi.org/10.1007/978-3-030-79851-2\\_7](https://doi.org/10.1007/978-3-030-79851-2_7)
- Börzel, T. (2010). European Governance: Negotiation and Competition in the Shadow of Hierarchy. *JCMS: Journal of Common Market Studies*, 48(2), 191–219. <https://doi.org/10.1111/j.1468-5965.2009.02049.x>
- Börzel, T. A. (2002). Member State Responses to Europeanization. *JCMS: Journal of Common Market Studies*, 40(2), 193–214. <https://doi.org/10.1111/1468-5965.00351>
- Börzel, T. A. (2019). Governance Approaches to European Integration. In *European Integration Theory* (pp. 87–107). Oxford University Press. <https://www.oxfordpoliticstrove.com/display/10.1093/hepl/9780198737315.001.0001/hepl-9780198737315-chapter-5>
- Börzel, T. A., & Risse, T. (2018). From the euro to the Schengen crises: European integration theories, politicization, and identity politics. *Journal of European Public Policy*, 25(1), 83–108. <https://doi.org/10.1080/13501763.2017.1310281>
- Börzel, T. A., & Heard-Lauréote, K. (2009). Networks in EU Multi-level Governance: Concepts and Contributions. *Journal of Public Policy*, 29(2), 135–151. <https://doi.org/10.1017/S0143814X09001044>
- Börzel, T. A., & Risse, T. (2019). Grand theories of integration and the challenges of comparative regionalism. *Journal of European Public Policy*, 26(8), 1231–1252. <https://doi.org/10.1080/13501763.2019.1622589>
- Bouckaert, G. (2015). Governance: A typology and some challenges. In A. Massey & K. Johnston, *The International Handbook of Public Administration and Governance* (pp. 35–55). Edward Elgar Publishing. <https://doi.org/10.4337/9781781954492.00008>
- Bouckaert, G. (2023). The neo-Weberian state: From ideal type model to reality? *Max Weber Studies*, 23(1), 13–59. <https://doi.org/10.1353/max.2023.0002>
- Bouckaert, G., Peters, B. G., & Verhoest, K. (2010a). How To Map Coordination: Issues of Methodology. In G. Bouckaert, B. G. Peters, & K. Verhoest (Eds.), *The Coordination of Public Sector Organizations: Shifting Patterns of Public Management* (pp. 67–92). Palgrave Macmillan UK. [https://doi.org/10.1057/9780230275256\\_4](https://doi.org/10.1057/9780230275256_4)
- Bouckaert, G., Peters, B. G., & Verhoest, K. (2010b). *The coordination of public sector organizations: Shifting patterns of public management*. Palgrave Macmillan.

- Business Register Interconnection System (BRIS)*. (n.d.). Retrieved September 11, 2025, from <https://ec.europa.eu/digital-building-blocks/sites/digital-building-blocks/sites/spaces/DIGITAL/blog/2017/09/19/533365899/Business+Register+Interconnection+System+BRIS>
- Campmas, A., Jacob, N., & Simonelli, F. (2022). How can interoperability stimulate the use of digital public services? An analysis of national interoperability frameworks and e-Government in the European Union. *Data & Policy*, 4, e19. <https://doi.org/10.1017/dap.2022.11>
- Cappemini, Directorate-General for Communications Networks, Content and Technology (European Commission), IDC, Politecnico di Milano, & Sogeti. (2025). *eGovernment benchmark 2025: Building online, user friendly, and interoperable services: factsheets*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2759/9177128>
- Carretero, J., Izquierdo-Moreno, G., Vasile-Cabezas, M., & Garcia-Blas, J. (2018). Federated Identity Architecture of the European eID System. *IEEE Access*, 6, 75302–75326. IEEE Access. <https://doi.org/10.1109/ACCESS.2018.2882870>
- Cavaye, A. L. M. (1997). Challenges during the development of transnational information systems. *Journal of Information Technology*, 12(2), 99–106. <https://doi.org/10.1080/026839697345116>
- Chantillon, M., Crompvoets, J., & Peristeras, V. (2017). *The Governance Landscape of Geospatial E-Services—The Belgian Case*.
- Charalabidis, Y., Flak, L. S., & Viale Pereira, G. (Eds.). (2022). *Scientific Foundations of Digital Governance and Transformation: Concepts, Approaches and Challenges* (Vol. 38). Springer International Publishing. <https://doi.org/10.1007/978-3-030-92945-9>
- Chatterjee, D., & Ravichandran, T. (2004). Beyond exchange models: Understanding the structure of B2B information systems. *Information Systems and E-Business Management*, 2(2), 169–186. <https://doi.org/10.1007/s10257-004-0033-7>
- Chatterjee, D., & Ravichandran, T. (2013). Governance of Interorganizational Information Systems: A Resource Dependence Perspective. *Information Systems Research*, 24(2), 261–278. <https://doi.org/10.1287/isre.1120.0432>
- Chowdhury, M. F. (2014). Interpretivism in Aiding Our Understanding of the Contemporary Social World. *Open Journal of Philosophy*, 4(3), Article 3. <https://doi.org/10.4236/ojpp.2014.43047>
- Christiansson, M.-T., Axelsson, K., & Melin, U. (2015). Inter-organizational Public e-Service Development: Emerging Lessons from an Inside-Out Perspective. In E. Tambouris, M. Janssen, H. J. Scholl, M. A. Wimmer, K. Tarabanis, M. Gascó, B. Klievink, I. Lindgren, & P. Parycek (Eds.), *Electronic Government* (pp. 183–196). Springer International Publishing. [https://doi.org/10.1007/978-3-319-22479-4\\_14](https://doi.org/10.1007/978-3-319-22479-4_14)
- Cini, M., & Czulno, P. (2022). Digital Single Market and the EU Competition Regime: An Explanation of Policy Change. *Journal of European Integration*, 44(1), 41–57. <https://doi.org/10.1080/07036337.2021.2011260>
- Cohen, L., Manion, L., & Morrison, K. (2017). Action research. In *Research Methods in Education* (8th ed.). Routledge.
- Commission, E. (2025). *Work Programme 2025–2027 of the Digital Europe Programme (DIGITAL) | Shaping Europe's digital future*. <https://digital-strategy.ec.europa.eu/en/library/work-programme-2025-2027-digital-europe-programme-digital>
- Common European data spaces | Shaping Europe's digital future*. (n.d.). Retrieved January 19, 2026, from <https://digital-strategy.ec.europa.eu/en/policies/data-spaces>

- Criado, J. I. (2012). Interoperability of eGovernment for Building Intergovernmental Integration in the European Union. *Social Science Computer Review*, 30(1), 37–60. <https://doi.org/10.1177/0894439310392189>
- Cross Border Digital Services | Nordic cooperation. (n.d.). Retrieved December 26, 2025, from <https://www.norden.org/en/information/cross-border-digital-services>
- Dawes, S. S. (2008). The Evolution and Continuing Challenges of E-Governance. *Public Administration Review*, 68(s1), S86–S102. <https://doi.org/10.1111/j.1540-6210.2008.00981.x>
- Dawes, S. S. (2009). Governance in the digital age: A research and action framework for an uncertain future. *Government Information Quarterly*, 26(2), 257–264. <https://doi.org/10.1016/j.giq.2008.12.003>
- Dawes, S. S., Cresswell, A. M., & Pardo, T. A. (2009). From “Need to Know” to “Need to Share”: Tangled Problems, Information Boundaries, and the Building of Public Sector Knowledge Networks. *Public Administration Review*, 69(3), 392–402. [https://doi.org/10.1111/j.1540-6210.2009.01987\\_2.x](https://doi.org/10.1111/j.1540-6210.2009.01987_2.x)
- Dawes, S. S., Gharawi, M. A., & Burke, G. B. (2012). Transnational public sector knowledge networks: Knowledge and information sharing in a multi-dimensional context. *Government Information Quarterly*, 29, S112–S120. <https://doi.org/10.1016/j.giq.2011.08.002>
- Deleixhe, M., & Duez, D. (2021). The new European border and coast guard agency: Pooling sovereignty or giving it up? In *Understanding Conflicts of Sovereignty in the EU*. Routledge.
- Distel, B., & Lindgren, I. (2019). Who Are the Users of Digital Public Services?: A Critical Reflection on Differences in the Treatment of Citizens as ‘Users’ in e-government Research. In P. Panagiotopoulos, N. Edelmann, O. Glassey, G. Misuraca, P. Parycek, T. Lampoltshammer, & B. Re (Eds.), *Electronic Participation* (Vol. 11686, pp. 117–129). Springer International Publishing. [https://doi.org/10.1007/978-3-030-27397-2\\_10](https://doi.org/10.1007/978-3-030-27397-2_10)
- Dunleavy, P. (Ed.). (2006). *Digital era governance: IT corporations, the state, and E-government*. Oxford University Press.
- Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New Public Management Is Dead—Long Live Digital-Era Governance. *Journal of Public Administration Research and Theory*, 16(3), 467–494. <https://doi.org/10.1093/jopart/mui057>
- Eberlein, B., & Newman, A. L. (2008). Escaping the International Governance Dilemma? Incorporated Transgovernmental Networks in the European Union. *Governance*, 21(1), 25–52. <https://doi.org/10.1111/j.1468-0491.2007.00384.x>
- Edelenbos, J., & Van Meerkerk, I. (2016). Normative theory. In C. Ansell & J. Torfing (Eds.), *Handbook on Theories of Governance*. Edward Elgar Publishing. <https://doi.org/10.4337/9781782548508.00044>
- Egan, M. (2020). The Internal Market: Increasingly Differentiated? In R. Coman, A. Crespy, & V. A. Schmidt (Eds.), *Governance and Politics in the Post-Crisis European Union* (1st ed., pp. 159–178). Cambridge University Press. <https://doi.org/10.1017/9781108612609.011>
- Elbardan, H., & Kholeif, A. O. R. (2017). An Interpretive Approach for Data Collection and Analysis. In H. Elbardan & A. O. Kholeif (Eds.), *Enterprise Resource Planning, Corporate Governance and Internal Auditing: An Institutional Perspective* (pp. 111–165). Springer International Publishing. [https://doi.org/10.1007/978-3-319-54990-3\\_5](https://doi.org/10.1007/978-3-319-54990-3_5)
- Engvall, T., & Flak, L. S. (2022).

