Cross-border digital public services in the European Union: a systematic literature review

Stefan Dedovic, Vincent Homburg

Cross-border digital public services in the European Union: a systematic literature review

Stefan Dedovic*

Johan Skytte Institute of Political Studies,
University of Tartu,
Lossi 36, 51003, Tartu, Estonia

and

KU Leuven,
Public Governance Institute,
Parkstraat 45, 3000, Leuven, Belgium
Email: stefan.dedovic@kuleuven.be
Email: stefan.dedovic@ut.ee
*Corresponding author

Vincent Homburg

Johan Skytte Institute of Political Studies,
University of Tartu,
Lossi 36, 51003, Tartu, Estonia

and

Department of Public Administration and Sociology,
Erasmus University Rotterdam,
Burgemeester Oudlaan 50, 3062 Rotterdam, The Netherlands
Email: vincent.homburg@ut.ee

Abstract: The success of the European single market and advancements in digital technologies have increased the focus on cross-border digital public services. To date, most academic research on digital public services has been concentrated on national and local levels, with research on cross-border digital public services being scattered across various academic disciplines. In this paper, we provide a systematic literature review on cross-border digital public services. We conclude that current research on cross-border digital public services describes the symptoms of faltering coordination at the level of European policy making organisational change challenges and limited maturity with low levels of interoperability between public administrations in the EU. However, cross-border digital public services literature is undertheorised, and we suggest using multi-level governance theories, theories of organisational change, interoperability studies, and service development literature to guide future research into cross-border digital public services, through which European citizens and businesses can experience the impact of European integration policies.

Biographical notes: Stefan Dedovic is currently a PhD candidate at the University of Tartu, Estonia and Research Associate at KU Leuven Belgium. He has graduated a magna cum laude on Erasmus Mundus Masters programme on Public Sector Innovation and e-governance. He has been involved in multiple international research projects and consultancy on the topics of digital government, interoperability, cross-border e-services and mobile government.

Vincent Homburg is Full Professor and Holder of the ERA Chair of e-governance and digital public services at the University of Tartu and Associate Professor in Public Administration at Erasmus University Rotterdam. He has published articles in, among other journals, *International Review of Administrative Sciences*, *Local Government Studies*, *Journal of Behavior and Information Technology*, *Knowledge, Technology and Policy*, and *Artificial Intelligence and Law*. He co-edited *The Information Ecology of E-Government* (IOS Press, 2005) and *The New Public Management in Europe* (Palgrave MacMillan, 2007). His monograph Understanding E-Government (2008) was published with Taylor and Francis.

1 Introduction

The most significant outcome of European integration arguably is the free movement of people, services, capital, and goods. European exchange students, expatriate workers seeking employment in European member states and business owners seeking expansion of their services in the European Union, however, are still experiencing more problems than their domestic counterparts. Partly this is so because the added value of digital public services that allow for free movement to take place (think of digital enrolment, digital identity and signatures, or access to business registries) is frequently unrecognised or underestimated (Berce et al., 2011; Mulder and Snijders, 2020; Ng, 2014), and arguably as a consequence, provision and use of these services are lagging behind European ambitions.

Since the emergence of the European Single Market, the European Union and national member states have been initiating legal frameworks, funding programs, political declarations and large-scale pilots to stimulate delivery of services between public sector organisations, residents, and businesses, regardless of where these public sector organisations are located (Eibl et al., 2022; Graux, 2021; Krimmer et al., 2021; Siapera et al., 2023). Two crucial legal frameworks in this context are

1   Regulation in the field of electronic identification and trust services (eIDAS), which has established the legal framework for the notification of national identity management systems in order to enable electronic identification of citizens of one member state in another member state.

2   Single digital gateway regulation (SDGR), that aims, inter alia, to enable 21 digital public services to users irrespective of their national residency as of December 2023 (Corici et al., 2022).

Successful implementation is dependent on national member states' national priorities and objectives, and on the outcomes of bilateral and multilateral policy negotiations between national and EU-level institutions. The European Commission has also initiated a series of pilots in which generic, domain-independent technological solutions, principles, and standards were developed and tested (for a more elaborate discussion of pilots, refer to Kramer, 2016; Leitold, 2019; Schmidt and Krimmer, 2022; Velicogna et al., 2020).

It is through cross-border electronic public services that many European citizens and businesses experience the arguably otherwise abstract notion of European integration (Stepančič and Blažič, 2018). One example of a more or less tangible cross-border public service is a digital prescription that allows a European citizen that is on transit to obtain medication from a pharmacy located in another location than the citizen's place of residence. Another example is a service that allows a European business to verify a potential business partner's legal entity, seat, capital and legal representatives by accessing the national business registry the foreign business is registered with. It has been argued that cross-border digital public services as those described above are of significant economic importance as around 10 million European jobs (5% of total employment in the EU) are dependent on cross-border services (Fries-tersch et al., 2021; Fritsch and Bartenrath, 2019).

Cross-border digital public services have not gone unnoticed in the academic literature and various authors have suggested to pay more attention to this emerging field of study (Criado, 2012; Klievink and Janssen, 2009; Scholl and Klischewski, 2007; Sideridis et al., 2022; Soe, 2020; Sideridis et al., 2017; Wimmer, 2021). However, studies of cross-border services are less frequent than studies of adoption, diffusion, and impact of electronic public services in national (Roger and Ghislain, 2017; Roy, 2009) and local jurisdictions (Carenini et al., 2017; Pittaway and Montazemi, 2020; Sánchez and Zuntini, 2019). Furthermore, cross-border services have primarily been studied at a pragmatic level (focusing on symptoms and shortcomings). If there is a 'state-of-the-art' in studies on cross-border electronic services, it will be piecemeal findings that are published in disjointed academic fields, such as information systems, legal studies, public administration, and political science. A systematic account and consistent, scholarly understanding of the challenges and dynamics of the development, implementation and use of cross-border digital public services has been lacking until now.

To remedy the situation described above, and to add to an emerging conversation in the academic literature on cross-border digital public services that is at most fragmented, we aim to improve the scholarly understanding of cross-border digital public services by presenting the results of a systematic review of the literature and synthesising a coherent set of future research directions. More particularly, we apply thematic synthesis (Thomas and Harden, 2008) in the context of a systematic literature review that adheres to

PRISMA guidelines (Moher et al., 2009) and answers the question, "What themes and knowledge gaps can be identified in the literature on the development and implementation of cross-border digital public services in the European Union, and what directions for future research can be suggested on the basis of these themes and knowledge gaps?".

The line of reasoning that answers the research question is constructed, as follows. In Section 2, we present the methodology of our systematic literature review. In Section 3, we present our findings, more specifically, descriptive findings of the analysed literature. Section 4 presents the thematic synthesis in the form of analytical themes. The discussion on the identified research gaps and future research direction is presented in Section 5. In the last section, we provide a summary of our paper.

2 Methodology

The goal of this study is to provide a comprehensive analysis of the academic literature and further understanding of cross-border digital public services, and this is done by conducting a systematic literature review. Systematic literature reviews can be distinguished from traditional reviews of literature by their emphasis on transparency and replicability of finding. In this particular study, we use two complementary methods to achieve transparency and replicability: PRISMA guidelines (Moher et al., 2009) and thematic synthesis (Thomas and Harden, 2008). PRISMA guidelines provide rigorous, explicit, and transparent guidelines for selecting and scanning vast amounts of literature (Mergel et al., 2018), making this methodology especially suited for processing large volumes of relatively homogeneous papers and particularly for purpose of meta-analyses (Page and Moher, 2017). PRISMA guidelines provide limited guidance for extracting and synthesising themes from smaller sets of rather heterogeneous papers, as is the case in our study of cross-border services (as shown in Section 2.1). To remedy this situation, we complemented the application of PRISMA guidelines with the thematic synthesis method (as shown in Section 2.2) (Thomas and Harden, 2008). In the following sub-sections, we describe how we systematically selected, analysed and discussed the fragmented literature on cross-border digital services.

2.1 Application of the PRISMA method: search and selection of sources

The literature search was conducted between November and December 2021 and again in February 2023 for papers published in 2022. After initial failed attempts to use combinations of specific key words, (such as "cross-border digital public services") we decided to use broader keywords in the initial search. Specifically, we used the following pre-defined keywords and their combination: (("cross border" OR "pan european") AND ("digital servi*" OR 'electronic service' OR e-servic*) OR interoperability OR 'Single Digital Gateway' OR "Digital Single Market"). We conducted the electronic search of literature in four main databases, SCOPUS, Web of Science, Google Scholar and Digital Government Reference Library v.17. This initial search yielded 2220 references, and after deleting 566 duplicates, we conducted screening of the 1654 results. During the screening procedure, we included papers that focused on public sector service,

information technology and cross-border aspects, or provided an analysis of a potential or existing cross-border digital public service. We excluded studies on technical architecture blueprints and engineering studies as well as studies focused on aspects beyond this paper's scope (i.e., commerce) as they primarily promoted specific architectural or information system solution. We also excluded papers that were not published in the English language. The type of sources we initially considered were journal papers, book chapters and contributions to information systems conference proceedings. Keywords are purposefully selected to include the broad scope of the literature related to the cross-border digital public services topic.

