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Einer-für-Alle/Viele: Challenges of the Musketeer Principle in Digitizing Germany

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Abstract

While digital transformation of governments faces a multiplicity of challenges, federalism is particularly affected due to its division of power. Germany faces various challenges when it comes to e-Government projects, such as decentralized administrative performance, heterogeneity of the federal IT landscape and complexity of public services. To cope with these challenges and accelerate digitalization, financial aid is provided under the recovery package released in 2020. The monetary support is addressing the federal states for the development of e-Government services. Thereby, the government aims to set incentives for a collaborative approach, as the service is meant to be shared among the federal states. Only when the service can be shared, the developing federal state is eligible to receive the money. This approach is called Einer-für-Alle/Viele (one for all/many). The purpose of this thesis is to identify the major challenges of realizing EfA. Based on literature on public sector coordination, with a focus on shared services and software as a service, general challenges were classified. Data was collected through one observation, three documentations, and ten semi-structured interviews, guided by the inventory list of potential challenges. A qualitative content analysis was chosen to analyze the data using MAXQDA as a software tool for coding. Thereby, a variety of challenges were identified. Among them are (1) a lack of a clear strategy and vision for the implementation of the services, in the short term mainly on the municipality level, in the long term mainly on the federal states level regarding financing, (2) desire for autonomy of public authorities and lack of trust resulting from an absence of previous collaborations, (3) adaption to the variety of established structures and processes, (4) development of a shared IT infrastructure based on the multiplicity of existing ones, (5) lack of standards, (6) data routing, (7) lack of a reference example, e.g. to calculate total costs, (8) (fair) distribution of costs, (8) jurisdiction and applicability of public procurement law, and (9) fulfilment of data protection requirements. Even though the thesis is not free of limitations, it is unique in its scale and provides a thorough description of challenges under EfA. Thus, it can provide valuable insights for government officials, and lay a basis for further research on EfA.

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Abbreviations

AL	Anschlussland
API	Application Program Interface
BMI	Bundesministerium des Innern, für Bau und Heimat
DVDV	Network-type Mechanism
EfA	Einer-für-Alle/Viele (“Musketeer Principle”)
FITKO	Föderale IT-Kooperation
GDPR	General Data Protection Regulation
GWB	Gesetz gegen Wettbewerbsbeschränkungen (Act against Restraints of Competition)
HTM	Hierarchy-type Mechanism
IaaS	Infrastructure as a Service
IT	Information Technology
KGSt	Kommunale Gemeinschaftsstelle für Verwaltungsmanagement
MTM	Market-type Mechanism
NEGZ	Das Nationale E-Government Kompetenzzentrum
NTM	Network-type Mechanism
OECD	Organization for Economic Cooperation and Development
OSCI	Online Services Computer Interface
OZG	Onlinezugangsgesetz
PaaS	Platform as a Service
SaaS	Software as a Service
UL	Umsetzungsland
XÖV	XML of the Public Administration
XTA	Subject-Independent Standard for Transport Procedures

1 Introduction

In the course of the COVID-19 pandemic, the importance of digitization has been highlighted. As it is required to reduce the points of personal contact, offering services online instead of in-person seems like a logical consequence. Particularly in the areas of health, education and the economy, an accelerated digital transformation is useful, for example for contact tracing and home schooling. Likewise, it is highly important to still be able to contact civil servants and receive the services the state offers, such as child benefits or unemployment benefits without being forced to show up in person at the offices. However, not all countries forged ahead in their digital transformation. Especially states with the organizational form of federalism seem to lag behind and face the most challenges (Jaeger, 2002; Klös, 2020; Lee, Tan, & Trimi, 2005; Scholta, Niemann, Halsbenning, Räckers, & Becker, 2019). As a consequence, Germany presents itself as a typical case to describe and analyze these issues. The among the challenges for Germany are the heterogeneity of the municipalities, and therefore the variety and quantity of existing digitized solutions and their IT providers. Hence, multiple duplications of developed online services exist that are not compatible for interoperability on a state-wide-level. Furthermore, municipalities also vary in modes of accessing financial and human resources to execute a digital transformation.

In 2017 the Onlinezugangsgesetz (OZG) was released to further and accelerate the digital transformation. It puts all public authorities under obligation to digitize 575 services for all citizens until the end of 2022. So far, no municipality can offer a completely digitalized service portfolio (Hustedt & Trein, 2020). The OZG demands in a high implementation effort, because based on the hypothesis that 460 services on the municipality level are to be developed and implemented separately, this alone would result in 180.000 implementations for 400 municipalities (Kersting & Graubner, 2020). Services provided on the federal states and federal level are not included in this calculation. There is the need for a centralized approach that helps to avoid duplications, enhances the digital sovereignty of public authorities, and offers access to financial resources (Kersting & Graubner, 2020).

In 2020, fighting against the COVID-19 pandemic, the central government in Germany decided on a recovery package. Among other purposes, this allocates financial resources for the digital transformation. However, the money is bound to the fulfilment of the “Einer-für-Alle/Viele” (EfA) approach (one for all/many). This states that digital services developed with the financial resources of the recovery package have to follow open standards in order for other federal states and municipalities to be able to adopt them. The legal cornerstone of enabling this federal collaboration was set in 2009 with the adaption

of Article 91c of the Basic Law. The 575 services were divided into topics which were then distributed for implementation to the federal states and municipalities. The platform marketplace for communication, coordination, and search purposes is developed and provided by a centralized entity, the Föderale IT-Kooperation (FITKO). While EfA seems like an appropriate and efficient solution to the issues Germany has been facing so far, there exist multiple criticisms. However, most of the ministerial departments in federal states have already started enthusiastically with developing EfA services.

Municipalities are the public institutions that have the most points of contact with the citizens, offer most of the services, and will be the executing power of the digital transformation in the end. Additionally, they are also the ones having to deal with the huge gaps in financial and human resources as well as the IT and project management knowledge required for the digital transformation. In a survey carried out by the Kommunale Gemeinschaftsstelle für Verwaltungsmanagement (KGSt) (Municipal Joint Office for Administrative Management), municipalities stated that they feel insecurity, time pressure, chaos, confusion, and desperation regarding the execution of the OZG (KGSt, 2020). Hence, they request more centralized support and standardization of services. Based on their concerns and requests, the EfA principle (herein after also refered to as EfA approach) seems like the solution. However, municipalities are affected by executing EfA services, where areas federal states are mostly confronted with developing and implementing EfA services. Thus, many actors are involved in or affected by this new approach.

For a successful realization, it is crucial to identify challenges. Previously defined challenges result in better preparation for the development and implementation of services, including taking early counter measures. However, according to the author's best knowledge, there does not exist a scientifically accompanied and published study so far regarding the challenges of EfA. Therefore, the thesis aims to answer the following research question:

What are major challenges of realizing the EfA approach?

As the research focuses on Germany's approach of subsequent use (EfA), which is unique in its size, time frame, and framework, the following research is classified as an exploratory single case study. This limits the generalizability of the research but offers in-depth research on the case. While there are centralized approaches used to foster digital transformation, this is not equal to the approach Germany is aiming at. As the present paper aims to be exploratory and so far no study exists on the challenges of EfA, the research question is formulated rather broadly, to gain first insights into possible challenges. In order to answer the research question properly, a literature review

according to Webster and Watson (2002) is executed first. Due to the lack of existing research, challenges from different concepts were summarized in an inventory list. The concepts were chosen based on the components of EfA. This was further identified as a suitable approach, as the present thesis does not aim to falsify or verify a theory, but rather uses the scientific literature to guide the study. The research question will be answered by a document analysis as well as semi-structured expert interviews. The interviews are guided by a set of questions derived from the literature review. The semi-structured interviews were transcribed and analyzed using the software MAXQDA, a tool for qualitative data and text analysis. Based on the findings of this thesis, future research can shed more light on the identified categories and challenges. Other German organizations as well as other multi-level governments can learn from the challenges identified in this research.