- Digital Governance as a Scientific Concept. In Y. Charalabidis, L. S. Flak, & G. Viale Pereira (Eds.), *Scientific Foundations of Digital Governance and Transformation: Concepts, Approaches and Challenges* (pp. 25–50). Springer International Publishing. [https://doi.org/10.1007/978-3-030-92945-9\\_2](https://doi.org/10.1007/978-3-030-92945-9_2)
- Escobar, F., Almeida, W. H. C., & Varajão, J. (2022). Digital transformation success in the public sector: A systematic literature review of cases, processes, and success factors. *Information Polity*, 1–21. <https://doi.org/10.3233/IP-211518>
- EUCARIS – EUCARIS is the EUropean CAR and driving license Information System. (n.d.). EUCARIS. Retrieved August 8, 2025, from <https://www.eucaris.net/>
- European Commission. (2023). *Annual report on the Single Market in the EU*.
- European Commission. (2025, August 8). *Electronic cross-border health services—European Commission*. [https://health.ec.europa.eu/ehealth-digital-health-and-care/digital-health-and-care/electronic-cross-border-health-services\\_en](https://health.ec.europa.eu/ehealth-digital-health-and-care/digital-health-and-care/electronic-cross-border-health-services_en)
- European Commission. Directorate General for Communications Networks, Content and Technology., Capgemini., Sogeti., IDC., & Politecnico di Milano. (2024a). *eGovernment benchmark 2024: Advancing pillars in digital public service delivery : insight report*. Publications Office. <https://data.europa.eu/doi/10.2759/0684>
- European Commission. Directorate General for Communications Networks, Content and Technology., Capgemini., Sogeti., IDC., & Politecnico di Milano. (2024b). *eGovernment benchmark: Method paper 2020 2024*. Publications Office. <https://data.europa.eu/doi/10.2759/56497>
- Feleke, H., & Lessa, L. (2024). Maturity as a critical sustainability factor for e-government: Toward a conceptual framework. *THE ELECTRONIC JOURNAL OF INFORMATION SYSTEMS IN DEVELOPING COUNTRIES*, 90(3), e12308. <https://doi.org/10.1002/isd2.12308>
- Fritsch, M., & Bartenrath, R. (2019). *Cross border services in the internal market: An important contribution to economic and social cohesion* [Study].
- Gil-Garcia, J. R., Chun, S. A., & Janssen, M. (2009). Government information sharing and integration: Combining the social and the technical. *Information Polity*, 14(1–2), 1–10. <https://doi.org/10.3233/IP-2009-0176>
- Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: Finding the crossroads. *Public Management Review*, 20(5), 633–646. <https://doi.org/10.1080/14719037.2017.1327181>
- Gil-Garcia, J. R., Guler, A., Pardo, T. A., & Burke, G. B. (2019). Characterizing the importance of clarity of roles and responsibilities in government inter-organizational collaboration and information sharing initiatives. *Government Information Quarterly*, 36(4), 101393. <https://doi.org/10.1016/j.giq.2019.101393>
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, 16(1), 15–31. <https://doi.org/10.1177/1094428112452151>
- Gomm, R., Hammersley, M., & Foster, P. (Eds.). (2000). *Case study method: Key issues, key texts*. SAGE.
- Gottschalk, P. (2009). Maturity levels for interoperability in digital government. *Government Information Quarterly*, 26(1), 75–81. <https://doi.org/10.1016/j.giq.2008.03.003>
- Grant, G., & Tan, F. B. (2013). Governing IT in inter-organizational relationships: Issues and future research. *European Journal of Information Systems*, 22(5), 493–497. <https://doi.org/10.1057/ejis.2013.21>

- Graux, H. (2021). The Single Digital Gateway Regulation as an Enabler and Constraint of Once-Only in Europe. In R. Krimmer, A. Prentza, & S. Mamrot (Eds.), *The Once-Only Principle* (Vol. 12621, pp. 83–103). Springer International Publishing. [https://doi.org/10.1007/978-3-030-79851-2\\_5](https://doi.org/10.1007/978-3-030-79851-2_5)
- Gregor. (2006). The Nature of Theory in Information Systems. *MIS Quarterly*, 30(3), 611. <https://doi.org/10.2307/25148742>
- Guy Peters, B. (2022). Institutional theory. In C. Ansell & J. Torfing (Eds.), *Handbook on Theories of Governance*. Edward Elgar Publishing. <https://doi.org/10.4337/9781800371972.00039>
- Haas, E. B. (2004). *The uniting of Europe: Political, social, and economic forces, 1950–1957*. University of Notre Dame Press.
- Halmos, A. (2018). Cross-border digital public services. In J. W. Scott (Ed.), *Cross-border Review—Year Book 2018*. Central European Service for Cross-border Initiatives (CESCI). [https://budapest.cesci-net.eu/wp-content/uploads/\\_publications/CBR/CBR\\_Y2018.pdf](https://budapest.cesci-net.eu/wp-content/uploads/_publications/CBR/CBR_Y2018.pdf)
- Hancock, A., & Moens, B. (2025, June 24). Europe’s plan to finally make its single market work. *Financial Times*. <https://www.ft.com/content/ae2aeb68-7d74-4803-9133-ee9a5b7686ea>
- Harcourt, A. J., & Radaelli, C. M. (2023). The single market. In *The Elgar Companion to the European Union* (pp. 224–234). Edward Elgar Publishing. <https://www.elgaronline.com/edcollchap/book/9781800883437/book-part-9781800883437-28.xml>
- Heidebrecht, S. (2025). Digital Policy as a Driver of Integration: Spillover Effects and European Commission Empowerment. *Politics and Governance*, 13(0). <https://www.cogitatiopress.com/politicsandgovernance/article/view/10474>
- Hevner, A., & Chatterjee, S. (2010). Design Science Research in Information Systems. In A. Hevner & S. Chatterjee, *Design Research in Information Systems* (Vol. 22, pp. 9–22). Springer US. [https://doi.org/10.1007/978-1-4419-5653-8\\_2](https://doi.org/10.1007/978-1-4419-5653-8_2)
- Hodapp, D., & Hanelt, A. (2022). Interoperability in the era of digital innovation: An information systems research agenda. *Journal of Information Technology*, 026839622110643. <https://doi.org/10.1177/02683962211064304>
- Hodson, D., & Puetter, U. (2019). The European Union in disequilibrium: New intergovernmentalism, postfunctionalism and integration theory in the post-Maastricht period. *Journal of European Public Policy*, 26(8), 1153–1171. <https://doi.org/10.1080/13501763.2019.1569712>
- Hooghe, L., & Marks, G. (2019). Grand theories of European integration in the twenty-first century. *Journal of European Public Policy*, 26(8), 1113–1133. <https://doi.org/10.1080/13501763.2019.1569711>
- Janowski, T. (2015). 22. From electronic governance to policydriven electronic governance – evolution of technology use in government. In L. Cantoni & J. A. Danowski (Eds.), *Communication and Technology* (pp. 425–438). DE GRUYTER. <https://doi.org/10.1515/9783110271355-024>
- Janssen, M., Charalabibis, Y., Kuk, G., & Cresswell, T. (2011). Introduction: E-government Interoperability, Infrastructure and Architecture: State-of-the-art and Challenges. *Journal of Theoretical and Applied Electronic Commerce Research*, 6(1), I–VIII. <https://doi.org/10.4067/S0718-18762011000100001>
- Kalvet, T., Toots, M., & Krimmer, R. (2018). Contributing to a digital single market for Europe: Barriers and drivers of an EU-wide once-only principle. *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*, 1–8. <https://doi.org/10.1145/3209281.3209344>