The screening process took place in three phases. The first phase of selecting the relevant literature was based on screening reference titles, which resulted in 179 relevant papers. In the second phase, we analysed the abstracts of the papers and reduced the set to 28 potential papers. The third phase included an analysis and assessment of the full text. It resulted in eight references being excluded due to the exclusion criteria (promoting architectural solution or lack of discussion on cross-border aspect). In addition, we included five more studies based on the snowball approach and consultation with the experts (Lanzara, 2014; Ng, 2014; Schmidt and Krimmer, 2022; Tinholt et al., 2013; Weehuizen and Van Oranje, 2007). This led to a total of 25 papers, which are assessed and synthesised in this paper (Table A1). The papers selected were based on the results of the databases searched (which did not include project deliverables that are not included in literature databases) and the variety of research fields and discussions. More specifically, the results of the large-scale projects related to cross-border services (TOOP, SCOOP4C, SPOCS etc.), might be valuable for this research study; however, many if not most papers address topics (engineering issues, architectural components) that are mentioned in the exclusion criteria of our application of the PRISMA procedure. The results of the PRISMA search strategy can be found in Figure 1.

Existing methodologies on how to conduct a literature review emphasise the importance of explaining selection logic and tend to avoid mentioning minimally required or maximally allowed numbers of papers to be discussed in a systematic literature review (Jennex, 2015; Pati and Lorusso, 2018), but 25 papers aligns with what according to a meta-review of published systematic literature reviews is a generally accepted practice (between 16 and 54 papers discussed in the discipline of political science, and between 12 and 854 papers discussed in the discipline of economics and business studies) (Chapman, 2021).

2.2   *Data synthesis approach (application of thematic synthesis)*

In deciding what data methodology approach, to use, we followed Xiao and Watson's (2019) guidelines on conducting a systematic literature review. As our purpose is to extend the knowledge and contribute to a better understanding of cross-border electronic public services based on mainly qualitative literature, we decided to implement thematic synthesis method and guidelines by Thomas and Harden (2008). Thematic synthesis suggests applying qualitative content analysis methods (Miles et al., 2014; Saldaña, 2009) to smaller sets of relatively diverse papers by

1   applying line-by-line coding

2   constructing descriptive themes of all coded segments

3   subsequently, developing analytical themes.

In this study, inductive, line-by-line coding of sentences and sections resulted in a code tree that captured the commonalities and similarities of emerging themes and gaps. The data synthesis process was conducted using the data analytics software MAXQDA 2020 PRO, and consisted of three stages, with discussions between the authors providing for interobserver reliability.

Figure 1   PRISMA method (see online version for colours)
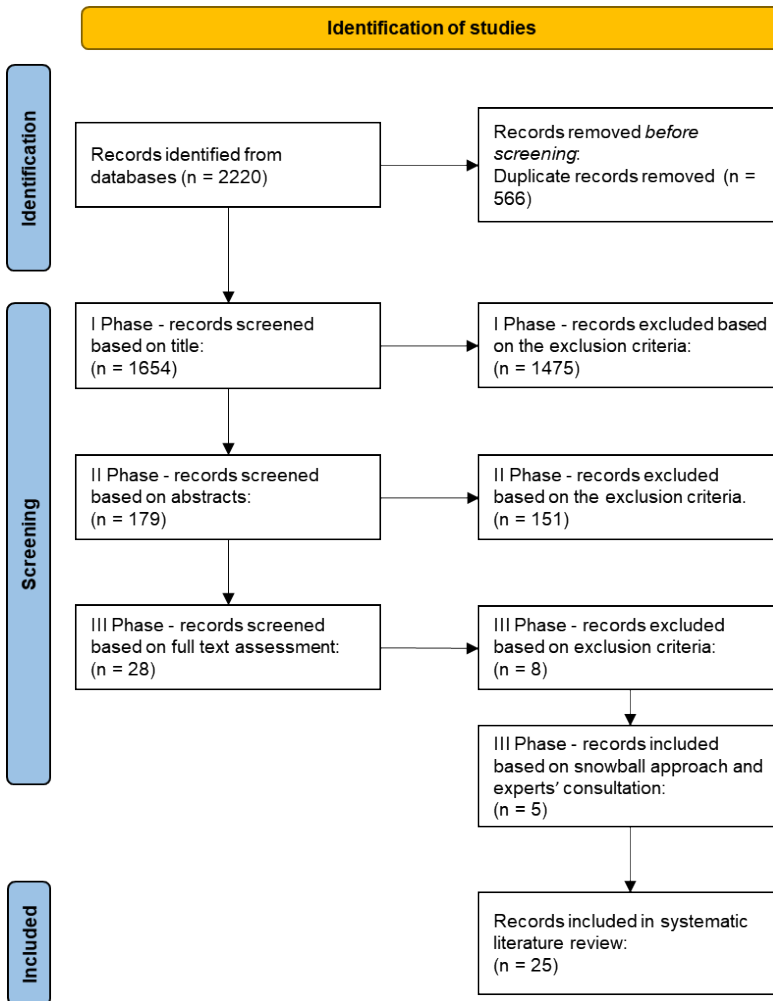
In the first stage of the synthesis, we conducted line-by-line coding of the 25 full texts using descriptive and process coding methods (Miles et al., 2014; Saldaña, 2009). The first stage coding process resulted in a total of 266 codes of 390 segments. During the first coding stage, we coded the sentences and passages that portray the relevance for

developing, implementing or using cross-border services. The second stage included the creation of new codes that captured the commonalities of the existing codes developed in the first stage. For example, the codes 'human resources' and "member states lack of resources" merged under the code "importance of the resources". Before completing the two stages, we also examined the texts associated with codes and addressed potential misalignment. This iterative approach resulted in a total of seven descriptive themes. Next, in the third stage, we reviewed and re-ordered the descriptive themes in more encompassing analytical themes until we reached the point of saturation with the synthesis of codes and themes in three analytical themes. It is important to note that the thematic synthesis process has been iterative, including several iterations over the coded segments, and that in this process, newly discovered theoretical frameworks informed and fuelled the iterative process, which is consistent with insights derived from best practices reported in the field of thematic synthesis (Thomas and Harden, 2008) and qualitative analysis more generally (Miles et al., 2019).

2.3   Limitations

As is the case with every study, this study does not come without limitations. A first limitation is that in the search terms we explicitly focused on the search terms 'cross border' and "pan european", and we may have missed studies dedicated to international information exchange in the context of public service delivery that did not use these terms – although we tried to remedy this situation by reaching out to experts and including papers recommended by these experts. A second limitation is that every systematic literature review – including our review – is susceptible to possible biases in interpreting reported findings. Although we cannot rigorously guarantee objectivity, we remedied this possible limitation by using thematic synthesis, and more particularly reflected on the coding trees and checked whether biases could have impacted our analyses by continuously discussing findings and possible rival interpretations.

3   Descriptive findings

We have observed that there has been a rise in scholarly attention towards the subject of cross-border digital public services since the first publication in 2006 and today. The results shows that academic attention to cross border digital public services in Europe has increased among researchers since 2018, which may be attributed to the adopted regulations and start of large-scale projects (Schmidt and Krimmer, 2022) (Figure 2).

We observed that cross-border digital public services have been studied in a variety of academic disciplines, with knowledge on the topic scattered across various bodies of knowledge. The discussion about the development, implementation or usage of cross-border digital public services takes place in disciplines as varied as the discipline of information systems (44%), eGovernment (24%), law (16%), public administration (12%) and political sciences (4%) (Table 1). The distribution shows a lack of a dominant theoretical foundation, but various research methods exist with which cross-border digital public services are studied.