The thesis is structured as follow: the next chapter provides the research background on digital transformation in federalism, strategies that foster digitalization, and the challenges of these strategies. The chapter closes with an inventory list of challenges. Next, the research design to answer the research questions will be presented. This is followed by outlining the results of the qualitative content analysis. Here the focus is on the identified challenges, but the chapter also includes a brief case description as well as a brief overview of perceived opportunities. The paper concludes with a discussion of the results, the theoretical and practical implications as well as on the research limitations and potential future research.

2 Research Background

The research question of the paper originates from practice, hence aims to identify the challenges of the new guiding approach EfA for the digital transformation in Germany. To place the topic in a larger context, a systematic and concept-centric literature review is conducted according to Webster and Watson (2002). Since the EfA approach has not been discussed in research and scientific literature in this thesis was mostly used to guide the study, the literature search was expanded to involve academic papers and policy reports on public sector coordination, shared services, and software as a service (SaaS) (cloud computing). These concepts were included based on the components of EfA. Further explanation regarding the methodology of the choice of the concepts will follow in Chapter 2.2. As a result, an inventory of potential challenges was compiled, covering interoperability, accountability, privacy and security, and further relevant factors. This inventory was then used as input for the development of survey questions for the interviews.

2.1 Digital Transformation in Federalism

Digital transformation aims to improve and optimize services to make them more efficient and accessible to citizens by using Information Technologies (IT) (Mergel, Edelmann, & Haug, 2019). Ideally, a change in Government is required for a successful transformation which then again will lead to more government efficiency. However, most changes are rather directed at switching the service delivery from offline to online rather than challenging and optimizing the ongoing processes and services (Mergel et al., 2019).

Governments face multiple issues when aiming for a digital transformation. Previous research has shown that federalism can be identified as one central problem to e-Government ambitions (Jaeger, 2002; Klös, 2020; Lee et al., 2005; Scholta et al., 2019). Federalism is a form of organizing a state (Scharpf, 1988). Contrary to a central state, federalism has multiple levels. All levels have their own government which is elected separately from the central government (Scharpf, 1988). These governments have certain authorities and are themselves again guided by one central government. Furthermore, in federalism judicial, executive, and legislative powers are separated from each other in the horizontal as well as the vertical (Scharpf, 1988). Examples of multi-level governments are Australia, Belgium, the United States of America, and Germany. In the past couple of years, high motivation and ambitions for a digital transformation in Germany could be observed in strategies, coalition agreements, action plans, and others (Kersting & Graubner, 2020). As argued by Kersting and Graubner (2020), these ambitions are not reflected by Germany's OECD digital government index. Here, the country is ranked 26

out of 33 OECD countries in 2019 (OECD, 2020). The latest statistic published by the OECD can support the conclusion that a federal structure can slow down the digital transformation. Out of the ten highest ranks, only two states are federal (OECD, 2020).

A thorough literature review reveals that the main challenges for federal regimes, for example Germany, are the federal decision-making framework, distribution of financial resources, quantity and diversity of municipalities, variety of existing solutions, and outsourced IT governance and implementation. While these seem to be general challenges of digitalization, they occur in increased scope, origins, and intensity in federal governments. Furthermore, the following does not identify all challenges in digitalizing the public sector but rather concentrates on federal-specific ones that explain the introduction of the EfA approach. Hence, the subsequent chapters elaborate these identified challenges.

2.1.1 Federal Decision-Making Framework

Germany's bureaucracy can be described as an obstacle in itself. Contrary to centralized governments, a lot of tasks are not coordinated by a central authority (Gauß, 2020; Mergel, 2021). Federalism in Germany consists of three levels: Bund (federal), Länder (federal states), and Städte und Kommunen (municipalities). Several ministries on the first two levels exist, working separately on the concept of digitization (Gauß, 2020). However, in federalism such as in Germany, not only states have a certain degree of independence and organizational sovereignty, but municipalities as well (Boeckeler & Hasecker, 2021; Kersting & Graubner, 2020). Therefore, they are not only capable but it is also expected of them that they initiate activities and initiatives for digitization (Lasar, 2019). However, in federalism the federal level is responsible for the legislation. It passes laws which on the one hand guide the municipalities by prioritizing reforms, taking decisions, and developing the future (Lasar, 2019). On the other hand, it limits the scope of action of the municipalities. This distribution of responsibilities, and therefore the interdependency of the two levels, slow down the digital transformation in Germany (Boeckeler & Hasecker, 2021). Most federal laws do not provide the legal infrastructure to provide services online (Lasar, 2019), for example signing documents digitally. The law still partially states that contracts and documents are only legally binding if there is a physical signature. It needs to change in order to digitize services. Otherwise, although documents could be downloaded, filled out, and saved online, they still need to be printed out. Hence, while the municipalities are under pressure to digitize their services, they are not completely able to do that. This is reasoned in the federal and federal states laws which are out of scope of their responsibilities to change (Lasar, 2019).

Furthermore, a consent culture that requires high coordination effort can often be observed in federalism (Hustedt & Trein, 2020; Lasar, 2019). The consent culture occurs as all three levels constantly need to find an agreement that suits the majority of parties (Hustedt & Trein, 2020). This consent culture can lead to a joint decision trap (Scholta et al., 2019). In order to realize a law or strategy, a heterogeneous set of authorities have to concur. Hence, the process is rather slow and mostly ends in a compromise for all involved parties, a suboptimal outcome based on the lowest common denominator (Hustedt & Trein, 2020; Scholta et al., 2019). Furthermore, Hustedt and Trein (2020) state that the need for coordination hinders the integration of new technologies and processes. In order to introduce technologies and processes that function across the whole country, standards have to be introduced. To come to an agreement on the standards, coordination and arrangements are necessary between the three levels (federal to municipality) (Hustedt & Trein, 2020). To sum up, vertical as well as the horizontal distribution of power in federalism is hindering digitalization (Hustedt & Trein, 2020).

2.1.2 Distribution of Financial Resources

A lack in financial and human resources especially is identified as a challenge to digital transformation for most countries, independent of their form of government. Hereby, the allocation of financial resources is a critical factor, which is often criticized in federal concepts for creating problems (Scholta et al., 2019; Watts, 1998). The approach of distributing is important as resources define the boundaries of executing the governments constitutionally assigned legislative and executive responsibilities (Watts, 1998). In a federal concept, there is so far no successful approach of autonomous revenue sources which cover the expenditures of the governments (Watts, 1998). In Germany, many municipalities not only lack the financial resources but are even in dept, as they solely earn most of their money through citizens and companies paying business taxes (Lasar, 2019). Therefore, the lowest level of the three levels is either not capable of implementing digital changes as demanded by the law or has to find a cheaper, but less optimal solution (Lasar, 2019). Furthermore, governmental organizations are rather characterized by short-term investment behavior, due to their limited budgets (Lasar, 2019). This precludes investments in solutions which would result in long-term cost-cutting especially for the municipalities, but also the federal states (Lasar, 2019). Hence, the misplaces or missing financial responsibility of the law is slowing down the digital transformation (Scholta et al., 2019).