- Kapucu, N. (2014). Complexity, Governance and Networks: Perspectives from Public Administration. *Complexity, Governance & Networks*, 1(1), 29.  
<https://doi.org/10.7564/14-CGN3>
- Keast, R., Mandell, M. P., & Agranoff, R. (Eds.). (2013). *Network Theory in the Public Sector: Building New Theoretical Frameworks*. Routledge.  
<https://doi.org/10.4324/9780203752562>
- Kenis, P., Schol, L. G. C., Kraaij-Dirkzwager, M. M., & Timen, A. (2019). Appropriate Governance Responses to Infectious Disease Threats: Developing Working Hypotheses. *Risk, Hazards & Crisis in Public Policy*, 10(3), 275–293.  
<https://doi.org/10.1002/rhc3.12176>
- Kjær, A. M. (2010). *Governance* (Repr). Polity Press.
- Klein, H. K., & Myers, M. D. (1999). A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. *MIS Quarterly*, 23(1), 67–93.  
<https://doi.org/10.2307/249410>
- Klievink, B., & Janssen, M. (2009). Realizing joined-up government—Dynamic capabilities and stage models for transformation. *Government Information Quarterly*, 26(2), 275–284. <https://doi.org/10.1016/j.giq.2008.12.007>
- Klievink, B., Janssen, M., & Tan, Y.-H. (2012). A Stakeholder Analysis of Business-to-Government Information Sharing: The Governance of a Public-Private Platform. *International Journal of Electronic Government Research*, 8.
- Köpping Athanasopoulos, H. (2020). Neofunctionalism in Theory and Practice. In H. Köpping Athanasopoulos (Ed.), *EU Migration Management and the Social Purpose of European Integration: The Spillover of Misery* (pp. 13–41). Springer International Publishing. [https://doi.org/10.1007/978-3-030-42040-6\\_2](https://doi.org/10.1007/978-3-030-42040-6_2)
- Larsson, H., & Grönlund, Å. (2014). Future-oriented eGovernance: The sustainability concept in eGov research, and ways forward. *Government Information Quarterly*, 31(1), 137–149. <https://doi.org/10.1016/j.giq.2013.07.004>
- Layne, K., & Lee, J. (2001). Developing fully functional E-government: A four stage model. *Government Information Quarterly*, 18(2), 122–136.  
[https://doi.org/10.1016/S0740-624X\(01\)00066-1](https://doi.org/10.1016/S0740-624X(01)00066-1)
- Leosk, N., Pöder, I., Schmidt, C., Kalvet, T., & Krimmer, R. (2021). Drivers for and Barriers to the Cross-border Implementation of the Once-Only Principle. In R. Krimmer, A. Prentza, & S. Mamrot (Eds.), *The Once-Only Principle: The TOOP Project* (pp. 38–60). Springer International Publishing.  
[https://doi.org/10.1007/978-3-030-79851-2\\_3](https://doi.org/10.1007/978-3-030-79851-2_3)
- Lindgren, I. (2013). *Public e-Service Stakeholders: A Study on Who Matters for Public e-Service Development and Implementation*. Linkopings Universitet.  
<http://ebookcentral.proquest.com/lib/kuleuvenul/detail.action?docID=30401633>
- Lindgren, I., & Jansson, G. (2013). Electronic services in the public sector: A conceptual framework. *Government Information Quarterly*, 30(2), 163–172.  
<https://doi.org/10.1016/j.giq.2012.10.005>
- Lindgren, I., Madsen, C. Ø., Hofmann, S., & Melin, U. (2019). Close encounters of the digital kind: A research agenda for the digitalization of public services. *Government Information Quarterly*, 36(3), 427–436. <https://doi.org/10.1016/j.giq.2019.03.002>
- Lindgren, I., & van Veenstra, A. F. (2018). Digital government transformation: A case illustrating public e-service development as part of public sector transformation. *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*, 1–6.  
<https://doi.org/10.1145/3209281.3209302>

- Loukis, E., Janssen, M., Dawes, S., & Zheng, L. (2016). Evolving ICT and governance in organizational networks—Conceptual and theoretical foundations. *Electronic Markets*, 26(1), 7–14. <https://doi.org/10.1007/s12525-015-0210-1>
- Lowndes, V., & Skelcher, C. (1998). The Dynamics of Multi-organizational Partnerships: An Analysis of Changing Modes of Governance. *Public Administration*, 76(2), 313–333. <https://doi.org/10.1111/1467-9299.00103>
- Lumineau, F., Kong, D. T., & Dries, N. (2024). *A Roadmap for Navigating Phenomenon-Based Research in Management* (SSRN Scholarly Paper No. 5031962). Social Science Research Network. <https://doi.org/10.2139/ssrn.5031962>
- Luna-Reyes, L. F., Andersen, D. F., Black, L. J., & Pardo, T. A. (2021). Sensemaking and social processes in digital government projects. *Government Information Quarterly*, 38(2), 101570. <https://doi.org/10.1016/j.giq.2021.101570>
- Lynn, T., Rosati, P., Conway, E., Curran, D., Fox, G., & O’Gorman, C. (2022). Digital Public Services. In T. Lynn, P. Rosati, E. Conway, D. Curran, G. Fox, & C. O’Gorman, *Digital Towns* (pp. 49–68). Springer International Publishing. [https://doi.org/10.1007/978-3-030-91247-5\\_3](https://doi.org/10.1007/978-3-030-91247-5_3)
- Lyytinen, K., & Damsgaard, J. (2001). What’s Wrong with the Diffusion of Innovation Theory? In M. A. Ardis & B. L. Marcolin (Eds.), *Diffusing Software Product and Process Innovations* (pp. 173–190). Springer US. [https://doi.org/10.1007/978-0-387-35404-0\\_11](https://doi.org/10.1007/978-0-387-35404-0_11)
- Maier, C., Thatcher, J. B., Grover, V., & Dwivedi, Y. K. (2023). Cross-sectional research: A critical perspective, use cases, and recommendations for IS research. *International Journal of Information Management*, 70, 102625. <https://doi.org/10.1016/j.ijinfomgt.2023.102625>
- Mărcuț, M. (2020). *The Governance of Digital Policies: Towards a New Competence in the European Union*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-38073-1>
- Marks, G. (1993). Structural Policy and Multilevel Governance in the EC. In *The state of the European Community* (In A. Cafruny & G. Rosenthal (Eds.), pp. 391–410). Lynne Rienner.
- Markus, M. L., & Bui, Q. “Neo.” (2012). Going Concerns: The Governance of Interorganizational Coordination Hubs. *Journal of Management Information Systems*, 28(4), 163–198. <https://doi.org/10.2753/MIS0742-1222280407>
- Martinez, O. J. (2024). Adapting to an Economic Crisis: The Market System vs Hierarchical Governance. *Journal of Macromarketing*, 44(3), 723–736. <https://doi.org/10.1177/02761467241234250>
- Mazur, V., & Ramiro Troitiño, D. (2024). Digitalization, Neofunctionalism, and Integration in the European Union. In D. Ramiro Troitiño (Ed.), *E-Governance in the European Union: Strategies, Tools, and Implementation* (pp. 7–22). Springer Nature Switzerland. [https://doi.org/10.1007/978-3-031-56045-3\\_2](https://doi.org/10.1007/978-3-031-56045-3_2)
- McBride, K., Misnikov, Y., & Draheim, D. (2021). *Discussing The Foundations for Interpretivist Digital Government Research*.
- McNiff, J. (2017). *Action Research: All you need to know*. SAGE.
- Meijer, A., Bolívar, M. P. R., & Gil-Garcia, J. R. (2018). From E-Government to Digital Era Governance and Beyond: Lessons from 15 Years of Research into Information and Communications Technology in the Public Sector. *Journal of Public Administration Research and Theory*.
- Miller, G. (Ed.). (1999). *Handbook of research methods in public administration*. Dekker.