Figure 2 Publication years
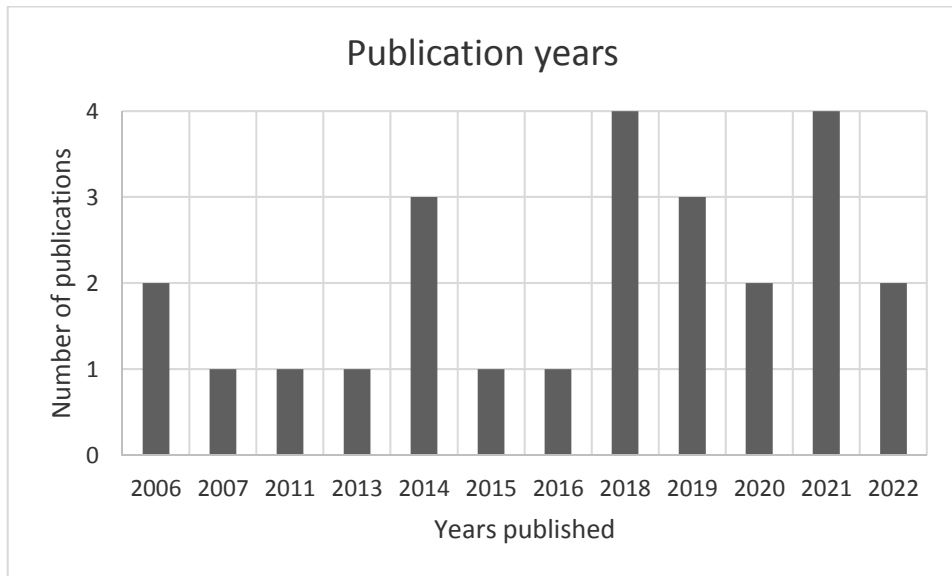
Table 1 Academic disciplines

Academic discipline	*Count* (%)
Information systems	11 (44%)
eGovernment	6 (24%)
Law	4 (16%)
Public administration	3 (12%)
Political sciences	1 (4%)

Most of the reviewed cross-border digital public services studies employed single case studies as their primary research method (56%), with other studies using surveys (16%), action research (8%), experiments (8%) and mixed method designs (4%) (8% had an unspecified methodology) (Table 2). Based on the dispersion of different methods employed by studies we reviewed, we conclude that the research on cross-border digital public services is mainly empirical and focuses on the development and implementation of digital public services in various contexts.

Table 2 Research methods

Methodology/Methods	*Number of papers*	*Percentage* (%)
Case study	14	56
Survey	4	16
Experiment	2	8
Action research	2	8
Unspecified	2	8
Mixed	1	4

In addition, our analysis revealed that most studies (92%) use inductive reasoning, while only a small proportion of publications (8%) employ deductive reasoning, as shown in Table 3. Based on the distribution of research design and the orientation of the studies, we identify that research on cross-border digital public services primarily relies on empirical datasets, which may suggest that the topic may still be in its infancy stage, with a lack of convergence towards specific theoretical orientations.

Table 3   Research design and orientation

Designs and orientation	Number of papers (%)
Inductive reasoning	23 (92%)
Deductive reasoning	2 (8%)

4   Findings of thematic synthesis

The thematic synthesis approach has resulted in three main analytical themes. During our synthesis we have merged the descriptive themes into analytical themes discussing main features of cross-border digital public services. The features of cross-border digital public services are presented in forms of governance discussion including the multi-level context of development and implementation; discussion of attributes of inter-organisational relationships including the requirement for trust, collaboration and coordination of cross-border digital public services; and the importance of the interoperability and integration of heterogenous systems in the EU. In the following sub-sections, we provide explanation on what each theme entails.

4.1   Governance of cross-border digital public services

The cross-border digital public services have been characterised by the involvement of multiple stakeholders with varieties in degrees of geographic focus and functions, and that operate in various coalitions at various levels of decision-making. This refers to a first analytical theme in academic literature on cross-border digital public services. This theme relates to the discussion of cross-border digital public services as a multi-level governance process, with the involvement of stakeholders across geographic and functional dimensions.

Along the geographic dimension, studies show the involvement of local administrations, national administrations, regional organisations and supranational institutions (Kramer, 2016; Leosk et al., 2021; Mulder and Snijders, 2020; Prentza et al., 2021; Schmidt and Krimmer, 2022; Weehuizen and Van Oranje, 2007; Williams et al., 2018).

On the functional dimension, various studies describe the roles of public agencies (Leosk et al., 2021; Prentza et al., 2021; Schmidt and Krimmer, 2022; Soe, 2018; Weck et al., 2022), private actors (Prentza et al., 2021; Schmidt and Krimmer, 2022; Weck et al., 2022) and societal organisations (Soe, 2018; Tinholt et al., 2013; Weck et al., 2022; Weehuizen and Van Oranje, 2007), with each actor being a service provider and/or service consumer (Leosk et al., 2021; Prentza et al., 2021) (Trupec et al., 2015).

The positions and roles of stakeholders are partly the result of political-administrative, cultural and strategic path dependencies (Lanzara, 2014; Soe, 2018; Trupec et al., 2015; Williams et al., 2018; Zarazaga-Soria et al., 2007), and partly result from de facto or de jure veto powers while participating in one or more arenas in which decision making is taking place.

Within this analytical theme, various studies focus on and describe the European Commission's role in bridging the differences between member states (Leosk et al., 2021; Mäkinen et al., 2006; Marcut, 2019). Studies report that this form of coordination has taken place through agenda setting in the e-GOV action plan 2010, the Malmö and Tallinn declarations and in the 2014–2018 strategy on European e-justice (Berce et al., 2011; Schmidt and Krimmer, 2022). Furthermore, literature suggests that the European Commission promotes digital strategies (Kramer, 2016; Mulder and Snijders, 2020; Schmidt and Krimmer, 2022) and develops frameworks (Graux, 2021; Kramer, 2016; Leosk et al., 2021; Mulder and Snijders, 2020; Nalin et al., 2019; Ng, 2014; Schmidt and Krimmer, 2022; Velicogna et al., 2020; Weehuizen and Van Oranje, 2007), more specifically the 1999 e-Signature directive (Kramer, 2016; Schmidt and Krimmer, 2022; Velicogna et al., 2020) and the 2007 e-service directive (Mulder and Snijders, 2020). Since the e-service directive, general regulations and specific sectorial regulations have also been developed (Kramer, 2016; Lanzara, 2014; Mulder and Snijders, 2020; Nalin et al., 2019; Schmidt and Krimmer, 2022; Velicogna et al., 2020). These regulatory frameworks are considered to be critical conditions in the development and implementation of cross-border digital public services (Leosk et al., 2021; Tinholt et al., 2013). A final role for the EU, as reported in the literature, is promoting standardisation (Nalin et al., 2019; Schmidt and Krimmer, 2022; Soe, 2018) and developing the general building blocks for cross-border services to be implemented by member states (Mäkinen et al., 2006; Nalin et al., 2019; Schmidt and Krimmer, 2022; Soe, 2018, Kramer, 2016; Leitold, 2019, Velicogna et al., 2020).

The literature points out the importance of the implementation of regulatory frameworks and building blocks by member states, whereas it also signals specific challenges, national interests, idiosyncratic infrastructures, and existing services are prohibitive for harmonisation and standardisation across member states (Graux, 2021; Kramer, 2016; Leitold, 2019; Leosk et al., 2021; Stanimirovic and Jocic, 2022; Williams et al., 2018). Many studies describe the idiosyncrasies of member states as an important determinant in the faltering implementation of cross-border digital public services (Kramer, 2016; Leosk et al., 2021; Natsiavas et al., 2018; Ng, 2014; Prentza et al., 2021; Stanimirovic and Jocic, 2022; Tinholt et al., 2013; Weck et al., 2022).

A final theme in the literature is the implementation of cross-border digital public services in and across member states (Weehuizen and Van Oranje, 2007), either through the adoption by member states of services that are developed by the European Commission, or through the joint development of services by local, national or regional organisations (Berce et al., 2011; Ng, 2014; Weehuizen and Van Oranje, 2007).

4.2 *Attributes of inter-organisational relationships*

The service delivery across-borders are dependent on the relationships between organisations involved in public service delivery. Thus, the second analytical theme that surfaced from the thematic synthesis are the attributes of inter-organisational

relationships between organisations that deliver cross-border digital public services (Lanzara, 2014; Leosk et al., 2021; Prentza et al., 2021; Weck et al., 2022).

Studies suggest that the drivers behind the delivery of cross-border digital public services are a reduction of the administrative burden for European public administrations, citizens and businesses (Kramer, 2016; Leosk et al., 2021; Prentza et al., 2021; Tinholt et al., 2013; Weehuizen and Van Oranje, 2007), the improvement of digital government maturity (Prentza et al., 2021; Trupec et al., 2015), and high level, abstract European values and the associated freedom of movement, capital, services and goods (Kramer, 2016; Marcut, 2019; Soe, 2018; Tinholt et al., 2013; Weck et al., 2022; Weehuizen and Van Oranje, 2007). However, specific executive agencies that are tasked with delivering cross-border services are reported to be confronted with a lack of financial resources (Kramer, 2016; Nalin et al., 2019; Natsiavas et al., 2018; Soe, 2018; Weck et al., 2022) and human resources (Castelnovo, 2014; Leosk et al., 2021; Natsiavas et al., 2018; Prentza et al., 2021; Soe, 2018; Weck et al., 2022), as well as uncertainty related to the required changes in organisational structures and processes (Lanzara, 2014; Mulder and Snijders, 2020; Prentza et al., 2021; Trupec et al., 2015). The organisations discussed in the literature are the national and local courts, tax agencies, business registries and cities (Lanzara, 2014; Prentza et al., 2021; Soe, 2018).