In addition to the lack of financial resources, the majority of municipalities in Germany have around 10,000 inhabitants and around 20 civil servants (Lasar, 2019). This shortcoming of human resources is exacerbated by the lack of IT and project management

knowledge (Kersting & Graubner, 2020; Lasar, 2019). Furthermore, federal states as well face the issues of shortcomings in technological and project management expertise even though the origins are different (Gantman, 2017). The government as employer does not seem to be attractive enough for young IT experts, for example, due to the inflexibility of workflows (Gantman, 2017). On both levels, the lack of digitization experts often results in failed IT projects or the hiring of external consultants (Mergel, 2021).

Another issue identified in Germany is the gap in problem identification and solving capacity, which is present in the different authorities across all levels (Kersting & Graubner, 2020). While on the federal level, and some federal states and municipality levels, people talk about artificial intelligence or blockchain in the public sector, others are simply happy that they can offer digital appointment allocation (Kersting & Graubner, 2020). Hence, there is a major difference between the individual municipalities and federal states.

2.1.3 Quantity and Diversity of Municipalities

Germany consists of 400 municipalities and 16 federal states which all have their own public administration (Boeckeler & Hasecker, 2021). Between them, there is a high level of heterogeneity. Regulations differ between federal states and sometimes even between municipalities (Kuhn, Balta, & Krcmar, 2010). Therefore, one digital service working in one federal state does not automatically imply it will legally, organizationally, or technically work in another federal state. The structure of the municipalities further distinguishes regarding economic, social, and demographic factors (Lasar, 2019). Furthermore, the municipalities also differ in their size of population and area which influences the transformation towards e-Government. If a municipality has a low population they have less staff to execute the transformation, less money, and fewer contact points with citizens. Furthermore, based on their location they have a better or worse IT infrastructure (Lasar, 2019). On the one hand, the citizen cannot make use of the online service with a slow connection to the internet. On the other hand, public servants cannot deliver the services. Therefore, the local infrastructure conditions challenge the digital transformation of a municipality (Lasar, 2019).

In further complication, due to the method of income the municipalities find themselves in competition with each other (Lasar, 2019). The municipalities gain the majority of their financial resources from company taxes. Therefore, they have to be attractive for companies to settle down in their region, offer jobs and pay taxes (Lasar, 2019). As argued by West (2011) this competition between governments limits innovative and collaborative development of technology between agencies and jurisdiction. Further, this leads to a wide variety of existing IT solutions (Lasar, 2019).

2.1.4 Variety of Existing Solutions

The lack of financial and human resources as well as the different prioritization of different services leads to a variety of existing solutions in Germany. Moreover, as coordination efforts are low and all levels and parties have competencies and power, there is a high amount and diversity of existing digital solutions which differ significantly in quality (Hustedt & Trein, 2020; Klös, 2020). One aspect of diversity is the kind of service provider and usage of IT systems. Furthermore, the quality and level of the digitized service varies between municipalities (Hustedt & Trein, 2020). The multiplicity and variety of services make it difficult to communicate across governments and integrate the service on one platform (Hustedt & Trein, 2020).

Thus, in addition to the variety there exist duplications of services. The duplications of digitalized services resulted from a lack of coordination and communication, as well as transparency from the federal level and hence informal networks between the lower levels are formed (Gauß, 2020; Mergel, 2019). Several of these duplications do not have the potential to be replicated (Mergel, 2019). Therefore, it is hardly possible for other federal states or municipalities to adopt an existing solution and thus making the development of an own solution unnecessary. Consequently, there is the need to optimize the procedure to avoid that work is executed and paid for twice and to reduce the amount of man hours spent on it, too.

2.1.5 Outsourced IT Governance and Implementation

Even though outsourcing cannot be considered as a federal specific challenge, it is still identified as a bigger issue; therefore it will be discussed in the following. Cordella and Willcocks (2010) define outsourcing as the "contracting out of IT services/activities to third party management for required result" (2010, p. 83). There are multiple reasons why public organizations started to outsource services and activities to external providers and most of them are routed in the era of New Public Management. The overall goal is to outsource services where the public authorities failed to develop services matching users' expectations (Cordella & Willcocks, 2010). Further, as mentioned in Chapter 2.1.2**Error! Reference source not found.** the missing IT and project knowledge in the public sector, especially on the level of municipalities, encourage outsourcing of IT governments and implementation to gain access to expertise (Gantman, 2017; Kersting & Graubner, 2020). Another main goal is to save resources and gain efficiencies (Cordella & Willcocks, 2010; Gantman, 2017). In literature, more drivers regarding IT outsourcing in the public sector can be found.

Consequently, (IT) outsourcing has its advantages, if used properly. If commodity activities (e.g. payroll), useful activities (without effect on competitive advantage) or activities with a low complexity and interaction with other activities are outsourced, it can be an advantage as the organization can concentrate on its core businesses (Cordella & Willcocks, 2010; Dunleavy, 2008). However, in practice, public organizations often outsource exactly the opposite type of activities and services. External consultants are often bought to do the project management. Further, in most cases often the introduced technological solutions are not developed in-house but also bought as existing, non-customized solutions from private organizations. Several issues can occur due to outsourcing of activities and services. First, outsourcing IT operations to various organizations can lead to an even more fragmented IT landscape. This raises difficulties when aiming for integrated systems across the public organization, let alone across organizations and federal states (Cordella & Willcocks, 2010). Another issue occurs as the public sector is dependent on the contracted supplier capabilities and offers. Thus, one can lose control over its IT and business requirements (Cordella & Willcocks, 2010). The client is highly dependent on the suppliers expertise and willingness to cooperate and integrate required customization (Gantman, 2017). Through this dependency, additional difficulties can occur if the provider is taken over or goes bankrupt (Cordella & Willcocks, 2010). However, not only the lack of digital sovereignty can be an issue, but also the fact that this strategy does not motivate public servants to gain further or expand their digital and project management skills and knowledge (Lasar, 2019).

It has to be mentioned, even though outsourcing is recommended for noncomplex and nonspecific activities and services, it will still create difficulties and raise issues in the public administration. Cordella and Willcocks (2010) state that the complexity faced today cannot be solved by outsourcing, as it results from coordination issues. Therefore, outsourcing will rather increase the challenge of coordination instead of removing it.

2.2 Strategies to Tackle the Challenges in Federalism

Nonetheless, it is stated that the structure of the federal regime has its advantages and should not be changed in order to digitalize faster (Kersting & Graubner, 2020; Scholta et al., 2019). Rather, coordination between the public sector organizations should be strengthened. For this purpose, various approaches are suggested in literature. Strategies for public sector coordination regarding topics of digitization are among others shared services, cloud computing or government as a platform. The concepts and strategies presented in the following are not the only possible way to approach the challenges. They have rather been chosen because their components correspond to the ones from the EfA approach.