- Mulder, E.-J. (2024). Europeanization the Digital Way: Trans-European IT Systems—The Case of EESSI. In D. Ramiro Troitiño (Ed.), *E-Governance in the European Union: Strategies, Tools, and Implementation* (pp. 227–241). Springer Nature Switzerland. [https://doi.org/10.1007/978-3-031-56045-3\\_15](https://doi.org/10.1007/978-3-031-56045-3_15)
- Neuman, W. L. (2008). *Social research methods: Qualitative and quantitative approaches* (6. ed., repr). Pearson.
- Nicoli, F. (2020). Neofunctionalism revisited: Integration theory and varieties of outcomes in the Eurocrisis. *Journal of European Integration*, 42(7), 897–916. <https://doi.org/10.1080/07036337.2019.1670658>
- Nielsen, M. M. (2020). *The Demise of eGovernment Maturity Models: Framework and Case Studies* [Doctoral Dissertation, Tallinn University of Technology]. <https://doi.org/10.23658/taltech.20/2020>
- Nowell, B., & Milward, H. B. (2022). *Apples to Apples: A Taxonomy of Networks in Public Management and Policy* (1st ed.). Cambridge University Press. <https://doi.org/10.1017/9781108987646>
- Pardo, T. A., Gil-Garcia, J. R., & Luna-Reyes, L. F. (2012). *Collaborative Governance and Cross-Boundary Information Sharing: Envisioning a Networked and IT-Enabled Public Administration*.
- Peristeras, V., Tarabanis, K., & Loutas, N. (2007). Cross – Border Public Services: Analysis and Modeling. *2007 40th Annual Hawaii International Conference on System Sciences (HICSS'07)*, 101–101. <https://doi.org/10.1109/HICSS.2007.158>
- Piattoni, S. (2009). Multi-level Governance: A Historical and Conceptual Analysis. *Journal of European Integration*, 31(2), 163–180. <https://doi.org/10.1080/07036330802642755>
- Powell, W. (1990). Neither Market Nor Hierarchy: Network Forms of Organization. *Research in Organizational Behaviour*, 12, 295–336.
- Prentza, A., Mitzman, D., Ehasu, M., & Leontaridis, L. (2021). TOOP Pilot Experiences: Challenges and Achievements in Implementing Once-Only in Different Domains and Member States. In R. Krimmer, A. Prentza, & S. Mamrot (Eds.), *The Once-Only Principle: The TOOP Project* (pp. 191–207). Springer International Publishing. [https://doi.org/10.1007/978-3-030-79851-2\\_10](https://doi.org/10.1007/978-3-030-79851-2_10)
- Provan, K. G., & Kenis, P. (2008). Modes of Network Governance: Structure, Management, and Effectiveness. *Journal of Public Administration Research and Theory: J-PART*, 18(2), 229–252.
- Ramiro Troitiño, D. (2022). Jean Monnet: Neofunctionalism at Work in the European Integration. In D. Ramiro Troitiño, R. Martín de la Guardia, & G. A. Pérez Sánchez (Eds.), *The European Union and its Political Leaders: Understanding the Integration Process* (pp. 121–140). Springer International Publishing. [https://doi.org/10.1007/978-3-030-96662-1\\_13](https://doi.org/10.1007/978-3-030-96662-1_13)
- Ramiro Troitiño, D. (Ed.). (2024). *E-Governance in the European Union: Strategies, Tools, and Implementation*. Springer Nature Switzerland. <https://doi.org/10.1007/978-3-031-56045-3>
- Ramiro Troitiño, D., & Mazur, V. (2024). The Strategy of the European Institutions on Digital Integration. In D. Ramiro Troitiño (Ed.), *E-Governance in the European Union: Strategies, Tools, and Implementation* (pp. 23–38). Springer Nature Switzerland. [https://doi.org/10.1007/978-3-031-56045-3\\_3](https://doi.org/10.1007/978-3-031-56045-3_3)
- Ravšelj, D., Umek, L., Todorovski, L., & Aristovnik, A. (2022). A Review of Digital Era Governance Research in the First Two Decades: A Bibliometric Study. *Future Internet*, 14(5), Article 5. <https://doi.org/10.3390/fi14050126>

- Rukanova, B., Wigand, R. T., van Stijn, E., & Tan, Y.-H. (2015). Understanding transnational information systems with supranational governance: A multi-level conflict management perspective. *Government Information Quarterly*, 32(2), 182–197. <https://doi.org/10.1016/j.giq.2014.12.003>
- Sadeghi, M., Carenini, A., Corcho, O., Rossi, M., Santoro, R., & Vogelsang, A. (2024). Interoperability of heterogeneous Systems of Systems: From requirements to a reference architecture. *The Journal of Supercomputing*, 80(7), 8954–8987. <https://doi.org/10.1007/s11227-023-05774-3>
- Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research methods for business students* (7th edition). Pearson.
- Saurugger, S. (2023). Grand theories of integration: Neofunctionalism, intergovernmentalism and constructivism. In S. Faure & C. Lequesne (Eds.), *The Elgar Companion to the European Union* (pp. 13–26). Edward Elgar Publishing. <https://doi.org/10.4337/9781800883437.00009>
- Savoldelli, A., Codagnone, C., & Misuraca, G. (2014). Understanding the e-government paradox: Learning from literature and practice on barriers to adoption. *Government Information Quarterly*, 31, S63–S71. <https://doi.org/10.1016/j.giq.2014.01.008>
- Savrul, M. (2023). Digital Union – European Union Digital Market and Transformation. In A. Günar & D. Saygın (Eds.), *The European Union in the Twenty-First Century: Major Political, Economic and Security Policy Trends* (p. 0). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-80382-537-320231004>
- Schengen Information System—European Commission*. (n.d.). Retrieved September 11, 2025, from [https://home-affairs.ec.europa.eu/policies/schengen/schengen-information-system\\_en](https://home-affairs.ec.europa.eu/policies/schengen/schengen-information-system_en)
- Schimmelfennig, F. (2019). The choice for differentiated Europe: An intergovernmentalist theoretical framework. *Comparative European Politics*, 17(2), 176–191. <https://doi.org/10.1057/s41295-019-00166-5>
- Schmidt, C., & Krimmer, R. (2022). How to implement the European digital single market: Identifying the catalyst for digital transformation. *Journal of European Integration*, 44(1), 59–80. <https://doi.org/10.1080/07036337.2021.2011267>
- Schmitter, P. C. (2009). On the Way to a Post-Functionalist Theory of European Integration. *British Journal of Political Science*, 39(1), 211–215. <https://doi.org/10.1017/s0007123408000483>
- Scholl, H. J. (2015). *E-Government: Information, Technology, and Transformation: Information, Technology, and Transformation*. Routledge. <https://doi.org/10.4324/9781315704906>
- Scholl, H. J. (2020). Digital Government: Looking Back and Ahead on a Fascinating Domain of Research and Practice. *Digital Government: Research and Practice*, 1(1), 1–12. <https://doi.org/10.1145/3352682>
- Scholta, H., Mertens, W., Kowalkiewicz, M., & Becker, J. (2019). From one-stop shop to no-stop shop: An e-government stage model. *Government Information Quarterly*, 36(1), 11–26. <https://doi.org/10.1016/j.giq.2018.11.010>
- Schwalm, S., & Alamillo-Domingo, I. (2022). *Self-Sovereign-Identity & eIDAS: A Contradiction? Challenges and Chances of eIDAS 2.0\**. 89–108. <https://doi.org/10.53136/979125994752910>
- Schwarz, G. M., & Stensaker, I. G. (2016). Showcasing phenomenon-driven research on organizational change. *Journal of Change Management*, 16(4), 245–264. <https://doi.org/10.1080/14697017.2016.1230931>

- Stephenson, P. (2013). Twenty years of multi-level governance: ‘Where Does It Come From? What Is It? Where Is It Going?’ *Journal of European Public Policy*, 20(6), 817–837. <https://doi.org/10.1080/13501763.2013.781818>
- Stoker, G. (2018). Governance as theory: Five propositions. *International Social Science Journal*, 68(227–228), 15–24. <https://doi.org/10.1111/issj.12189>
- Tan, E., & Cromptvoets, J. (Eds.). (2022). *The new digital era governance: How new digital technologies are shaping public governance*. Brill | Wageningen Academic. <https://doi.org/10.3920/978-90-8686-930-5>
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8, 10.
- Tolk, A. (2013). Interoperability, Composability, and Their Implications for Distributed Simulation: Towards Mathematical Foundations of Simulation Interoperability. *2013 IEEE/ACM 17th International Symposium on Distributed Simulation and Real Time Applications*, 3–9. <https://doi.org/10.1109/DS-RT.2013.8>
- Troitiño, D. R., Mazur, V., & Kerikmäe, T. (2024). E-governance and integration in the European union. *Internet of Things*, 27, 101321. <https://doi.org/10.1016/j.iot.2024.101321>
- Twizeyimana, J. D., & Andersson, A. (2019). The public value of E-Government – A literature review. *Government Information Quarterly*, 36(2), 167–178. <https://doi.org/10.1016/j.giq.2019.01.001>
- Van Cauter, L. (2016). *Government-to-government information system failure in Flanders: An in-depth study* [Doctoral Dissertation]. KU Leuven.
- van den Broek, T., & van Veenstra, A. F. (2018). Governance of big data collaborations: How to balance regulatory compliance and disruptive innovation. *Technological Forecasting and Social Change*, 129, 330–338. <https://doi.org/10.1016/j.techfore.2017.09.040>
- van Gestel, N. (2024). A persistent ideal of public services networks amid alternative reform strategies: A study over three decades. *Public Management Review*, 26(8), 2380–2401. <https://doi.org/10.1080/14719037.2023.2269962>
- Velicogna, M., Steigenga, E., Taal, S., & Schmidt, A. (2020). Connecting EU Jurisdictions: Exploring How to Open Justice Across Member States Through ICT. *Social Science Computer Review*, 38(3), 274–294. <https://doi.org/10.1177/0894439318786949>
- Vilpišauskas, R. (2013). Eurozone Crisis and European Integration: Functional Spillover, Political Spillover? *Journal of European Integration*, 35(3), 361–373. <https://doi.org/10.1080/07036337.2013.774785>
- Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems*, 15(3), 320–330. <https://doi.org/10.1057/palgrave.ejis.3000589>
- Webber, D. (2019). Trends in European political (dis)integration. An analysis of postfunctionalist and other explanations. *Journal of European Public Policy*, 26(8), 1134–1152. <https://doi.org/10.1080/13501763.2019.1576760>
- Williams, I., Falch, M., & Tadayoni, R. (2018). Institutional Legitimacy and Digital Public Cross-Border Service Delivery Between Denmark/Sweden and Denmark/Germany. *Nordic and Baltic Journal of Information and Communications Technologies*, 2018(1), 121–152. <https://doi.org/10.13052/nbjict1902-097X.2018.008>
- Wimmer, M. A., Boneva, R., & Di Giacomo, D. (2018). Interoperability governance: A definition and insights from case studies in Europe. *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*, 1–11. <https://doi.org/10.1145/3209281.3209306>