The adoption of cross-border digital public services is usually characterised by discussions on privacy concerns and the security issues associated with the required collaboration between public administrations (Akkaya and Krcmar, 2018; Castelnovo, 2014; Graux, 2021; Leitold, 2019; Mulder and Snijders, 2020; Natsiavas et al., 2018; Ng, 2014; Prentza et al., 2021; Tinholt et al., 2013; Weck et al., 2022; Williams et al., 2018; Zarazaga-Soria et al., 2007). Furthermore, due to the inherent requirement of the multiple public administrations involved in the delivery of cross-border digital public services, studies identify the conditions for successful service delivery in the establishment of collaboration, coordination and specific agreements (Leosk et al., 2021; Mäkinen et al., 2006; Marcut, 2019; Soe, 2018; Williams et al., 2018). In addition, establishing trust and the willingness to share data between executive organisations is also identified as a prerequisite (Akkaya and Krcmar, 2018; Graux, 2021; Natsiavas et al., 2018; Ng, 2014; Prentza et al., 2021; Trupec et al., 2015; Velicogna et al., 2020; Weck et al., 2022; Williams et al., 2018).

4.3   *Interoperability and integration of government services across borders*

The existing heterogeneity of public service delivery and solutions among member states, affect the ability of the systems to exchange, understand and use required information or data. Therefore, a third analytical theme that emerges from the thematic synthesis is the lack of interoperability between public administrations and the low levels of maturity of cross-border digital public services (Castelnovo, 2014; Lanzara, 2014; Leosk et al., 2021; Schmidt and Krimmer, 2022; Stanimirovic and Jocic, 2022; Velicogna et al., 2020; Zarazaga-Soria et al., 2007). With interoperability being a concept having various interpretations in various contexts, we follow definition of European Interoperability framework and define interoperability as "the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems" (European Commission, 2017). The reported challenges here include differences in language and national cultures between

various member states that are involved in the delivery of digital public services across national borders (Kramer, 2016; Lanzara, 2014; Natsiavas et al., 2018; Ng, 2014; Williams et al., 2018; Zarazaga-Soria et al., 2007). Apart from cultural and semantic diversity, and despite EU harmonisation efforts, the diversity in legal norms in member states hinders the development of cross-border digital public services (Berce et al., 2011; Kramer, 2016; Leitold, 2019; Leosk et al., 2021; Nalin et al., 2019; Ng, 2014; Soe, 2018; Stanimirovic and Jocic, 2022; Williams et al., 2018).

This cultural and legal diversity contributes to the heterogeneity of operational procedures, requirements and data models (Berce et al., 2011; Kramer, 2016; Leitold, 2019; Mäkinen et al., 2006; Nalin et al., 2019; Ng, 2014; Prentza et al., 2021; Weck et al., 2022; Williams et al., 2018) within and between members states, but also at EU level (Prentza et al., 2021).

The lack of interoperability has been reported to result in users being confronted with varieties of partly inconsistent electronic submission forms (Kramer, 2016; Ng, 2014) and generally low levels of user-friendliness (Lanzara, 2014; Natsiavas et al., 2018; Schmidt and Krimmer, 2022; Velicogna et al., 2020). User involvement in the design of services has been missing and the actual use of cross-border digital public services is generally lagging behind expectations (Akkaya and Krcmar, 2018; Berce et al., 2011; Lanzara, 2014; Mulder and Snijders, 2020; Ng, 2014; Soe, 2018), arguably because the added value of utilising cross-border digital public services is unknown to potential users (Mulder and Snijders, 2020; Velicogna et al., 2020).

5   Research gaps and directions

The descriptive findings of the systematic literature review suggest that most papers adopt a case study approach and that, overall, studies prioritise describing the symptoms of challenges with developing and implementing cross-border digital public services at the expense of providing more rigorous theoretical underpinnings of the enabling and hindering factors of cross-border services. As expected, the literature is somewhat fragmented and piecemeal. In the previous section, we provided a synthesis of the main discussion topics of the development and implementation of cross-border digital public services in the literature. The structure and contents of descriptive findings and synthesis highlight three avenues for a future research agenda, which are discussed below.

5.1   Gap and direction one: a multi-level governance perspective
on cross-border services

We infer from our synthesis that the development and implementation of cross-border digital public services span across various levels of public governance activities and include various actors and a multitude of implementation models, which is consistent with multi-level policy making processes in the EU more generally (Hooghe and Marks, 2001; Marks, 1993; Mathieu, 2016). Although current studies of cross-border digital public services have argued that institutional factors are arguably more challenging than the technical and semantic complexities of cross-border digital public services (Berce et al., 2011; Leosk et al., 2021), a more fundamental understanding of how policy development and decision-making takes place in various arenas across and within countries is currently lacking. Previous research has stipulated a lack of interoperability

and identified a plurality of data exchange solutions, roles and interests as symptoms of an overall lack of progress in cross-border digital public services development and implementation, but studies overall have remained silent on how decision-making takes place within and across member states. We suggest refining governance networks, principal agent and the multi-level governance theory (beyond casually referring to this body of knowledge) in order to analyse how decision-making at various governance levels takes place concerning the development of infrastructures and drafting of legislative frameworks, with particular attention to how decision making in arenas at European, national and subnational levels may or may not be aligned. In addition, we suggest future research to identify the implications of multi-level governance setting and decision making on the development process of cross-border services.

In this way, institutions are not necessarily conceptualised as black boxes through which the technical design of services is inhibited or complicated. Instead, in-depth studies of interests in and interactions between local, national and supranational arenas allow for a much richer analysis of how public and private actors operate within malleable, emerging arenas and overarching multi-level networks in which decision-making arenas may be related. Future cross-border digital public services studies may be inspired by the multi-level governance studies of international environmental policy initiatives (Homsy et al., 2019), delivery of welfare services across national borders (Del Pino and Pavolini, 2015) and European telecommunication policies (Gerli et al., 2023).

5.2   *Gap and direction two: a focus on inter-organisational relationships*

We infer with our synthesis that implementation of cross-border digital public services requires organisational transformation and a redesign of existing infrastructures and processes (Lanzara, 2014; Prentza et al., 2021; Velicogna et al., 2020). The literature consistently reports on the difficulties of executive organisations towards the required change and the lack of resources. It must be observed that studies report symptoms of inertia, but the vast academic literature on the management of organisational change in public administration (Kuipers et al., 2014), and more particularly on 'digital' public leadership (Bennis, 2013; Dinh et al., 2014; Klein, 2020; Meijer, 2014; Morse, 2010), is not echoed in the current academic literature on cross-border services. Exploring what public leadership styles are effective in achieving required structural and cultural changes in organisations that deliver cross-border digital public services (van der Voet, 2016) could be of the utmost relevance in understanding whether, and, if so, how organisations that deliver cross-border digital public services succeed in achieving change and transformation (Akkaya and Krcmar, 2018; Prentza et al., 2021; Williams et al., 2018). In addition, future research may focus on what determinants affect organisational change and to what extent change is required nationally. Researchers may also benefit from the organisational change literature in business process reengineering more specifically (Kasemsap, 2020; Kompella, 2020; Weerakkody et al., 2011).

Moreover, studies report difficulties in relation to coordination, collaboration and cooperation between executive organisations (Castelnovo, 2014; Kramer, 2016; Mäkinen et al., 2006; Marcut, 2019), but the reviewed literature does not refer to literature on inter-organisational relationships or information sharing and integration (Chatterjee and Ravichandran, 2004; Dawes, 1996; Gil-Garcia et al., 2009; Gil-Garcia and Sayogo, 2016; Karlsson et al., 2017; Susha, 2020). We suggest using and developing resource dependency theory, transaction-costs economics and institutional theory (Barringer and

Harrison, 2000; Romano et al., 2010) to gain a better understanding of the explanatory mechanisms behind the institutionalisation of changes and outcomes cross-border digital public services as well as the alignment of the responsibilities, processes and expectations towards cross-border services.

5.3 Gap and direction three: a focus on interoperability, digital maturity and citizen-centric service delivery of cross-border digital public services

We identified with our synthesis that the literature particularly focuses on digital maturity, interoperability and integration of cross-border digital public services (and the lack thereof). Studies on the digital maturity of cross-border digital public services have reported how users may experience complex user interfaces, low levels of user-friendliness, and may have difficulties understanding the added value of cross-border digital public services (Berce et al., 2011; Kramer, 2016; Lanzara, 2014; Leitold, 2019; Leosk et al., 2021; Ng, 2014; Prentza et al., 2021; Velicogna et al., 2020; Williams et al., 2018). It must be noted that in the studies mentioned above, the academic literature on interoperability and interoperation, particularly on integrated public services (Axelsson and Melin, 2008; Boudreau and Bernier, 2017; Klievink and Janssen, 2009; Krimmer et al., 2021; Pardo et al., 2012; Scholl and Klischewski, 2007; Wouters et al., 2022), has been echoed to a limited degree and future research attempts may benefit from this body of knowledge in studying what determinants are inhibitive of providing more mature and holistic cross-border services. In addition, studies identify the multiplicity of the interoperability initiatives and heterogenous developments (Prentza et al., 2021; Stanimirovic and Jocic, 2022); thus, to understand better the path of cross-border digital public services in the future, future research may also explore the current developments in interoperability. More specifically, future studies should adopt a truly explanatory approach and focus on what hinders organisations to align their business processes and organisational strategies, and what are crucial aspects of organisational decision-making and implementation processes that result in interoperability.