The selection procedure is shortly summarized here. As EfA aims for a collaborative approach, public sector coordination literature was chosen as the overarching context. Hereon, coordination mechanisms that correlate with EfA were chosen for the course of this research. As a first of these, the concept of shared services is included. Shared services are supposed to enable government entities to focus on their core functions, resulting in reduced costs, standardized processes and increased grade of service quality (Janssen & Wagenaar, 2004a). In the process of EfA this means that a federal state is responsible for one or more thematic fields, but not the full spectrum. Accordingly, they will have more available resources to invest and focus on their obligatory services. Further, the concept of SaaS was included here as it not only corresponds to multiple elements of EfA, but was additionally mentioned in guiding concepts, documents and by interviewees (Anonymous interviewee 11, 2021; Anonymous interviewee 6, 2021; Bundesministerium des Innern, für Bau und Heimat (BMI), 2020a; Document 2, 2021). The concepts will be explained in more detail below. Government as a platform, as proposed by O'Reilly (2011), was further considered as a possible concept to be included, as it assumes that public authorities develop their own applications based on the IT infrastructure provided by the (central) government, as the governments only support. However, while explained in greater detail in Chapter 3.1, services developed with the EfA approach cannot make use of the government as a platform elements so far, hence the concept is for now excluded in this thesis, but should be part of further research.

2.2.1 Public Sector Coordination

Issues such as duplications occur due to a lack of coordination, transparency, and communication (Mergel, 2019; Peters, 2018). Public sector coordination is a useful tool not only to avoid duplications, but, furthermore, to avoid contradictory programs, displacements, and silos. In addition it emphasizes horizontal management, better reaction to changing demands of clients towards integrated services, solving of cross-cutting problems, and appears to be more capable generally and to be able to build confidence among the public (Peters, 2018). Generally Malone and Crowston (1994) define coordination as "managing dependencies between activities" (Malone & Crowston, 1994, p. 90). In their paper they aim to shed more light on the coordination 'theory', focusing on coordination in computer systems and human systems as well as a in complex systems including both (socio-technical systems). Based on this, others extended the research on coordination, such as Bouckaert, Peters, and Verhoest (2010) who focus on the coordination of public sector organizations. In their book, they define public sector coordination

> to be the instruments and mechanisms that aim to enhance the voluntary or forced alignment of tasks and efforts of organizations within the public sector. These mechanisms are used in order to create a greater coherence, and to reduce redundancy, lacunae and contradictions within and between policies, implementation or management (Bouckaert et al., 2010, p. 16).

According to Bouckaert et al. (2010) virtual synonyms exist for the term coordination such as cooperation, coherence, collaboration, and integration. In the government context, coordination focusing on computer systems are defined as collaborative e-Government (Chun, Luna-Reyes, & Sandoval-Almazán, 2012). Kattel, Lember, and Tõnurist (2019) further argue for a new form of collaboration, namely digital collaboration, where collaboration happens through independent interaction between software and digital or human agents (Kattel et al., 2019).

Besides, different kinds of coordination do exist. While negative coordination aims to avoid conflicts by including agreements in a program or organization considering consequences for all involved parties, positive coordination goes beyond that (Peters, 2018). It aims to not only avoid conflicts but to find ways for agreeing on solutions from which all involved parties benefit (Peters, 2018). Strategic coordination is required to reach a broader strategic goal of the government, "such as improving the health status of a population" (Peters, 2018, p. 3). Here, the coordination takes place prospectively, coordinating the multiple actors involved within the public sector to reach the broader goal (Peters, 2018). Lastly, governments are coordinated on horizontally as well as vertically. Horizontal coordination occurs for example between ministries or agencies, hence between organizations or units on the same hierarchical level (Bouckaert et al., 2010). Vertical coordination defines the coordination between different levels such as a higher-level organization or actor and a unit of lower-level organization or actor (Bouckaert et al., 2010). Therefore, it is especially important for federalism, as the government consists of multiple levels, each with substantial autonomy (Peters, 2018). Thus, vertical coordination is important to the European Union and countries such as Germany (Mergel, 2019; Peters, 2018). However, Boudreau and Bernier (2017) conclude that public managers should make use and find a balance between vertical and horizontal governance mechanisms.

As discussed above, coordination is a useful tool for governments to avoid various issues. There exists a trilogy of coordination mechanisms which research refers to as: (a) hierarchy, (b) markets, and (c) networks. While in the following the three concepts will be described independently from each other, it has to be mentioned that these mechanisms should not be seen as alternative approaches to each other but rather as complementary

to one another (Bouckaert et al., 2010). In practice, governments combine the mechanisms and even if one might be dominating, the others are still a crucial part of a program's success.

The most convenient mechanism to achieve coordination in the public sector is by hierarchy. Here, "coordination is about setting and implementing priorities as well as about merely getting organizations to work together smoothly and effectively" (Peters, 2018, p. 7). Hierarchy-type mechanisms (HTM) use two fundamental processes and resources (Bouckaert et al., 2010). First, HTM require authority based on legitimacy. That infers that governance is made possible without much need for reconciling with other parties involved, since the authority is based on its acceptability. Second, if the government does not hold this authority, it can use the resource of power to reach its goal. That is, governments can use financial resources, laws and, as a last resort, coercion to achieve their goal (Bouckaert et al., 2010). Hence, HTM aim for direct control over the action of the public institutions by their government (Bouckaert et al., 2010). In addition, the hierarchical type of coordination uses a variety of different coordination tools. Examples of those are: "setting of objectives and rules, allocation of tasks and responsibilities, and establishing lines of direct control and accountability" (Bouckaert et al., 2010, p. 66). Hence, management and structural instruments are used (Bouckaert et al., 2010). Management instruments are, for example, "procedural rules, top-down planning systems, or traditional input-oriented financial management systems", whereas structural instruments can be, for example, "organizational mergers, coordinating functions, direct lines of control, and accountability" (Bouckaert et al., 2010, p. 66). After all, HTM can to some extant be defined as a constant part of the public sector. Formal rules (closely) guide the behavior of civil servants as well as the recording of their and the citizens' rights and duties (Bouckaert et al., 2010).

The second mechanism of coordination is by markets. Market-type mechanisms (MTM) aim to bring together provider and client (Bouckaert et al., 2010). They are thus based on the exchange between these actors through competition and bargaining. The fundamental process and resource of MTM is bargaining, which is dependent on elements of information and power. One, the party holding more information about the programs can secure an advantage in the process of bargaining, and two, possession of power or authority is also a benefit (Bouckaert et al., 2010). Another important coordination instrument in markets are price mechanisms, which aim to achieve balance between supply and demand. MTM can accomplish effortless coordination, when they are established and function correctly (Bouckaert et al., 2010). MTM work best under two conditions. First, there are a plurality of providers and clients on the market and entering an existing market does not require high endeavor and costs. Second, fully transparent

information about price and quality of the product must be provided (Bouckaert et al., 2010). In the context of public sector, the government acts as the creator, regulator, and guardian of the market. In this role, the government must ensure a minimum of the following conditions. First, there must be transparency on the value of the services. That is, it must be traceable how the quality of a product matches its price. Second, monopoly positions must be avoided so that the clients can freely choose the service (Bouckaert et al., 2010).

The last factor is the mechanism of coordination by networks which base interaction on solidarity and cooperation (Bouckaert et al., 2010). Here, different actors cooperate, bargain, and negotiate with each other. However, while HTM require authority and power and MTM require bargaining, information and power, network-type mechanisms (NTM) need the fundamental resources and processes of mutual co-optation and trust. Especially trust between the participants is an important element for coordination (Bouckaert et al., 2010). This infers that they are convinced that the others have good intentions and their own expectations will be fulfilled. Then the outcome of the bargaining process will be effective. In addition to this, participants have to find a balance between pursuing their own interest and at the same time accepting to be a member of a collaboration and hence pursue collective goals through cooperation (Bouckaert et al., 2010). Besides, coordination in NTM can occur in multiple forms, whether the organizations solely exchange information among each other or they even form a joint organization (Bouckaert et al., 2010). A further differentiation can be made between formal and informal networks. While informal networks are based on a silent mutual agreement, formal networks can also be expressed through the use of contracts (Bouckaert et al., 2010). In the context of the public sector, mostly informal coordination emerges spontaneously. In the context of NTM, the central government takes over the role of the network enabler, network manager and, network participant (Bouckaert et al., 2010).