- Wouters, S., Janssen, M., & Crompvoets, J. (2021). Understanding Actor Roles in Inter-organizational Digital Public Services. In H. J. Scholl, J. R. Gil-Garcia, M. Janssen, E. Kalampokis, I. Lindgren, & M. P. Rodríguez Bolívar (Eds.), *Electronic Government* (pp. 43–58). Springer International Publishing.  
[https://doi.org/10.1007/978-3-030-84789-0\\_4](https://doi.org/10.1007/978-3-030-84789-0_4)
- Wouters, S., Janssen, M., Lember, V., & Crompvoets, J. (2023). Strategies to advance the dream of integrated digital public service delivery in inter-organizational collaboration networks. *Government Information Quarterly*, 40(1), 101779.  
<https://doi.org/10.1016/j.giq.2022.101779>
- Xiao, Y., & Watson, M. (2019). Guidance on Conducting a Systematic Literature Review. *Journal of Planning Education and Research*, 39(31), 93–112.  
<https://doi.org/10.1177/0739456X1772397>
- Yadav, J., Saini, A. K., & Yadav, A. K. (2022). Analysing and securing the sustainability of e-Government projects from technical aspect using employees perspective approach. *International Journal of Information Technology*, 14(2), 1131–1143.  
<https://doi.org/10.1007/s41870-019-00333-7>
- Yang, T.-M., Pardo, T., & Wu, Y.-J. (2014). How is information shared across the boundaries of government agencies? An e-Government case study. *Government Information Quarterly*, 31(4), 637–652. <https://doi.org/10.1016/j.giq.2014.05.002>
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (Sixth edition). SAGE.

## SUMMARY IN ESTONIAN

### **Euroopa Liidu digitaalne lõimumine: piiriüleste digitaalsete avalike teenuste arendamine ja haldamine**

Euroopa digitaalne integratsioon on olnud Euroopa Liidu (EL) strateegiline fookus juba mitu aastakümnet. Teenuste vaba liikumise eesmärk kogu ELis pärineb 1957. aastast ning seda peetakse Euroopa Liidu üheks keskseks põhimõtteks. Siiski ei ole see eesmärk tänaseni täielikult saavutatud. Tehnoloogia areng ja selle kasvav kasutus valitsuste poolt üle maailma on lubanud suuremat tõhusust, tulemuslikkust ja kulude kokkuhoidu nii kodanikele, ettevõtetele kui ka avalikele asutustele. Kuigi avalike teenuste suurenenud digitaliseeritus on mõnedes liikmesriikides toonud kaasa edusamme, seisavad Euroopa Liidu kodanikud ja ettevõtted riigiüleste digitaalsete teenuste kasutamisel endiselt silmitsi märkimisväärsete väljakutsetega. Näiteks ei ole Eesti kodanikul võimalik kasutada digiretsepti teise riigi kohalikus apteegis, hoolimata Eesti kõrgelt arenenud digitaalsest tervishoiusüsteemist. Vaatamata sellele, et piiriüleste digitaalsete avalike teenuste arendamise vajadust on juba pikalt teadvustatud, jäävad need endiselt maha riigisisest pakutavatest digitaalsetest avalikest teenustest. Piiriüleste digitaalsete avalike teenuste tähtsus ilmnes eriti selgelt COVID-19 pandeemia ajal, mil kodanike ja ettevõtete liikumine oli oluliselt piiratud ning sõltuti peamiselt digitaalsest ligipääsust. See näitab, et Euroopa digitaalne integratsioon on Euroopa Liidus veel saavutamata, vaatamata pikaajalistele investeringutele.

Kuigi senine teadustöö on andnud olulise panuse Euroopa integratsiooni kõrgetasemelise poliitilise dünaamika ning piiriüleste digitaalsete teenuste tehnilise arengu mõistmisse, pakuvad mittetehnilised aspektid, eriti nende arenduste juhtimine, jätkuvalt väljakutset ning on alauuritud. Lisaks on ka piiriüleste digitaalsete avalike teenuste kestlikkuse mõõde suures osas läbi uurimata, kuivõrd see viitab taristu ja teenuste tulevikku suunatud võimekusele jätkata talitust ja kohaneda põhjapanevate sotsiaalsete, majanduslike, keskkondlike ning tehnoloogiliste muutustega. Teadlaste hinnangul on juhtimis- korraldused keskse tähtsusega eeltingimuseks keerukate võrgustunud avalike teenuste ökosüsteemide, sealhulgas piiriüleste digitaalsete avalike teenuste, edukaks toimimiseks. Piiriüleste digitaalsete avalike teenuste kujutavad endast EL-i integratsiooni kõrgeimat taset, kuna need föderaliseerivad riiklike avalike teenuste kättesaadavuse ja osutamise piiriülel tasandil. See föderaliseerimine ei piirdu ainult tehnilise andmestiku jagamise võimaldamisega, vaid hõlmab ka digitaalsete avalike teenuste ühist juhtimist, mida on vaja paremini mõista, selgitamiseks nende teenuste eripärasid, keerukust ning põhjuseid, miks neid ei arendata ja rakendata suuremas mahus ning miks nende juhtimine ja arendamine on sedavõrd suur väljakutse. Seetõttu käsitleb käesolev doktoritöö piiriüleste digitaalsete avalike teenuste mitmetahulise riikideülese probleemina, mis ühendab poliitika, tehnoloogia ja juhtimise aspekte ning mida kujundavad

mitmetasandilised suhted ELi institutsioonide ja suveräänsete liikmesriikide vahel, kus digitaalsed piirid püsivad hoolimata digiteenuste piirideta olemusest. Seega on uurimislüngaks, millele käesolev doktoritöö keskendub, keerukad juhtimiskorraldused, mitmetasandiliste ja mitmekesiste osapoolte vastastikmõju ning tegurid, mis hõlbustavad või takistavad piirideülest teenusepakkumist.

Sellest tulenevalt on doktoritöö põhieesmärgiks süvendada teadmisi piiriüleste digitaalsete avalike teenuste arendamisest ja juhtimisest riikideüleses kontekstis, eriti EL-is. Doktoritöö eesmärgiks on vähendada seda uurimislünka, edendades teadmisi piiriüleste digitaalsete avalike teenuste arendamisega seotud eripäradest, keerukusest ja juhtimiskorraldustest. Doktoritöö põhineb süsteemaatilisel sünteesil teaduskirjandusest, mis käsitleb piiriüleseid digitaalseid avalikke teenuseid (uurimus I) ja koostalitlusvõime lahenduste juhtimise ja kestlikkuse (uurimus II) ning kasutatavate juhtimiskorralduste (uurimus III) analüüsil. Doktoritöö järeldusi toetavad autori varasemate publikatsioonide tulemused (uurimused IV, V, VI, VII). Doktoritöö keskseks uurimisküsimuseks on: „Kuidas arendatakse, juhitakse ja kujundatakse Euroopa Liidus piiriüleseid digitaalseid avalikke teenuseid, arvestades nende olemuslikku keerukust ja mitmetahulisust?“