Furthermore, the literature consistently reports the need to pay more attention to the user-friendliness, value and design of cross-border digital public services (Akkaya and Krcmar, 2018; Graux, 2021; Leitold, 2019; Mulder and Snijders, 2020; Natsiavas et al., 2018; Ng, 2014; Tinholt et al., 2013). Existing literature in the field of service design (Kokkinakos et al., 2016; Sideridis et al., 2022; Smith and Fischbacher, 2002) and public value (Galvagno and Dalli, 2014; Klievink et al., 2018; MacLean and Titah, 2022; Rose et al., 2018; Twizeyimana and Andersson, 2019) may be of the utmost relevance here. Future research may also address the added value and impact of cross-border digital public services both using quantitative methods with which impact is measured and assessed ex-post (MacLean and Titah, 2022), as well as using qualitative methods. With the latter, the literature can be enriched by capturing, analysing and theorising first hand, rich, real-life experiences of citizens that are confronted with cross-border services in their daily lives.

6 Conclusion

Cross-border digital public services arguably play a significant role in fostering integration within the European Single Market. While academic studies published in a

variety of academic disciplines have described and partly analysed symptoms of faltering cross-border digital public services, until now a more systematic understanding of research gaps and future research directions has been missing. With our systematic literature, we aim to address and bridge this research gap. To achieve this research objective we used the PRISMA methodology and thematic synthesis with the aim to identify themes and knowledge gaps in the fragmented literature on the development and implementation of cross-border digital public services in the European Union, and suggest directions for future research on the basis of these themes and knowledge gaps.

As an answer to the first part of our research question, we identified governance of cross-border digital public services (issues related to multi-level-multi-actor context and relations between European Union and member states' institutions), attributes on inter-organisational relationships (issues of trust, collaboration and coordination among public service delivery organisations), and discussion on interoperability and integration of government services across-borders (interoperability, maturity and service quality challenges) as major themes in the fragmented literature on cross-border digital public services. We found that cross-border digital public service delivery takes place in governance networks that are characterised by varieties of actors, geographic and functional levels, and relations and roles between EU institutions and national governments. In addition, we found that that inter-organisational relationships of public service delivery organisations and the need for establishing trust and willingness to share data surface as promising themes in the study of cross-border digital public service delivery. Lastly, we identified that the literature suggests that interoperability and integration is critical to development and implementation of cross-border digital public services. For each theme, we identified that studies have quite elaborately described symptoms of faltering cross-border digital public service delivery yet have refrained from using or contributing to more conceptual understandings of the complexities of cross-border digital public services.

For the second part of our research question, we identified specific research gaps and suggested future research directions using specific theoretical lines of reasoning from adjacent fields of study for each of the analytical themes. As a research suggestion for the first analytic theme, we suggest researching what arenas can be identified in the policy making approaches of the EU and member states, how and why decision-making in cross-border digital public services is affected by the multi-level setting, and to what degree relations between decision-making processes in various arenas explain the overall development of cross-border digital public services. In addition, we encourage researchers to explain convergence and divergence in ways in which solutions are developed and implemented. For the second analytic theme on inter-organisational relationships, we suggest using the literature on organisational change, inter-organisational relationships, information sharing and integration to improve our understanding of institutionalisation of cross-border digital public services. More specifically, we suggest identifying what variables are related to organisational change and the transformation of organisations in more informative ways than merely referring to these terms as catchphrases with which desirable changes (or lack thereof) are described. In addition, we suggest addressing the question how institutionalism affects implementation of cross-border digital public services. For the third analytic theme on interoperability, digital maturity, and citizen centric service delivery, we suggest using the literature on interoperability, integration and integrated public services to identify determinants that prevent the development, implementation and use of more mature and

integrated cross-border services. Also, we suggest using the literature on public service delivery and citizens' experiences and requirements with cross-border service delivery to explain citizens' discontent and the disappointing levels of use of cross-border services, arguably also focusing on organisational interoperability challenges and cross-cultural challenges while developing digital public services. In addition, we encourage further research to focus on capturing, analysing and theorising experiences of citizens that are confronted and use cross-border services.

Overall, with this paper, we contribute to the literature on cross-border digital public services by providing a systematic synthesis of themes and directions for future research on the digital services with which citizens may experience European integration – or fail to do so. In doing so, we hope to have demonstrated how relevant 'political' intricacies of European decision-making are for the development of cross-border digital public services, and that European integration efforts – or a lack thereof – manifest themselves to citizens through digital services. A more fundamental understanding of these two sides of the coin may be vital for shaping how a digital Europe will present itself to European citizens.

Acknowledgements

References

Akkaya, C. and Krcmar, H. (2018) 'Towards the implementation of the EU-wide 'Once-Only principle': perceptions of citizens in the DACH-region', in Parycek, P., Glassey, O., Janssen, M., Scholl, H.J., Tambouris, E., Kalampokis, E. and Virkar, S. (Eds.): *Electronic Government*, Springer International Publishing, Cham, pp.155–166, doi: 10.1007/978-3-319-98690-6_14.

Axelsson, K. and Melin, U. (2008) 'An inter-organisational perspective on challenges in one-stop government', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 1, No. 3, pp.296–314, doi: 10.1504/IJEG.2008.020451.

Barringer, B.R. and Harrison, J.S. (2000) 'Walking a tightrope: creating value through interorganizational relationships', *Journal of Management*, Vol. 26, No. 3, p.37.

Bennis, W. (2013) 'Leadership in a digital world: embracing transparency and adaptive capacity', *MIS Quarterly*, Vol. 37, No. 2, pp.635–636.

Berce, J., Vehovar, V., Slavec, A. and Vintar, M. (2011) 'Pan-European services in Slovenia', *Electronic Journal of E-Government*, Vol. 9, No. 2, pp.122–131.

Boudreau, C. and Bernier, L. (2017) 'The implementation of integrated electronic service delivery in quebec: the conditions of collaboration and lessons', *International Review of Administrative Sciences*, SAGE Publications Ltd., Vol. 83, No. 3, pp.602–620, doi: 10.1177/002085231 5598215.

Carenini, A., Celino, I., Comerio, M., Paoli, F.D. and Maurino, A. (2017) 'MuSe: A semantic solution for personalised recommendations of municipality services', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 9, Nos. 1–2, pp.112–131, doi: 10.1504/IJEG.2017.084649.

Castelnovo, W. (2014) 'Social computing and cooperation services for connected government and cross-boundary services delivery', in Mahmood, Z. (Ed.): *Emerging Mobile and Web 2.0 Technologies for Connected E-Government*, IGI Global, Hershey, PA, pp.231–257, doi: 10.4018/978-1-4666-6082-3.ch010.

Chapman, K. (2021) 'Characteristics of systematic reviews in the social sciences', *The Journal of Academic Librarianship*, Vol. 47, No. 5, p.102396, doi: 10.1016/j. acalib.2021.102396.

Chatterjee, D. and Ravichandran, T. (2004) 'Inter-organizational information systems research: a critical review and an integrative framework', *Proceedings of the 37th Annual Hawaii International Conference on System Sciences 2004*, p.10, doi: 10.1109/HICSS.2004.1265398, Big Island, HI, USA.

Corici, A.A., Podgorelec, B., Zefferer, T., Hühnlein, D., Cucurull, J., Graux, H., Dedovic, S., Romanov, B., Schmidt, C. and 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. Presented at the dg.o 2022: The 23st Annual International Conference on Digital Government Research*, ACM, Virtual Event Republic of Korea, pp.41–53, https://doi.org/10.1145/3543434.3543638

Criado, J.I. (2012) 'Interoperability of eGovernment for building intergovernmental integration in the European union', *Social Science Computer Review*, SAGE Publications Inc., Vol. 30, No. 1, pp.37–60, doi: 10.1177/0894439310392189.

Dawes, S.S. (1996) 'Interagency information sharing: expected benefits, manageable risks', *Journal of Policy Analysis and Management*, Vol. 15, No. 3, pp.377–394, doi: 10.1002/(SICI) 1520-6688(199622)15:3<377::AID-PAM3>3.0.CO;2-F.

Del Pino, E. and Pavolini, E. (2015) 'Decentralisation at a time of harsh austerity: multilevel governance and the welfare state in Spain and Italy facing the crisis', *European Journal of Social Security*, Vol. 17, No. 2, pp.246–270, doi: 10.1177/138826271501700206.

Dinh, J.E., Lord, R.G., Gardner, W.L., Meuser, J.D., Liden, R.C. and Hu, J. (2014) 'Leadership theory and research in the new millennium: current theoretical trends and changing perspectives', *The Leadership Quarterly*, Vol. 25, No. 1, pp.36–62, doi: 10.1016/j.leaqua. 2013.11.005.