While collaboration is defined as the sharing of knowledge and ideas, collaborative development is the sharing of actual material such as source codes (Nieves, Shockey, & Knudsen, 2011). The following paragraph aims to give a short overview of the concept of collaborative development, focusing on collaborative software development. Building on the trilogy of coordination mechanisms defined above, the following can be defined as NTM. Cooperation is linked to constant and intensive interaction (Hildenbrand, Rothlauf, Geisser, Heinzl, & Kude, 2008). However, while organizations in a collaboration work towards a common goal, it implies as well that they further pursue their individual, antagonistic goals (Hildenbrand et al., 2008; Nieves et al., 2011). In collaborative software development, different organizations work together to improve or build software, which is shared over the source code (Nieves et al., 2011). Like in

coordination, collaborative development aims to reduce duplications and, furthermore, it profits from multiple experts working on it. By doing this it provides a higher quality of the source code, free of flaws and security vulnerabilities (Nieves et al., 2011). Additionally, collaborative development can foster mutual learning processes, as recommended by Kersting and Graubner (2020). Especially in federalism, organizations should jointly learn and develop together. Learning in federalism can be realized by spill-over effects (Kersting & Graubner, 2020). Spill-over effects occur if one municipality or federal state develops a digital solution for administrative service and others profit from the solution by adapting it to their own system. This could lead to a cultural change in which parties are proud to copy instead of being proud to develop their own individual solution (Kersting & Graubner, 2020). Moreover, standards would promote the spill-over effect, as incorporating already existing digital services into existing IT environments is resource-saving. For problematic areas of implementation, Kersting and Graubner (2020) propose a centralized approach. Here a solution is developed on the highest level and can be adapted by the lower levels. Furthermore, Lasar (2019) argues that especially smaller municipalities should join forces to make use of external support and apply together for financial budgets and benefits.

2.2.2 Shared Services as a Tool for Coordination

There are various tools and modes of government collaboration for increasing efficiency (Gil-Garcia, 2012; Juell-Skielse, Lönn, & Päivärinta, 2017). One which has proved essential is shared services (Becker, Niehaves, & Krause, 2009; Janssen, Kamal, Weerakoddy, & Joha, 2012; Juell-Skielse et al., 2017). Shared services, not to be mistaken with outsourcing, have been promoted by policy institutes and consultancies as in them advantages of centralization and decentralization are combined (Boon & Verhoest, 2018). Shared services aim to tackle the issue of duplication of systems and software (Hafizi, 2016; Janssen & Wagenaar, 2004a; Schulz & Brenner, 2010).

A common definition of shared services in scientific literature does not exist (Soalheira & Timbrell, 2014). However, Ulbrich, Schulz, and Brenner (2010) define shared services based on their extensive literature review as

> an organizational concept that consolidates processes within the group in order to reduce redundancies; delivers support processes; is a separate organizational unit within the group; is aligned with external competitors; has cost-cutting as a major driver for implementation; is focused on internal customers; and is operated like a business (2010, p. 271).

To be more specific, shared services as a tool for government collaboration are “where common activities, common processes, and resources within and between organizations are shared and serve several partners”, as summarized and defined by Juell-Skielse et al. (2017, p. 580) in their literature review. Becker et al. (2009) identified in their study two crucial conditions of collaboration in the context of shared services, the presence of key actors as well as prior cooperation between the parties, later, validated by Janssen et al., (2012).

Even though the definition of shared services is not consistent, there are factors in concert with most studies. First, shared services mostly refer to generic services or, expressed differently, they are “specific sourcing arrangements for overhead processes” (Boon & Verhoest, 2018, p. 536). Hence, they concern “all the functions that steer and support the primary processes within an organization” (Boon & Verhoest, 2018, p. 536), such as human resources, finance, and IT (Boon & Verhoest, 2018). For a service to be reused, in multiple processes and different departments, the stakeholders involved should jointly develop it (Janssen & Wagenaar, 2004b). In the public sector context this can also mean that multiple public agencies jointly develop the shared service (Paagman, Tate, Furtmueller, & Bloom, 2015). Nonetheless, shared services commonly include a service level agreement, which identifies the features and characteristics of the shared services (Soalheira & Timbrell, 2014). It is based on agreements between vendor and clients.

Schulz and Brenner (2010) summarize characteristics of shared services that are often cited. First, which is that shared services are the result of the consolidation processes within an organization (Schulz & Brenner, 2010). Furthermore, they are engaged in support services, staff functions, and internal services (Schulz & Brenner, 2010). Shared services have a “focus on internal clients” and “delivery to internal customers” (Schulz & Brenner, 2010, p. 213). Additionally, they are aligned with external competitors. Schulz and Brenner (2010) further identified shared service centers as a separate organization within the group that “operate(s) like a normal business unit” (Schulz & Brenner, 2010, p. 215). This infers that services are priced to generate a profit. Lastly, shared services make use of “best practices” (Schulz & Brenner, 2010).

There are different types of shared services which can be allocated to the different coordination mechanisms discussed previously (HTM, MTM, NTM). It can be differentiated between centralized and decentralized shared service structures (Becker et al., 2009). In a centralized structure, the service is managed by shared service centers (Becker et al., 2009). And the shared services are offered over a platform with one vendor and many clients. This can generally be classified as a hierarchical mechanism. As there is only one vendor, coordination would not be regulated through price mechanisms such

as in MTM, nor is there a strong support for a network. However, there can also exist a network and market approach, such as in decentralized shared service structures. Here, shared service organizations are structured as shared service networks (Becker et al., 2009). Thus, many vendors and many clients participate, providing a minimum of one shared service to the other actors. Additionally, Hafizi, Miskon, and Rahman (2014) classify different types of shared services. First, the inter-organizational shared services will be outlined. In this concept the service is shared within the organization as well as with other organizations/ministries. The sharing arrangement is managed by the separate agencies instead of a shared service center (Hafizi et al., 2014; Miskon, Fielt, Bandara, & Gable, 2013). It is somewhat similar to the decentralized shared service structures of Becker et al. (2009). The coordination dominantly occurs under MTM and NTM, as the arrangements are coordinated by trust and bargaining. Another type of shared service arrangements is the shared service center alliances/consortium. In contrast to the first, a single organization, the alliance, coordinates the provision of the service(s) to the different agencies and ministries involved (Hafizi et al., 2014; Miskon et al., 2013).

The motives of the public sector to make use of shared services are out of political, economic, strategic and organizational, and political reasons (Janssen & Wagenaar, 2004b; Paagman et al., 2015). Shared services have the rationale that organizations or public authorities are more competitive and efficient if they do fewer things better with less resources (Wang & Wang, 2015). They save costs, improve efficiency, effectiveness, and productivity (Aldag & Warner, 2018; Janssen & Wagenaar, 2004a; Schulz & Brenner, 2010). As the service is jointly developed, experts are gathered, which leads to a high concentration of expertise and innovation, resulting in improved service quality and competitive quality (Aldag & Warner, 2018; Janssen & Wagenaar, 2004a; Schulz & Brenner, 2010). Furthermore, shared services lead to an increase in the quality of the services that are delivered as processes which are standardized and customer oriented (Janssen & Wagenaar, 2004a; Raudla & Tammel, 2015). Lastly, as IT is changing ever more rapidly and constantly, continual innovation and optimization are required to keep up to date (Janssen & Wagenaar, 2004a). This is more easily achievable in collaborations between departments, organizations, or public agencies (Peters, 2018). Additionally, shared services allow avoiding duplications and fragmentation of developed services (Hafizi et al., 2017; Janssen & Wagenaar, 2004a).