Doktoritöö teoreetiline raamistik põhineb makro-meso-mikro-tasandi lähenemisel. Makrotasandil toetavad Euroopa integratsiooni teooriad nagu neofunktsionalism, valitsustevahelisus ja postfunktsionalism selgitusi ELis toimivate integratsiooniprotsesside ja suveräänsuse koondamise põhjuste kohta. Need teooriad võimaldavad käsitleda institutsioonide rolli integratsiooniprotsessis ning integreerumisteekondi. Samas, kuna integratsiooniteooriatel on piiratud seletusvõime juhtimisstruktuuride ja -protsesside osas, eriti mesotasandil, kasutatakse piiriüleste digitaalsete avalike teenuste juhtimisstruktuuride ja -protsesside empiirilisel analüüsil avaliku halduse ja ELi valitsemise teemat kirjanudust. Juhtimismudelid ja -korraldused hierarhiate, turgude ja võrgustike kujul pakuvad analüütilist ülevaadet mehhanismidest, mida piiriülesed digitaalsed avalikud teenused võivad kasutada. Lisaks aitab ELi juhtimist käsitlev arutelu paremini mõista rolle ja struktuure, mida EL-i tasemel kasutatakse kokkulepete koordineerimiseks ja haldamiseks ning digipoliitikate väljatöötamiseks ja rakendamiseks. Kuigi piiriülesed digitaalsed avalikud teenused sõltuvad riiklikust avalike teenuste osutamisest ning riiklike ja kohalike osapoolte rollidest, täiendab mikrotasandi käsitlus operatiivsetest võimaldajatest (operative enablers) mesotasandi selgitust juhtimiskorraldustest riikideülese ja riikliku tasandi vahel. Mikrotasandi selgitused operatiivsete võimaldajate kohta põhinevad digiajastu valitsemise, küpsusmodelite, digitaalse valitsemise projektide ja koostalitlusvõime alasel kirjandusel. See kirjandus pakub selgitusi protsesside ja tegurite kohta, mis IKT ja selle koostalitluse põhivõimaldajate mõjul teenuste muundumist kujundavad.

Töö metodoloogiliseks lähtekohaks on fenomenipõhine uurimus, mille eesmärk on dokumenteerida ja mõtestada piiriüleseid digitaalseid avalikke teenuseid ja nende põhilist eeltingimust, koostalitlusvõime lahendusi, viisil, mis põhineb päriselulisel rakendatavusel. Käesolev doktoritöö lähtub tõlgenduslikust

käsitusest ning induktiivsest, juhtumeid kaardistavast uurimisdisainist, mis sobib hästi keerukate sotsio-tehniliste ja juhtimisalaste nähtuste mõistmiseks. Doktoritöö järgib kvalitatiivset mitme meetodi strateegiat, mis ühendab kolm teineteist täiendavat lähenemist: süstemaatilise kirjandusülevaate koos temaatilise sünteesiga (uurimus I), kaardistamiseks killustunud uurimisvaldkonda ning tuvastamiseks peamisi korduvaid mustreid ja uurimislünki; mGov4EU projekti käigus läbi viidud tegevusuuringu (uurimus II), panustamiseks vahetult koostalitlusvõime lahenduste arendamise ja kestlikkusega seotud sotsio-tehnilisse dünaamikasse; ning kvalitatiivse mitme juhtumiga uuringu (uurimus III), mis tugineb poolstruktureeritud ekspertintervjuudele ja dokumendianalüüsile, selgitamiseks juhtimiskorraldusi tegelikus rakenduses ning tabamiseks vaikivat (tacit) teadmist. Uurimisdisain on tervikuna läbilõikeline ning põhineb empiirilisel tööel, mis viidi läbi aastatel 2021–2024. Tulemuste kumulatiivse täpsuse ja sidususe suurendamiseks rakendati andmete triangulatsiooni, hõlmates intervjuusid, töötube, vaatlusi ja ametlikke dokumente.

Dokoritöö põhineb kaasatud uuringute sünteesitud tulemustel ja seob need mitmetasandilise teoreetilise raamistikuga, käsitledes ühtlasi tulevase uurimisuundi ja implikatsioone Euroopa integratsiooni ja digitaalse valitsemise alasele teaduskirjandusele. Arutelu keskendub sellele, kuidas uurimuste tulemused panustavad laiematesse debattidesse Euroopa integratsiooni edenemisest digivaldkonnas ning piiriüleste digitaalsete avalike teenuste juhtimise küsimustesse. Seejuures kinnitab doktoritöö makro-meso-mikrotasandi lähenemise sobivust piiriüleste digitaalsete avalike teenuste uurimiseks, kuna see võimaldab tabada nii integratsiooni poliitilisi dünaamikaid kui ka rakendamise talitluslikku tegelikkust.

Makrotasandil kinnitab doktoritöö peajasjalikult neofunktsionalistliku lähenemise paikapidavust, mille kohaselt võib integratsioon ühes valdkonnas viia ülekandefektini ka teises ning riikideüleised toimijad tegutsevad peamiselt poliitika eestvedajatena. Seda toetab piiriüleste digitaalsete avalike teenuste peamise tõukejõudude esiletõstmine, eeskätt halduskoormuse vähendamine ja teenuste vaba liikumise kehtestamine kogu ELis, viitega ELi alusväärtuste tagamisele. Lisaks peegeldavad leiud valitsustevahelise uurimissuuna väiteid, toonitades nii pinget teenusepakkumise ja riikliku suveräänsuse vahel kui ka riikideülese koordineerimise rolli EL-i juhtimises. Hajutatud omandimudelite levik, milles rahvusriigid säilitavad kontrolli süsteemi ressursside ja andmete üle, samuti mured organisatsiooniliste muutuste ning finants- ja inimressursside puuduse pärast, peegeldavad valitsustevahelise lähenemise argumente. Teisalt, ehkki tulemused ei toetanud postfunktsionalistlikke seisukohti politiseerimise, avaliku vastuseisu ega funktsionaalsete survefaktorite ja identiteedi konflikti osas, viitavad piiriüleste digitaalsete avalike teenuste ebaselge lisandväärtus paljude osapoolte jaoks ning piiratud tähelepanu kasutajakogemusele sellele, et legitiimsus ja tajutud kasu on integratsiooni kestlikkuse seisukohalt määrava tähtsusega.

Meso- ja mikrotasandil süvendab doktoritöö teadmisi piiriüleste digitaalsete avalike teenuste toimimisest praktikas ning koostalitlusvõimest kui nende

edukuse kesksest eeltingimusest. Võrgustikuline juhtimine tõuseb esile kui valdav juhtimisvorm, tuginedes suhetepõhisele usaldusele ja koostöömehhanismidele. Tuvastatud juhtimiskorraldused sobituvad olemasolevate organisatsioonidevaheliste juhtimise tüpoloogiatega, sealhulgas hübriidsete võrgustikumudelite ja võrgustikku haldavate organisatsioonidega. Samas kinnitab Euroopa Komisjoni kahetine roll poliitika eestvedaja, regulaatori ja koordinaatorina „hierarhia varju“ (shadow of hierarchy) olemasolu; olukorda, milles riikideülesed õigusraamistikud ja koordineerimisvõimekus mõjutavad arendusi ja juhtimist isegi võrgustikupõhiste korralduste korral. Mikrotasandil kinnitavad tulemused, et koostalitlusvõime ei piirdu üksnes tehnilise ühilduvusega, vaid hõlmab ka organisatsioonilist, semantilist ja õiguslikku koostalitlust, ning et jätkusuutlikkus sõltub nende mõõtmete juhtimisest sidusrühmade kaasamise, võrgustikulise juhtimise ning kujunenud usalduse kaudu. Ehkki piiriüleste digitaalsete avalike teenuste arendamine on peamiselt kantud halduskoormuse vähendamise, ELi väärtuste tugevdamise ning digitaalse küpsuse suurendamise eesmärkidest, jääb teenust osutavate organisatsioonide otsene organisatsiooniline kasu sageli ebapiisavalt teadvustatuks. See kinnitab vajadust sobivamate juhtimismehhanismide järele, mis määratleksid selgemalt vastutuse, rollid ja väärtuste jaotumise osalevate organisatsioonide vahel. Piiriüleste digitaalsete avalike teenuste arendamist ja tulemuslikku pakkumist kujundavad organisatsioonide valmidus teha organisatsioonilisi muudatusi ning nende olemasolev digitaalse arengu tase. Käesolev doktoritöö esitab mitmeid soovitusi, piiriüleste digitaalsete avalike teenuste arendamiseks ja kestlikkuse tagamiseks. Esiteks on oluline keskenduda organisatsioonilise kasu tuvastamisele, mis motiveeriks avalikke asutusi neid teenuseid kasutusele võtma. Lisaks peaks toetama alt-üles ja regionaalseid koostööalgatusi, näiteks hädaabiteenuste valdkonnas, kus piiriülene koostalitlusvõime on hädavajalik. Täiendavalt peaks piiriüleste digitaalsete avalikke teenuseid käsitlema organisatsioonilise võimekusena, mitte täiesti uute teenustena, teadvustades sellega kaasnevate organisatsiooniliste muutuste vajalikkust ja kasu. Lõpetuseks on oluline tugevdada avalike asutuste suutlikkust andmete pakkumisel ning kasutajatele loodava teenuse väärtuse suurendamisel, kuna tulemuslikkuse saavutamine sõltub mitmest asjaolust, sealhulgas piiriülesest andmevahetusest ja otsesest teenusepakkumisest.