Eibl, G., Temple, L., Sellung, R., Dedovic, S., Alishani, A. and Schmidt, C. (2022) 'Towards a transdisciplinary evaluation framework for mobile cross-border government services', in Janssen, M., Csáki, C., Lindgren, I., Loukis, E., Melin, U., Viale Pereira, G., Rodríguez Bolívar, M.P. and Tambouris, E. (Eds.): *Electronic Government, Lecture Notes in Computer Science*, Springer International Publishing, Cham, pp.543–562, https://doi.org/10.1007/978-3-031-15086-9_35

European Commission (2017) *New European Interoperability Framework: Promoting Seamless Services and Data Flows for European Public Administrations*, Publications Office of the European Union, LU.

European Union (2009) 'Ministerial Declaration on eGovernment Malmo declaration [WWW Document]', *Information Policy*, https://www.i-policy.org/2009/11/ministerial-declaration-on-egovernment.html (Accessed 31 March, 2024).

European Union (2017) *Tallinn Declaration on eGovernment. 2017. p. at the ministerial meeting during Estonian Presidency of the Council of the EU on 6 October 2017*, https://digital-strategy.ec.europa.eu/en/news/ministerial-declaration-egovernment-tallinn-declaration

European Union (2020) *Berlin Declaration on Digital Society and Value-based Digital Government*, Berlin, Germany.

Fries-tersch, E., Siöland, L. and Jones, M. (2021) *Annual Report on Intra-EU Labour Mobility 2020*, European Commission, p.207.

Fritsch, M. and Bartenrath, R. (2019) *Cross Border Services in the Internal Market: An Important Contribution to Economic and Social Cohesion*, Study.

Galvagno, M. and Dalli, D. (2014) 'Theory of value co-creation: a systematic literature review', in Gummesson, E., Mele, C. and Polese, F. (Eds.): *Managing Service Quality*, Vol. 24, No. 6, pp.643–683, doi: 10.1108/MSQ-09-2013-0187.

Gerli, P., Navio-Marco, J. and Whalley, J. (2023) 'The multilevel governance of state aid for broadband diffusion: evidence from three European countries', *International Journal of Public Administration*, Vol. 46, No. 3, pp.185–194, doi: 10.1080/01900692.2021.1993904.

Gil-Garcia, J.R. and Sayogo, D.S. (2016) 'Government inter-organizational information sharing initiatives: understanding the main determinants of success', *Government Information Quarterly*, Vol. 33, No. 3, pp.572–582, doi: 10.1016/j. giq.2016.01.006.

Gil-Garcia, J.R., Chun, S.A. and Janssen, M. (2009) 'Government information sharing and integration: combining the social and the technical', *Information Polity*, Vol. 14, Nos. 1–2, pp.1–10.

Graux, H. (2021) 'The single digital gateway regulation as an enabler and constraint of once-only in Europe', in Krimmer, R., Prentza, A. and Mamrot, S. (Eds.): *The Once-Only Principle*, Vol. 12621, Springer International Publishing, Cham, pp.83–103, doi: 10.1007/978-3-030-79851-2_5.

Homsy, G.C., Liu, Z. and Warner, M.E. (2019) 'Multilevel governance: framing the integration of top-down and bottom-up policymaking', *International Journal of Public Administration,* Routledge, Vol. 42, No. 7, pp.572–582, doi: 10.1080/01900692.2018.1491597.

Hooghe, L. and Marks, G. (2001) *Multi-Level Governance and European Integration*, Rowman & Littlefield Publishers, Lanham, M.D.

Jennex, M. (2015) 'Well-done literature reviews: a journal's editor-in-chief perspective', *A Guide to Publishing for Academics*, 1 ed., Auerbach Publications.

Karlsson, F., Frostenson, M., Prenkert, F., Kolkowska, E. and Helin, S. (2017) 'Inter-organisational information sharing in the public sector: a longitudinal case study on the reshaping of success factors', *Government Information Quarterly*, Vol. 34, No. 4, pp.567–577, doi: 10.1016/j. giq.2017.10.007.

Kasemsap, K. (2020) 'The roles of business process modeling and business process reengineering in e-government', in Management Association, I.R. (Ed.): *Open Government*, IGI Global, Hershey, PA, pp.2236–2267, doi: 10.4018/978-1-5225-9860-2.ch102.

Klein, M. (2020) 'Leadership characteristics in the era of digital transformation', *Business and Management Studies: An International Journal*, Vol. 8, No. 1, pp.883–902, doi: 10.15295/bmij.v8i1.1441.

Klievink, B. and Janssen, M. (2009) 'Realizing joined-up government – dynamic capabilities and stage models for transformation', *Government Information Quarterly*, Vol. 26, No. 2, pp.275–284, doi: 10.1016/j. giq.2008.12.007.

Klievink, B., van der Voort, H. and Veeneman, W. (2018) 'Creating value through data collaboratives', *Information Polity*, IOS Press, Vol. 23, No. 4, pp.379–397, doi: 10.3233/IP-180070.

Kokkinakos, P., Koussouris, S., Panopoulos, D. and Askounis, D. (2016) 'A methodology for recording, analysing and prioritising public services', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 8, No. 1, pp.39–57, doi: 10.1504/IJEG.2016.076 682.

Kompella, L. (2020) 'Role of organisational aspects in requirements engineering processes of a socio-technical system: insights from e-governance case studies', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 12, No. 2, pp.113–140, doi: 10.1504/ IJEG.2020.109551.

Kramer, X.E. (2016) 'Access to justice and technology: transforming the face of cross-border civil litigation and adjudication in the EU', in Benyekhlef, K., Bailey, J., Burkell, J. and Gélinas, F. (Eds.): *EAccess to Justice*, University of Ottawa Press, Ottawa, Canada, pp.351–376.

Krimmer, R., Dedovic, S., Schmidt, C. and Corici, A-A. (2021) 'Developing cross-border E-governance: exploring interoperability and cross-border integration', in Edelmann, N., Csáki, C., Hofmann, S., Lampoltshammer, T.J., Alcaide Muñoz, L., Parycek, P., Schwabe, G. and Tambouris, E. (Eds.): *Electronic Participation, Lecture Notes in Computer Science*, Springer International Publishing, Cham, pp.107–124, https://doi.org/10.1007/978-3-030-82824-0_9

Kuipers, B.S., Higgs, M., Kickert, W., Tummers, L., Grandia, J. and Van Der Voet, J. (2014) 'The management of change in public organisations: a literature review', *Public Administration*, Vol. 92, No. 1, pp.1–20, doi: 10.1111/padm.12040.

Lanzara, G.F. (2014) 'The circulation of agency in judicial proceedings: designing for interoperability and complexity', in Contini, F. and Lanzara, G.F. (Eds.): *The Circulation of Agency in E-Justice: Interoperability and Infrastructures for European Transborder Judicial Proceedings*, Springer Netherlands, Dordrecht, pp.3–32, doi: 10.1007/978-94-007-7525-1_1.

Leitold, H. (2019) 'Supporting decision making and policy through large scale pilots', *Proceedings of AHFE 2014 Presented at the Advances in Human Factors and Ergonomics 2014: 5th International Conference on Applied Human Factors and Ergonomics*, Krakow, Poland, p.11.

Leosk, N., Põder, I., Schmidt, C., Kalvet, T. and Krimmer, R. (2021) 'Drivers for and barriers to the cross-border implementation of the once-only principle', in Krimmer, R., Prentza, A. and Mamrot, S. (Eds.): *The Once-Only Principle: The TOOP Project*, Springer International Publishing, Cham, pp.38–60, doi: 10.1007/978-3-030-79851-2_3.

MacLean, D. and Titah, R. (2022) 'A systematic literature review of empirical research on the impacts of e government: a public value perspective', *Public Administration Review*, Vol. 82, No. 1, pp.23–38, doi: 10.1111/puar.13413.

Mäkinen, M., Forsström, J., Aärimaa, M. and Rautava, P. (2006) 'A European survey on the possibilities and obstacles of electronic prescriptions in cross-border healthcare', *Telemedicine Journal and E-Health: The Official Journal of the American Telemedicine Association*, Vol. 12, No. 4, pp.484–489, doi: 10.1089/tmj.2006.12.484.

Marcut, M. (2019) *Smart Cities – Opportunities for Cross-Border Cooperation*, Eurolimes, Editura Universitatii din Oradea, Vol. 27, No. 27-28, pp.209–217.

Marks, G. (1993) 'Structural policy and multilevel governance in the EC', in Cafruny, A. and Rosenthal, G. (Eds.): *The State of the European Community*, Lynne Rienner, pp.391–410.

Mathieu, E. (2016) 'When Europeanization feeds back into EU governance: EU legislation, national regulatory agencies, and EU regulatory networks', *Public Administration*, Vol. 94, No. 1, pp.25–39, doi: 10.1111/padm.12156.

Meijer, A.J. (2014) 'From hero-innovators to distributed heroism: an in-depth analysis of the role of individuals in public sector innovation', *Public Management Review*, Vol. 16, No. 2, pp.199–216, doi: 10.1080/14719037.2013.806575.