However, shared services are not free of challenges, which will be a focus of Chapter 2.3.

2.2.3 Software as a Service as a Tool for Coordination

Further, through the general advanced technological progress the creation of a distributed collaborative sourcing model was enabled (Hadi, Omar, Sheik Osman, &

Hussaini, 2020; Janssen & Joha, 2011). Through this another tool for government collaborations, cloud computing, was developed, an effective manner for the development of integrated information systems (Tsaravas & Themistocleous, 2011) It especially makes new forms of collaboration, resource pooling and sharing of services possible (Hadi et al., 2020).

> Cloud Computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the datacenters that provide those services. The services themselves have long been referred to as Software as a Service (SaaS). The datacenter hardware and software are what we will call a Cloud (Armbrust et al., 2009, p. 4)

SaaS is one of the three service models of cloud computing, the other two are Infrastructure as a service (IaaS) and Platform as a Service (PaaS) (Dhar, 2012; Haag, Eckhardt, & Kronung, 2014; Tsaravas & Themistocleous, 2011; Zwattendorfer, Stranacher, Tauber, & Reichstädter, 2013). The concept of IaaS is defined as the lowest layer in cloud computing (Dhar, 2012) and is aiming at providing and delivering the IT infrastructure as a service, such as data storage, computing power, and communication capabilities (Haag et al., 2014; Zwattendorfer et al., 2013). Hence, IaaS providers manage and offer the physical infrastructure (Tsaravas & Themistocleous, 2011). The next level of the cloud service models is PaaS which aims to offer both technical abstraction and essential application infrastructure services (e.g. computation, messaging, connectivity, access control) (Dhar, 2012). Hence, the service providers offer specific application program interfaces (API) and platforms that enable the consumer to develop and deploy their own application on the cloud infrastructure (Haag et al., 2014; Zwattendorfer et al., 2013). This has the advantage that the users do not have to purchase and manage the necessary hard- and software systems (Haag et al., 2014). Lastly, the highest level is SaaS offering a wide range of software applications, in particular the cloud computing model the present paper is focusing on (Dhar, 2012). SaaS aims to deliver software as a service on-demand instead of a product (Janssen & Joha, 2011; Tsaravas & Themistocleous, 2011). Hence, the software is hosted, provided, and maintained over a network by the service provider (Haag et al., 2014; Janssen & Joha, 2011). As the software or application is made available over a network and lies in the responsibility of the provider, the user does not need to install software and physical infrastructure or take care of control and maintenance of the IT function (Janssen & Joha, 2011; Tsaravas & Themistocleous, 2011). Other advantages of SaaS are the fast implementation of software changes by the provider as well as the development of services only once which are then distributed to many users (Janssen & Joha, 2011).

Besides the three service models, cloud computing can be formulated and carried out by three deployment models, namely private cloud, public cloud, and hybrid cloud (Tsaravas & Themistocleous, 2011). In the deployment model of a private cloud, there is only one organization making use of the services, as they are deployed and operated solely for them (Zwattendorfer et al., 2013). Here the services are hosted and delivered from one data center, the responsibility for its management can be taken over by the organization itself or by a third party (Tsaravas & Themistocleous, 2011). Public clouds, on the other hand, are services deployed and operated for the general public and are publicly available (Zwattendorfer et al., 2013). With these everyone can use them as long as they pay the corresponding amount to the service provider responsible for their management (Tsaravas & Themistocleous, 2011). As for shared services (see Chapter 2.2.2), service level agreements are an important component, too. They define the service level the user can expect when paying for the service (Tsaravas & Themistocleous, 2011). However, there is also the possibility of a combination or interaction between the public and the private cloud (Zwattendorfer et al., 2013). In the hybrid cloud, elements of both are combined to balance each other's strengths and weaknesses (Tsaravas & Themistocleous, 2011).

Tsaravas and Themistocleous (2011) highlight five advantages of cloud computing for e-Government in their literature review. First, organizations can save costs, as the software installation and maintenance are outsourced to a third party. Furthermore, as the services are provided in a virtual datacenter, physical storage centers become redundant. Additionally, services can be accessed independently from the users' location through the internet. A fourth advantage is the flexibility of scaling the IT infrastructure. Based on the organization's needs, services and features can be installed in the cloud in a short period. There is no longer a need for a team to develop and implement these inside the organization, there is rather an expert team that can take care of it. Lastly, Tsaravas and Themistocleous (2011) list the reduction of other costs, as well as environmental benefit such as energy costs which can be saved as the organization does no longer needs to host its internal equipment.

2.3 Challenges

These perspectives of Chapter 2.2 were used to conceptually define the major challenges of the EfA approach. Hence, challenges of the concepts that relate to the components of EfA are summarized, listed, and elaborated on below. The challenges are divided into four categories: (1) organizational and strategical, (2), financial (3) technological and, (4) legal. The categories are based on the literature findings, these categories were used by other authors' in the context of shared services and SaaS. However, the categories and challenges are interdependent. Hence, some challenges can

occur in more than one category but are not listed in multiple ones. In Appendix A the challenges and their concept of origin are summarized.

2.3.1 Organizational and Strategical Challenges

In coordination literature, as well as in research on shared service centers and cloud computing, organizational and strategical challenges are named (Benlian & Hess, 2011; Haag et al., 2014; Janssen & Joha, 2011; Janssen & Wagenaar, 2004a; Knol & Sol, 2011; Raudla & Tammel, 2015). First, services that are suitable for the proposed approaches must be identified, including their granularity and boundary definition (Janssen & Wagenaar, 2004b). Furthermore, for such a process to be successful expertise in the field of technology, business process, and architecture is required (Janssen & Wagenaar, 2004b). Unsuitable services for the proposed approach will lead to additional challenges and complications. The identification of suitable services requires qualified resources such as expertise, commitment, and support from public organizations (Knol & Sol, 2011).

Another barrier, especially regarding coordination, is the importance of specialization in governments (Peters, 2018). Specialization of a ministry, with a narrow policy focus, is valuable, as in the creation of a ministry for finance, health, or environment. At the same time though, specialization is the antithesis of coordination, as specialization supports the building of silos (Peters, 2018), and too much coordination can lead to a loss of the benefits achieved by specialization.

The third organizational and strategical issue occurs when developing and operating services across organizational boundaries, which is accountability and responsibility (Haag et al., 2014; Janssen & Joha, 2011; Knol & Sol, 2011; Raudla & Tammel, 2015). As services are either developed, used, or enhanced collaboratively, accountability and responsibility of a service are divided (Raudla & Tammel, 2015). The shared accountability agreements can lead to unclear lines of accountability, as well as to give the opportunity for blame-shifting (Boston & Gill, 2011; Raudla & Tammel, 2015). Haag et al. (2014) refer to the danger of a wait-and-see attitude of governments due to distributed responsibilities. This occurs as governments feel less responsible for the developments and wait for others to act rather than spend unnecessarily on resources or endanger one’s reputation (Nezhad, Stephenson, Singhal, & Castellanos, 2009). The lack of ownership of problems and responsibility can also result in public servants missing a clear structure and hence designated clear contact persons, especially when problems occur (Cooke, 2006; Knol & Sol, 2011). Moreover, in government setting there usually exists strict financial and legal accountability (Peters, 2018). However, in coordination, these have to be split and defined differently which makes it more difficult.