Käesolev doktoritöö teeb mitmeid interdistsiplinaarseid panuseid, põimides avaliku halduse, infosüsteemide ja politoloogia vaatenurki. Tuginedes makro-meso-mikro-tasandi teooriatele, pakub uurimus tervikliku analüütilise raamistiku Euroopa Liidu piiriüleste digitaalsete avalike teenuste arendamise ja juhtimise mõistmiseks. Doktoritöö aitab lisaks kaasa piiriüleste digitaalsete avalike teenuste arengut kujundavate keerukuste, tunnuste ja juhtimiskorralduste süvitsi mõistmisele. Lõpetuseks on see doktoritöö autorile teadaolevalt esimene terviklik uurimus, mis on pühendatud konkreetsetele piiriülestele digitaalsetele avalikele teenustele Euroopa Liidu tasandil.

## **PUBLICATIONS**

## CURRICULUM VITAE

Name: Stefan Dedović  
Date of birth: 6 October 1995  
E-mail: stefan.dedovic@hotmail.com

### Education:

2021–2026 Doctoral studies in political science, Johan Skytte Institute of Political Studies, University of Tartu (Estonia)  
Dissertation topic: “European Union Digital Integration: Exploring development and governance of cross-border digital public services”

2019–2021 Master of Science (MSc) with *Magna Cum Laude* in Public Sector Innovation and e-Governance, KU Leuven (Belgium), University of Munster (Germany), Tallinn University of Technology (Estonia)  
Thesis: “Cross-border eID enactment in the EU: The case of Belgium and Estonia”

2014–2018 Bachelor of Sciences, BSc Hons in Political Science, Faculty of Political Sciences, University of Belgrade (Serbia)

### Professional experience:

10/2025– Senior EU Consultant, Sopra Steria, Belgium

10/2025– Research fellow, KU Leuven, Public Governance Institute, Belgium

09/2023–10/2025 Research Associate at KU Leuven, Public Governance Institute, Belgium

09/2021–10/2025 Junior Research Fellow and PhD Candidate, ECePS ERA Chair of e-governance and digital public services, University of Tartu, Estonia

10/2020–04/2021 Research Intern, Centre for European Policy Studies (CEPS), Belgium

### Publications:

**Dedović, Stefan**, & Cromptvoets, J. (2025). Delving into the governance of cross-border interoperability solutions in the EU. *JeDEM – EJournal of Edemocracy and Open Government*, 17(2), 65–89.  
<https://doi.org/10.29379/jedem.v17i2.981>

**Dedović, S.** & Cromptvoets, J. (2025) ‘Exploring the Practices of the Local Government Twin Transition: The Case of Leuven’, in Hofmann, S., Danneels, L., Dobbe, R., Novak, A.-S., Parycek, P., Schwabe, G. & Spitzer, V.

- (eds.) *Electronic Participation. ePart 2025. Lecture Notes in Computer Science*, vol. 15978. Cham: Springer. pp. 225–240.  
[https://doi.org/10.1007/978-3-032-02515-9\\_14](https://doi.org/10.1007/978-3-032-02515-9_14).
- Lember, V., Vihma, P., Bylicki, V., Crompvoets, J., **Dedovic, S.**, Karo, E., Kattel, R., Kristerson, M., Kurth, A., Meijer, A., Pullen, E. & Ruijter, E. (2025) *The Twin Transition Puzzle: Can city governments align digital and sustainability regimes?* Working Paper WP 2025-12. Institute for Innovation and Public Purpose, UCL. Available at:  
<https://www.ucl.ac.uk/bartlett/publications/2025/jul/twin-transition-puzzle5>
- Dedovic, Stefan** and Homburg, Vincent (2024). Cross-border digital public services in the EU: The systematic literature review. *International Journal of Electronic Governance* <https://doi.org/10.1504/IJEG.2024.138457>.
- Lampoltshammer, Thomas J.; Sellung, Rachele; **Dedovic, Stefan** (2024) Cross-Border Mobile Government Services: Exploring Business Model Dynamics in mGov4EU. In: *From Electronic to Mobile Government*. (181–193)  
[https://link.springer.com/chapter/10.1007/978-3-031-64471-9\\_11](https://link.springer.com/chapter/10.1007/978-3-031-64471-9_11)
- Schmidt, Carsten and **Dedovic, Stefan** (2024). Sustainability and Governance of the mGov4EU Project. In: *From Electronic to Mobile Government*. (165–180)  
[https://link.springer.com/chapter/10.1007/978-3-031-64471-9\\_10](https://link.springer.com/chapter/10.1007/978-3-031-64471-9_10)
- Corici AA., Podgorelec B., Zefferer T., Huhnlein D., Cucurull J., Graux H., **Dedovic Stefan**, Romanov B., Schmidt C., Krimmer R., (2022) Enhancing European Interoperability Frameworks to Leverage Mobile Cross-Border Services in Europe. DG.O 2022: The 23rd Annual International Conference on Digital Government Research. Association for Computing Machinery New York, NY, United States, 41–53.  
<https://dl.acm.org/doi/10.1145/3543434.3543638>
- Eibl G., Temple L., Sellung R., **Dedovic Stefan**, Alishani A., Schmidt C., (2022) Towards a transdisciplinary evaluation framework for mobile cross-border government services. In: *IFIP EGOV-CeDEM-ePart Proceedings. Towards a Transdisciplinary Evaluation Framework for Mobile Cross-Border Government Services | Electronic Government*
- Dedovic Stefan**, (2022). Potential challenges of Digital Government Transformation in Serbia. In: Delipetrev et al. (eds) “Digital Transformation, Data and AI in the Western Balkans” JRC Book of Abstracts.  
<https://publications.jrc.ec.europa.eu/repository/handle/JRC129903>
- Krimmer R., Solvak M., Alishani A., **Dedovic Stefan.**, Schmidt C., Castle S., (2022) *European Interoperability Landscape Report Nordic Institute for Interoperability Solutions—Report: European Interoperability Landscape Report 2022*
- Krimmer R., **Dedovic Stefan**, Schmidt C., Corici AA. (2021) *Developing Cross-border E-Governance: Exploring Interoperability and Cross-border Integration*. In: Edelmann N. et al. (eds) *Electronic Participation. ePart 2021. Lecture Notes in Computer Science*, vol 12849. Springer, Cham.  
[https://doi.org/10.1007/978-3-030-82824-0\\_9](https://doi.org/10.1007/978-3-030-82824-0_9)

## ELULOOKIRJELDUS

Nimi: Stefan Dedović  
Sünniaeg: 6. oktoober 1995  
E-post: stefan.dedovic@hotmail.com

### Hariduskäik:

- 2021–2026 Doktorantuur politoloogia erialal, Tartu Ülikooli Johan Skytte poliitikauuringute instituut (Eesti)  
Doktoritöö teema: „Euroopa Liidu digitaalne lõimumine: piiriüleste digitaalsete avalike teenuste arendamine ja haldamine“
- 2019–2021 Teadusmagister (MSc) *Magna Cum Laude*, avaliku sektori innovatsioon ja e-valitsemine, KU Leuven (Belgia), Munsteri Ülikool (Saksamaa), Tallinna Tehnikaülikool (Eesti).  
Lõputöö teema: “Cross-border eID enactment in the EU: The case of Belgium and Estonia”
- 2014–2018 Bakalaureus (BSc) kiitusega, politoloogia, Belgradi Ülikooli Politoloogia teaduskond (Serbia)

### Teenistuskäik:

- 10/2025– Euroopa Liidu vanemkonsultant, Sopra Steria, Belgia
- 10/2025– Assotsieerunud teadur, KU Leuven, avaliku halduse instituut, Belgia
- 09/2023–10/2025 Teadur, KU Leuven, avaliku halduse instituut, Belgia
- 09/2021–09/2025 Nooremteadur ja doktorant, ERA Chair e-valitsemise ja digitaalsete avalike teenuste valdkonnas (ECePS), Tartu Ülikool, Eesti
- 10/2020–04/2021 Teadustöö praktika, Centre for European Policy Studies (CEPS), Belgium

### Publikatsioonid:

- Dedović, Stefan,** & Cromptvoets, J. (2025). Delving into the governance of cross-border interoperability solutions in the EU. *JeDEM – EJournal of Edemocracy and Open Government*, 17(2), 65–89.  
<https://doi.org/10.29379/jedem.v17i2.981>
- Dedović, S.** & Cromptvoets, J. (2025) ‘Exploring the Practices of the Local Government Twin Transition: The Case of Leuven’, in Hofmann, S., Danneels, L., Dobbe, R., Novak, A.-S., Parycek, P., Schwabe, G. & Spitzer, V. (eds.) *Electronic Participation. ePart 2025. Lecture Notes in Computer Science*, vol. 15978. Cham: Springer. pp. 225–240.  
[https://doi.org/10.1007/978-3-032-02515-9\\_14](https://doi.org/10.1007/978-3-032-02515-9_14).