Mergel, I., Gong, Y. and Bertot, J. (2018) 'Agile government: systematic literature review and future research', *Government Information Quarterly*, Vol. 35, No. 2, pp.291–298, doi: 10.10 16/j.giq.2018.04.003.

Miles, M.B., Huberman, A.M. and Saldaña, J. (2014) *Qualitative Data Analysis: A Methods Sourcebook*, 3rd ed., SAGE Publications, Inc., Thousand Oaks, California.

Miles, M.B., Huberman, A.M. and Saldaña, J. (2019) *Qualitative Data Analysis: A Methods Sourcebook*, 4th ed., SAGE Publications, Inc., Los Angeles, London, New Delhi, Singapore Washington DC, Melbourne.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. and for the PRISMA Group (2009) 'Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement', *BMJ*, Vol. 339, No. 1, 21 July, pp.b2535–b2535, doi: 10.1136/bmj.b2535.

Morse, R.S. (2010) 'Integrative public leadership: catalyzing collaboration to create public value', *The Leadership Quarterly*, Vol. 21, No. 2, pp.231–245, doi: 10.1016/j. leaqua.2010.01.004.

Mulder, E-J. and Snijders, D. (2020) 'Playing the telephone game in a multilevel polity: on the implementation of e-government services for business in the EU', *Government Information Quarterly*, Vol. 39, No. 2, p.101526, doi: 10.1016/j. giq.2020.101526.

Nalin, M., Baroni, I., Faiella, G., Romano, M., Matrisciano, F., Gelenbe, E., Martinez, D.M., Dumortier, J., Natsiavas, P., Votis, K., Koutkias, V., Tzovaras, D. and Clemente, F. (2019) 'The European cross-border health data exchange roadmap: case study in the Italian setting', *Journal of Biomedical Informatics*, Vol. 94, p.103183, https://doi.org/10.1016/ j.jbi.2019.103183

Natsiavas, P., Kakalou, C., Votis, K., Tzovaras, D., Maglaveras, N., Komnios, I. and Koutkias, V. (2018) 'Identification of barriers and facilitators for ehealth acceptance: the KONFIDO study', in Maglaveras, N., Chouvarda, I. and de Carvalho, P. (Eds.): *Precision Medicine Powered by PHealth and Connected Health*, Springer, Singapore, pp.81–85, doi: 10.1007/978-981-10-7419-6_14.

Ng, G.Y. (2014) 'Testing transborder civil procedures in practice: findings from simulation experiments with the European payment order and the European small claims procedure', in Contini, F. and Lanzara, G.F. (Eds.): *The Circulation of Agency in E-Justice*, Springer Netherlands, Dordrecht, pp.265–286, doi: 10.1007/978-94-007-7525-1_11.

Page, M.J. and Moher, D. (2017) 'Evaluations of the uptake and impact of the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement and extensions: a scoping review', *Systematic Reviews*, Vol. 6, No. 1, p.263, doi: 10.1186/s13643-017-0663-8.

Pardo, T.A., Nam, T. and Burke, G.B. (2012) 'E-government interoperability: interaction of policy, management, and technology dimensions', *Social Science Computer Review*, SAGE Publications Inc., Vol. 30, No. 1, pp.7–23, doi: 10.1177/0894439310392184.

Pati, D. and Lorusso, L.N. (2018) 'How to write a systematic review of the literature', *HERD: Health Environments Research and Design Journal*, Vol. 11, No. 1, pp.15–30, doi: 10.1177/ 1937586717747384.

Pittaway, J.J. and Montazemi, A.R. (2020) 'Know-how to lead digital transformation: the case of local governments', *Government Information Quarterly*, Vol. 37, No. 4, p.101474, doi: 10. 1016/j.giq.2020.101474.

Prentza, A., Mitzman, D., Ehastu, M. and Leontaridis, L. (2021) 'TOOP pilot experiences: challenges and achievements in implementing once-only in different domains and member states', in Krimmer, R., Prentza, A. and Mamrot, S. (Eds.): *The Once-Only Principle: The TOOP Project*, Springer International Publishing, Cham, pp.191–207, doi: 10.1007/978-3-030-79851-2_10.

Roger, A.E. and Ghislain, A.A. (2017) 'Quality of service improvement based on procedure analysis and reengineering: a case study in Cameroonian public service', *International Journal of Electronic Governance,* Inderscience Publishers, Vol. 9,Nos. 1–2, pp.27–54, doi: 10.1504/ IJEG.2017.084647.

Romano, N.C., Pick, J.B. and Roztocki, N. (2010) 'A motivational model for technology-supported cross-organizational and cross-border collaboration', *European Journal of Information Systems*, Vol. 19, No. 2, pp.117–133, doi: 10.1057/ejis.2010.17.

Rose, J., Flak, L.S. and Sæbø, Ø. (2018) 'Stakeholder theory for the E-government context: framing a value-oriented normative core', *Government Information Quarterly*, Vol. 35, No. 3, pp.362–374, doi: 10.1016/j. giq.2018.06.005.

Roy, J. (2009) 'E-government and integrated service delivery in Canada: the province of nova scotia as a case study', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 2, Nos. 2–3, pp.223–238, doi: 10.1504/IJEG.2009.029131.

Saldaña, J. (2009) *The Coding Manual for Qualitative Researchers*, Sage, Los Angeles, Calif.

Sánchez, M.A. and Zuntini, J.I. (2019) 'Digital readiness in government: the case of Bahía Blanca Municipal Government', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 11, No. 2, pp.155–181, doi: 10.1504/IJEG.2019.101500.

Schmidt, C. and Krimmer, R. (2022) 'How to implement the European digital single market: identifying the catalyst for digital transformation', *Journal of European Integration*, Vol. 44, No. 1, pp.59–80, doi: 10.1080/07036337.2021.2011267.

Scholl, H.J. and Klischewski, R. (2007) 'E-government integration and interoperability: framing the research agenda', *International Journal of Public Administration*, Vol. 30, Nos. 8–9, pp.889–920, doi: 10.1080/01900690701402668.

Siapera, M., Schmitz, A., Wimmer, M.A. and Prentza, A. (2023) 'AgInTeF: agile interoperability testing framework for orchestrating overarching procedures in verifying digital public services', *Proceedings of the 24th Annual International Conference on Digital Government Research, Presented at the DGO 2023: Digital Government and Solidarity*, ACM, Gdansk Poland, pp.514–525, doi: 10.1145/3598469.3598527.

Sideridis, A.B., Pimenidis, E., Protopappas, L., Maliappis, M., Yialouris, C., Maragkopoulos, A.V. and Chatziandreou, A. (2022) 'Design issues of a pan European smart cross border 'dream like e-gov' primary healthcare medical service', *International Journal of Electronic Governance*, Vol. 14, Nos. 1–2, p.172, doi: 10.1504/IJEG.2022.123252.

Sideridis, A.B., Protopappas, L., Tsiafoulis, S. and Pimenidis, E. (2017) 'Smart cross-border e-gov systems: an application to refugee mobility', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 9, Nos. 3–4, pp.246–266, doi: 10.1504/IJEG.2017.088219.

Smith, A.M. and Fischbacher, M. (2002) 'Service design in the nhs: collaboration or conflict?', *Journal of Marketing Management*, Vol. 18, Nos. 9–10, pp.923–951, doi: 10.1362/026725701 2930349.

Soe, R-M. (2018) 'Smart cities: from silos to cross-border approach', *International Journal of E-Planning Research (IJEPR)*, IGI Global, Vol. 7, No. 2, pp.70–88, doi: 10.4018/IJEPR.2018 040105.

Soe, R-M. (2020) 'Innovation procurement as key to cross-border ITS pilots', *International Journal of Electronic Governance*, Inderscience Publishers, Vol. 12, No. 4, pp.387–403, doi: 10.1504/IJEG.2020.112585.

Stanimirovic, D. and Jocic, L.T. (2022) 'Accelerated digitalization of the epidemiological measures: overcoming the technological and process complexities of establishing the EU digital COVID certificate in Slovenia', *International Journal of Environmental Research and Public Health*, Multidisciplinary Digital Publishing Institute, Vol. 19, No. 21, p.14322, doi: 10.3390/ijerph192114322.

Stepančič, Ž. and Blažič, B.J. (2018) 'Exploring European digital single market: user adoption and preferences for eID services', *International Journal of Electronic Governance,* Inderscience Publishers, Vol. 10, No. 4, pp.382–422, doi: 10.1504/IJEG.2018.097267.

Susha, I. (2020) 'Establishing and implementing data collaborations for public good: a critical factor analysis to scale up the practice', *Information Polity*, Vol. 25, No. 1, pp.3–24, doi: 10. 3233/IP-180117.

Thomas, J. and Harden, A. (2008) 'Methods for the thematic synthesis of qualitative research in systematic reviews', *BMC Medical Research Methodology*, Vol. 8, p.10.