Furthermore, the lack of an implementation strategy can pose a challenge (Knol & Sol, 2011). If the top management is lacking a clear vision, misunderstandings can occur among the employees. Hence, goals have to be clearly identified for employees to understand the specific way of their contribution to the project (Knol & Sol, 2011). This requires making robust business cases and planning roadmaps (Knol & Sol, 2011). The lack of an implementation strategy can also result in ineffective management of resistance, communication of expectations, involvement of end-users, managing cultural changes, and cooperation among employees (Janssen & Joha, 2006; Knol & Sol, 2011). Therefore, an implementation strategy is required to avoid the listed issues. According to Knol and Sol (2011), governments have to choose between a top-down or bottom-up strategy, meaning that the implementation has either be planned and quickly implemented (top-down) or to proceed the process incrementally with soft pressure from the top (Knol & Sol, 2011; Wagenaar, 2006).

The shift of norms refers to a shift in expectations of the end-user (Knol & Sol, 2011). When the development of the service begins, the acceptable technological and service provision levels of the service can be lower than at the time of the implementation. Hence, the development of the services is challenged to identify and include important and useful innovations and new features (Knol & Sol, 2011).

The fourth issue of the organizational and strategical challenge is the balance between centralization and decentralization (Raudla & Tammel, 2015). Especially shared services aim to take the best of both elements and avoid or minimize its downsides. Hence, in theory, the combination results in advantages such as economies of scale and scope (centralization) and flexible and effective alignment of the organizations involved (decentralized) (Raudla & Tammel, 2015). However, according to Raudla and Tammel (2015) achieving this balance is one of the greater challenges. As the provided services are used across organizations and state boundaries there are fewer opportunities for customization (Raudla & Tammel, 2015). Raudla and Tammel (2015) refer to this issue as the “one size fits all” syndrome which indicates pure centralization and results in inflexibility as well as difficulties in offering suitable solutions. However, this issue is contradictory to the general higher target of user-centricity. Therefore, a balance between centralization and decentralization is even more important.

Moreover, as several organizations are usually involved, diverse interests exist among the participants (Knol & Sol, 2011). It can further occur that the participants lack a shared mindset. This can result in challenges such as resistance to change, or internal conflicts due to conflicting goals, individual interests, and associated behaviors (Janssen, Joha, & Zuurmond, 2009; Knol & Sol, 2011). In addition, due to a lack of experience in

collaborating, trust issues occur among several actors (between government organizations, between government organization and providers) (Becker et al., 2009; Janssen & Wagenaar, 2004a; Tsaravas & Themistocleous, 2011). However, there do not only exist diverse interests but additionally diverse structures across the federal states and ministerial departments. Wouters, Janssen, and Crompvoets (2020), who set their research focus on a case of creating digital invoicing services in Belgium, identified seven challenges regarding the governance of collaboration: "(1) creating a coordinated approach to the groups of users by various organizations, (2) exploring the necessary functionalities offered by different organizations and building shared infrastructures, (3) managing path-dependencies and changes in the environment, (4) dividing roles over many organizations and coordinating leadership, (5) identifying and managing the different needs of stakeholders and (6) their expectations, and (7) the extent of clear agreements and contracts" (2020, p. 232).

Another issue that leads inter alia to coordination failure, is performance management as organizations are rather more focused on the achievement of their individual goals than on the collective ones (Peters, 2018). This is related to the turf problem. Organizations fear that while coordinating with others, their budget, personal, or policies will be endangered. Hence, they try to defend these which hinders coordination (Peters, 2018). Boudreau and Bernier (2017) identify this as a challenge as well when focusing on a case in Quebec, Canada. They specially discuss "persistency of administrative practices, the desire for autonomy of public organizations and cumbersome governance structures" as challenging elements of collaboration (2017, p. 602). As the present research is engaged in public sector coordination, politics is another issue complicating coordination (Peters, 2018). In federal systems, the ruling parties in the separate states might be different from the ones in the federal government. Hence, their respective political agenda and goals can be contradictory, which can lead to coordination issues (Peters, 2018).

As services are developed, implemented, and operated differently than before, work and power are distributed in new ways (Knol & Sol, 2011). A transfer of personnel takes place because employees are part of the transformation, as their career paths are changed, and power can be lost or gained. Thus, the challenges are on the one hand to manage the reorganization and on the other, for the employees to accept their new roles (Knol & Sol, 2011). Their new role can also include a transfer of personnel from different departments (Knol & Sol, 2011). It must be taken into account that employees show resistance to change as they expect to lose their job (Knol & Sol, 2011).

Lastly, mutual learning between the organizations is still required. However, as Knol and Sol (2011) find out this does not always happen. While developing shared services, the

organizations rather tend to simultaneously make same mistakes. Here the lack of coordination is still present and challenges the development of services. Knol and Sol (2011) assume that this challenge occurs mostly when large and fragmented organizations are involved.

2.3.2 Financial Challenges

Even though all proposed approaches aim to reduce costs, there are also additional costs that have to be considered. First to be mentioned are adaption costs (Janssen & Joha, 2011), as for example, organizations have to restructure first and find different ways of organizing the development, implementation, and operation of services (Diez & SIlva, 2013). Secondly, existing services may have to be adapted to the changed standards to work smoothly with the new services. These transitions can be cost-intensive.

Benlian and Hess (2011) identify various financial risks and call them "hidden costs", for instance the probability of paying more than initially agreed on to reach the expected level of service. For example, the service provider does not pay the cost for the customization of the services and their maintenance (Benlian & Hess, 2011). The 'customer' has to pay for and organize that on its own. The additional costs hence can arise from changing and additional requirements.

2.3.3 Technological Challenges

Availability of technology and other technological challenges are mentioned several times in the literature search. The first technological challenge is the complex and diverse processes and IT systems (Knol & Sol, 2011). These present a challenge as their analysis, improvement, standardization, and harmonization are complicated (Knol & Sol, 2011).

As mentioned another challenge is the assurance of interoperability between the services in and between the organizations. As explained in Chapter 2.1, governmental organizations started to develop and advance e-Government solutions in isolation which resulted in inadequate IT infrastructure and legacy systems (Diez & SIlva, 2013; Ebrahim & Irani, 2005; Tsaravas & Themistocleous, 2011). Mostly, these legacy systems are unique which makes it hard to assure interoperability and reuse the developed service in other organizations (Tsaravas & Themistocleous, 2011). For example, development in isolation results in separate information systems for each product or service (Janssen & Wagenaar, 2004b). The information systems are often monolithic packages. As this makes it even more difficult to reuse functionalities in the same organizations, it leads to

an even greater challenge when introducing shared services where multiple organizations aim to reuse a service or product (Janssen & Wagenaar, 2004b).

Another issue is a lack of performance indicators. While this is also an organizational challenge, when referring to the process of agreeing on indicators a lack of these leads to a technological challenge (Dhar, 2012; Knol & Sol, 2011). A lack of performance indicators results in a lack of performance data and an inability to assess the performance of the collaborations and sharing of services (Knol & Sol, 2011). This goes hand in hand with the challenge resulting from a lack of standards (Dhar, 2012). Standards are controlled and define how applications communicate. Hence, it is important to establish standards in advance so the developed services by EfA can communicate amongst each other and with the existing services.