- Lember, V., Vihma, P., Bylicki, V., Cromptvoets, J., **Dedovic, S.**, Karo, E., Kattel, R., Kristerson, M., Kurth, A., Meijer, A., Pullen, E. & Ruijter, E. (2025) *The Twin Transition Puzzle: Can city governments align digital and sustainability regimes?* Working Paper WP 2025-12. Institute for Innovation and Public Purpose, UCL. Available at:  
<https://www.ucl.ac.uk/bartlett/publications/2025/jul/twin-transition-puzzle5>
- Dedovic, Stefan** and Homburg, Vincent (2024). Cross-border digital public services in the EU: The systematic literature review. *International Journal of Electronic Governance* <https://doi.org/10.1504/IJEG.2024.138457> .
- Lampoltshammer, Thomas J.; Sellung, Rachele; **Dedovic, Stefan** (2024) Cross-Border Mobile Government Services: Exploring Business Model Dynamics in mGov4EU. In: *From Electronic to Mobile Government*. (181–193)  
[https://link.springer.com/chapter/10.1007/978-3-031-64471-9\\_11](https://link.springer.com/chapter/10.1007/978-3-031-64471-9_11)
- Schmidt, Carsten and **Dedovic, Stefan** (2024). Sustainability and Governance of the mGov4EU Project. In: *From Electronic to Mobile Government*. (165–180)  
[https://link.springer.com/chapter/10.1007/978-3-031-64471-9\\_10](https://link.springer.com/chapter/10.1007/978-3-031-64471-9_10)
- Corici AA., Podgorelec B., Zefferer T., Huhnlein D., Cucurull J., Graux H., **Dedovic Stefan**, Romanov B., Schmidt C., Krimmer R., (2022) Enhancing European Interoperability Frameworks to Leverage Mobile Cross-Border Services in Europe. DG.O 2022: The 23rd Annual International Conference on Digital Government Research. Association for Computing Machinery New York, NY, United States, 41–53.  
<https://dl.acm.org/doi/10.1145/3543434.3543638>
- Eibl G., Temple L., Sellung R., **Dedovic Stefan**, Alishani A., Schmidt C., (2022) Towards a transdisciplinary evaluation framework for mobile cross-border government services. In: *IFIP EGOV-CeDEM-ePart Proceedings. Towards a Transdisciplinary Evaluation Framework for Mobile Cross-Border Government Services | Electronic Government*
- Dedovic Stefan**, (2022). Potential challenges of Digital Government Transformation in Serbia. In: Delipetrev et al. (eds) “Digital Transformation, Data and AI in the Western Balkans” JRC Book of Abstracts.  
<https://publications.jrc.ec.europa.eu/repository/handle/JRC129903>
- Krimmer R., Solvak M., Alishani A., **Dedovic Stefan.**, Schmidt C., Castle S., (2022) *European Interoperability Landscape Report Nordic Institute for Interoperability Solutions—Report: European Interoperability Landscape Report 2022*
- Krimmer R., **Dedovic Stefan**, Schmidt C., Corici AA. (2021) *Developing Cross-border E-Governance: Exploring Interoperability and Cross-border Integration*. In: Edelman N. et al. (eds) *Electronic Participation. ePart 2021. Lecture Notes in Computer Science*, vol 12849. Springer, Cham.  
[https://doi.org/10.1007/978-3-030-82824-0\\_9](https://doi.org/10.1007/978-3-030-82824-0_9)

## DISSERTATIONES RERUM POLITICARUM UNIVERSITATIS TARTUENSIS

1. **Allan Sikk.** Highways to power: new party success in three young democracies. Tartu, 2006.
2. **Holger Mölder.** Cooperative security dilemma – practicing the hobbesian security culture in the Kantian security environment. Tartu, 2010.
3. **Heiko Pääbo.** Potential of Collective Memory Based International Identity Conflicts in Post-Imperial Space. Tartu, 2011.
4. **Mihkel Solvak.** Private member's bills in parliament – a comparative study of Finland and Estonia. Tartu, 2011, 217 p.
5. **Viljar Veebel.** The role and impact of positive conditionality in the EU pre-accession policy. Tartu, 2012, 230 p.
6. **Alar Kilp.** Church authority in society, culture and politics after Communism. Tartu, 2012, 177 p.
7. **Maria Groeneveld.** The role of the state and society relationship in the foreign policy making process. Tartu, 2012, 193 p.
8. **Mari-Liis Sööt.** Explaining Corruption: Opportunities for Corruption and Institutional Trust. Tartu, 2013, 120 p.
9. **Kadri Lühiste.** Regime Support in European Democracies. Tartu, 2013, 124 p.
10. **Raul Toomla.** De facto states in the international system: Conditions for (in-)formal engagement. Tartu, 2013, 209 p.
11. **Andro Kitus.** A Post-Structuralist Concept of Legitimacy. A thesis in partial fulfilment of the requirements for the degree of Doctor of Philosophy. Tartu, 2014, 189 p.
12. **Kristian Lau Nielsen.** Soft Power Europe: The Lesser Contradiction in Terms and Practices. Tartu, 2016, 156 p.
13. **Birgit Poopuu.** Acting is everything: the European Union and the process of becoming a peacebuilder. Tartu, 2016, 242 p.
14. **Kristina Kallas.** Revisiting the triadic nexus: An analysis of the ethno-political interplay between Estonia, Russia and Estonian Russians. Tartu, 2016, 152 p.
15. **Liisa Talving.** Economic conditions and incumbent support: when and how does the economy matter? Tartu, 2016, 166 p.
16. **Ryhor Nizhnikau.** Externally Induced Institutional Change in the EU's Eastern Neighbourhood: Migration and Environment Reforms in Ukraine and Moldova in 2010–2015. Tartu 2017, 218 p.
17. **Kats Kivistik.** Relevance, Content and Effects of Left-Right Identification in Countries with Different Regime Trajectories. Tartu 2017, 204 p.
18. **Lukas Pukelis.** Informal mutual oversight mechanisms in coalition governments: Insights from the Baltic states for theory building. Tartu 2018, 145 p.
19. **Shota Kakabadze.** “The Caucasian Chalk Circle”: Georgia's Self at the East/West Nexus. Tartu 2020, 186 p.

20. **Maksim Kulaev.** Trade unions, transformism and the survival of Russian authoritarianism. Tartu 2020, 151 p.
21. **Juhan Saharov.** From Economic Independence to Political Sovereignty: Inventing “Self-Management” in the Estonian SSR. Tartu 2021, 161 p.
22. **Andrii Nekoliak.** ‘Memory Laws’ and the Patterns of Collective Memory Regulation in Poland and Ukraine in 1989–2020: A Comparative Analysis. Tartu 2022, 263 p.
23. **Ivan Ulises Kentros Klyszcz.** How Does Violent Conflict Affect Paradiplomacy? An Exploratory Research with Cases from the North Caucasus. Tartu 2022, 200 p.
24. **Lelde Luik.** Re-evaluating the Role of Representative Institutions in Radical Democratic Theory: Lessons from Democratic Identity Construction in Latvia. Tartu 2023, 149 p.
25. **Ionut Chiruta.** Triadic Nexus Relationships in an Age of Populism: Interactions between Hungary, Romania and the Hungarian Minority in Szeklerland. Tartu 2023, 201 p.
26. **Sanshiro Hosaka.** Nothing but Politics? Explaining the Reproduction of Russian Narratives About the Events in Ukraine Among Japanese Scholars and Intellectuals 2014–2019. Tartu 2025, 224 p.
27. **Eoin Micheál McNamara.** The Risk Society’s Stabilisation Failure? An Analysis of NATO and the International Security Assistance Force in Afghanistan. Tartu 2025, 370 p.
28. **Butrint Berisha.** Exploring the Role of Civil Society Organisations (CSOs) in Foreign Relations of De Facto States: A Comparative Analysis of Kosovo, Palestine and Taiwan. Tartu 2025, 236 p.
29. **George Spencer Terry.** Demanding Subjectivity: The Radical Right’s Use of Discursively Empty Referent Objects within a Post-Foundational Logics Framework. Tartu 2025, 139 p.
30. **Michael Cole.** The People, the Elites and the Russia Factor: A Comparative Study of Populist Discourses in Georgia and Ukraine. Tartu 2025, 242 p.
31. **Logan Carmichael.** Cybersecurity Governance Responses in the Estonian Digital Governance Model, 2007–2023. Tartu 2026, 170 p.