Tinholt, D., Carrara, W., Tol, T., Foley, P., Graux, H. and Erdogan, E. (2013) *Study on Analysis of the Needs for Cross-Border Services and Assessment of the Organisational, Legal, Technical and Semantic Barriers*, Publications Office, LU.

Trupec, T.P., Ljubi, I. and Belani, H. (2015) 'Sending and retrieving e-prescriptions across Europe: lessons learned', in Lacković, I. and Vasic, D. (Eds.): *6th European Conference of the International Federation for Medical and Biological Engineering*, Springer International Publishing, Cham, pp.715–718, doi: 10.1007/978-3-319-11128-5_178.

Twizeyimana, J.D. and Andersson, A. (2019) 'The public value of e-government – a literature review', *Government Information Quarterly*, Vol. 36, No. 2, pp.167–178, doi: 10.1016/j. giq.2019.01.001.

van der Voet, J. (2016) 'Change leadership and public sector organizational change: examining the interactions of transformational leadership style and red tape', *The American Review of Public Administration*, Vol. 46, No. 6, pp.660–682, doi: 10.1177/0275074015574769.

Velicogna, M., Steigenga, E., Taal, S. and Schmidt, A. (2020) 'Connecting EU jurisdictions: exploring how to open justice across member states through ICT', *Social Science Computer Review*, SAGE Publications Inc., Vol. 38, No. 3, pp.274–294, doi: 10.1177/089443931 8786949.

Weck, M., Jackson, E.B., Sihvonen, M. and Pappel, I. (2022) 'Building smart living environments for ageing societies: decision support for cross-border e-services between Estonia and Finland', *Technology in Society*, Vol. 71, p.102066, doi: 10.1016/j. techsoc.2022.102066.

Weehuizen, R. and Van Oranje, C. (2007) *Innovative and Adaptive Pan-European Services for Citizens in 2010 and beyond Pan-European eGovernment Services* (*PEGS*) *in Perspective: Function, Forms, Actors, Areas, Pathways and Indicators*, Prepared for DG Information Society and Media of the European Commission http://www.euregov.eu/index.html

Weerakkody, V., Janssen, M. and Dwivedi, Y.K. (2011) 'Transformational change and business process reengineering (BPR): lessons from the British and Dutch Public Sector', *Government Information Quarterly*, Vol. 28, No. 3, pp.320–328, doi: 10.1016/j. giq.2010.07.010.

Williams, I., Falch, M. and Tadayoni, R. (2018) 'Internationalization of e-government services', Presented at the *2018 11th CMI International Conference: Prospects and Challenges towards Developing a Digital Economy within the EU*, Copenhagen, Denmark, pp.19–31, doi: 10.1109/PCTDDE.2018.8624828.

Wimmer, M.A. (2021) 'Once-only principle good practices in Europe', in Krimmer, R., Prentza, A. and Mamrot, S. (Eds.): *The Once-Only Principle*, Vol. 12621, Springer International Publishing, Cham, pp.61–82, doi: 10.1007/978-3-030-79851-2_4.

Wouters, S., Janssen, M., Lember, V. and Crompvoets, J. (2023) 'Strategies to advance the dream of integrated digital public service delivery in inter-organizational collaboration networks', *Government Information Quarterly*, Vol. 40, p.101779. https://doi.org/10.1016/j.giq.2022.101779

Xiao, Y. and Watson, M. (2019) 'Guidance on conducting a systematic literature review', *Journal of Planning Education and Research*, Vol. 39, No. 31, pp.93–112, https://doi.org/10.1177/0739456X1772397

Zarazaga-Soria, F.J., Nogueras-Iso, J., Latre, M.A., Rodriguez, A., Lopez, E., Vivas, P. and Muro-Medrano, P.R. (2007) 'Providing SDI services in a cross-border scenario: the SDIGER project use case', in Onsrud, H.J. (Ed.): *Research and Theory in Advancing Spatial Data Infrastructure Concepts*, ESRI Press, Redlands, California, USA, pp.107–119.

Annex

Table A1   Selected papers

References	Year published	Type of document	Discipline	Type of e-service investigated	Methodology	Level of analysis
Castelnovo (2014) – Social computing and cooperation services for connected government and cross-boundary services delivery	2014	Book Chapter	Information Systems	General overview	Case study	National Italy
Graux (2021) – The single digital gateway regulation as an enabler and constraint of once-only in Europe	2021	Book Chapter	Law	General overview	Unspecified	EU level
Kramer (2016) – Access to justice and technology: transforming the face of cross-border civil litigation and adjudication in the EU	2016	Book Chapter	Law	European Small Procedures	Experiment	EU level
Lanzara (2014) – The circulation of agency in judicial proceedings: designing for interoperability and complexity	2014	Book Chapter	Law	European Small Procedures	Case study	EU level
Leosk et al. (2021) – Drivers for and barriers to the cross-border implementation of the Once-Only Principle	2021	Book Chapter	Information Systems	OOP	Case study	EU level
Prentza et al. (2021) – TOOP pilot experiences: challenges and achievements in implementing once-only in different domains and member states	2021	Book Chapter	Information Systems	Large Scale Pilots	Case study	EU level
Zarazaga-Soria et al. (2006) – Providing SDI services in a cross-border scenario: the SDIGER project use case	2006	Book Chapter	Information Systems	Geospatial services	Case study	C.B. level France and Spain
Akkaya and Krcmar (2018) – Towards the implementation of the EU-wide "Once-Only Principle": perceptions of citizens in the DACH-Region	2018	Conference paper	eGOV	OOP	Survey	Regional level (DACH)
Ng (2014) – Testing transborder civil procedures in practice: findings from simulation experiments with the European Payment Order and the European Small Claims procedure	2014	Conference paper	Law	European Small Procedures	Experiment	EU level

Table A1 Selected papers (continued)

References	Year published	Type of document	Discipline	Type of e-service investigated	Methodology	Level of analysis
Leitold (2019) – Supporting decision making and policy through large scale pilots	2019	Conference paper	Public administration	eID	Action research	EU level
Natsiavas et al. (2018) – Identification of barriers and facilitators for ehealth acceptance: the KONFIDO study	2018	Conference paper	Information Systems	eHealth	Survey	EU level
Trupec et al. (2015) – Sending and retrieving e-prescriptions across Europe: lessons learned	2015	Conference paper	Information Systems	e-Prescription	Case study	National Croatia
Williams et al. (2018) – Internationalisation of e-government services	2018	Conference paper	eGOV	Regional G2B services	Case study	Regional level (D.K., S.W., DE)
Berce et al. (2011) – Pan-European services in Slovenia	2011	Journal Paper	eGOV	Life events services	Survey	National Slovenia
Makinen et al. (2006) – A European survey on the possibilities and obstacles of electronic prescriptions in cross-border healthcare	2006	Journal Paper	Information Systems	eHealth	Survey	EU level
Marcut (2019) – Smart cities – opportunities for cross-border cooperation	2019	Journal Paper	Political Sciences	Smart city	Case study	C.B. level Romania Hungary
Mulder and Snijders (2020) – Playing the telephone game in a multilevel polity: on the implementation of e-government services for business in the EU	2020	Journal Paper	Public administration	Message box in Netherlands (G2)	Case study	National Netherlands
Nalin et al. (2019) – The European cross-border health data exchange roadmap: case study in the Italian setting	2019	Journal Paper	Information Systems	Data exchange e-prescription	Case study	National Italy
Schmidt and Krimmer (2021) – How to implement the European digital single market: identifying the catalyst for digital transformation	2021	Journal Paper	Public administration	Large Scale Projects	Action research	EU level
Soe (2018) – Smart cities: from silos to cross-border approach	2018	Journal Paper	Information Systems	Smart city	Case study	C.B. local level Estonia and Finland

Table A1   Selected papers (continued)

References	Year published	Type of document	Discipline	Type of e-service investigated	Methodology	Level of analysis
Stanimirovic and Jocic (2022) – Accelerated digitalisation of the epidemiological measures: overcoming the technological and process complexities of establishing the EU Digital COVID Certificate in Slovenia	2022	Journal Paper	Information Systems	COVID passport	Case study	National Slovenia
Velicogna et al. (2020) – Connecting EU jurisdictions: exploring how to open justice across member states through ICT	2020	Journal Paper	Information Systems	e-justice	Case study	EU level
Weck et al. (2022) – Building smart living environments for ageing societies: decision support for cross-border e-services between Estonia and Finland	2022	Journal Paper	eGov	Smart living environment	Case study	C.B. level Estonia and Finland
Tinholt et al. (2013) – Study on analysis of the needs for cross-border services and assessment of the organisational, legal, technical and semantic barriers	2013	Report	eGOV	Life events services	Mixed	EU level
Weehuizen and van Oranje (2007) – Innovative and adaptive pan-European services for citizens in 2010 and beyond. Pan-European eGovernment Services (PEGS) in perspective: function, forms, actors, areas, pathways and indicators	2007	Report	eGOV	Life events services	Unspecified	EU level