Additional technological challenge is the reliability of data (Tsaravas & Themistocleous, 2011). This challenge is based on trust and security issues which can be identified as a bigger concern in literature (Dhar, 2012; Janssen & Joha, 2011; Tsaravas & Themistocleous, 2011; Zwattendorfer et al., 2013). These trust issues can be directed at the organization developing and hosting the service (Tsaravas & Themistocleous, 2011). The party implementing the service has to trust the other one to adhere to regulatory requirements and develop a safe service. Janssen and Joha (2011) suggest involving the IT group of the implementing organization, as they have the knowledge on these issues and can identify security gaps, mechanisms to monitor the security and scalability. Furthermore, there should be tools to address and account for the roles in case of a potential failure of the service (Janssen & Joha, 2011). Not only the lack of such contingency plan can add to the challenges, but also the initial process of agreeing on the plan itself.

Other technical and privacy challenges are “concerning on network efficiency during a heavy data transfer workload, performance unpredictability of virtual machines and software licensing” (Tsaravas & Themistocleous, 2011, p. 157). In addition, due to the possible lack of interoperability between the services, data transfer might be more difficult or not possible at all. This can result in a lack of portability (Tsaravas & Themistocleous, 2011).

Lastly, some challenges are only mentioned in the literature, but the literature is missing further explanation on them. These are:

- Data transfer bottlenecks (Tsaravas & Themistocleous, 2011)
- Software licensing (Tsaravas & Themistocleous, 2011)

- Problem shift to composing and integration (Janssen & Joha, 2011)
- Access control and security (Janssen & Joha, 2011)
- Identification and authentication (Janssen & Joha, 2011)
- Performance management and scalability issues (Janssen & Joha, 2011)

2.3.4 Legal Challenges

Lastly, legal issues are mostly mentioned in the context of the challenges listed above or are at least interconnected with them. For that reason, legal issues will be here only glanced at to avoid repetition.

Firstly, as most mentioned above accountability occurs as an issue, for shared services as well as for SaaS (Janssen & Joha, 2011). For example, when developing a service, any data protection issues that might could come up with the new service have to be checked. Therefore, there needs to be a responsible party that reviews possible data protection issues in the beginning. An additional complication might be that as data is shared across organizations or stored at different locations, data ownership becomes unclear (Janssen & Joha, 2011).

Furthermore, a lack of agreement on the conditions of long-term cooperation between the involved parties, including the management of additional members, can result in legal issues (Janssen & Joha, 2011). In any agreement, parties should state how the cooperation continues to work in a long-term relationship.

Furthermore, a challenge resulting from legacy systems is the integration of services in the current systems (Diez & SIlva, 2013). This is especially an issue as the new services developed do not consider existing systems. Hence, service level agreements are required to assure some kind of basis which the services are built upon and so that organizations can prepare their systems to integrate the services later (Diez & SIlva, 2013). Lastly, the integration of software from different and multiple service providers is an added challenge highlighting the need for a service level agreement between all governmental organizations (Janssen & Joha, 2011).

The individual development of e-Government services further involves different starting points (Hafizi, 2016). The variation in their current state challenges the process agreeing on, for example, service level agreements as not every organization will benefit the same from the sharing model, or some even pay higher prices (Hafizi, 2016).

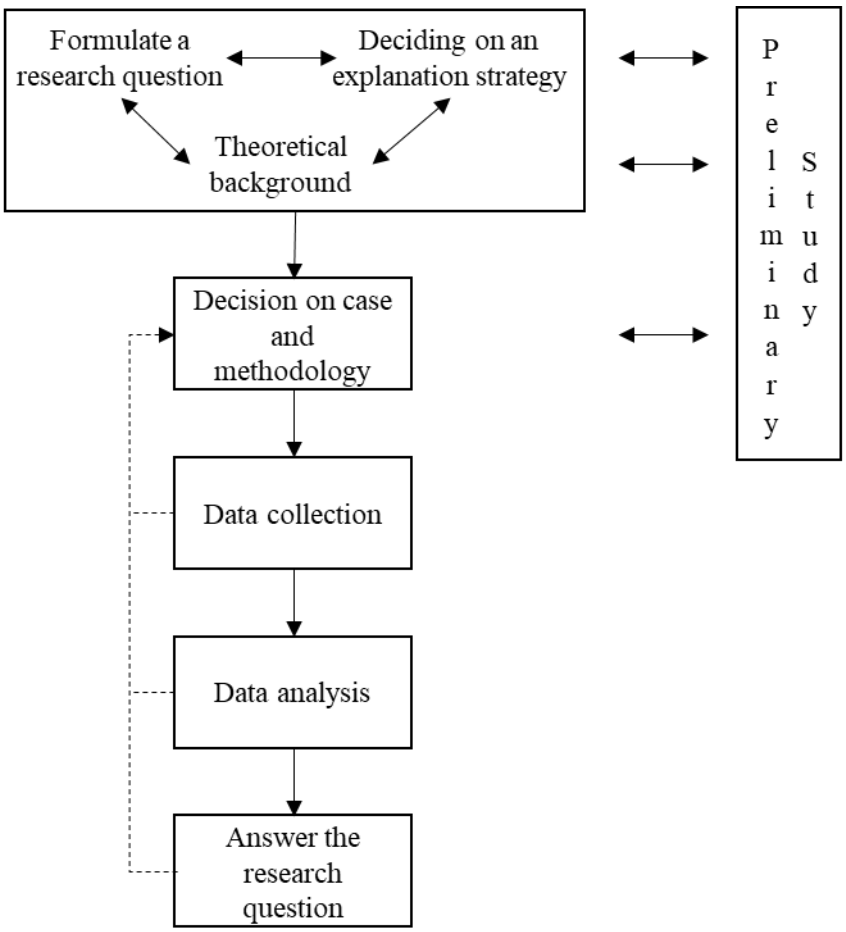
Finally, there has to be an organization or mechanism controlling the jurisdiction and application of law as well as the compliance with standards and guidelines (Janssen & Joha, 2011). It has to be clearly defined what will happen in case the service provider does not fulfil its obligations since otherwise it will later result in legal issues.

Source: Author's compilation

Figure 2.1 Interconnected challenges

3 Research Design

In the following, the research design of the thesis is outlined. The research design followed a structured empirical social science research process proposed by Meuser (2019) (see Figure 3.1). For the purpose of formulating a research question, a decision on an explanation strategy, as well as on the theoretical background. a preliminary interview was conducted. The preliminary study later supported the decision on the case, as well as the methodology that was followed to answer the research question. This chapter provides a definition of the type of research in the thesis, an overview of the methodology used for the theoretical background and discusses the approaches for data collection and its subsequent data analysis.



Source: Meuser (2019)

Figure 3.1 **S**tructured empirical social science research process

3.1 Methodology

An exploratory single case study was chosen to answer this thesis research question. Case studies are recognized as valuable in social science for in-depth investigations of contemporary phenomena and their real-world context (Yin, 2018). As case studies provide a deeper understanding of objects and behavior and hence enable researchers to build an understanding of a subject, they are considered an appropriate starting point when limited research exists (Mabry, 2012; Myers & Avison, 2002).

Single case studies aim to investigate a subject around a single case. Even though multiple case studies are considered less vulnerable, single case studies are more suitable if the case is critical, common, unusual, revelatory, or longitudinal (Yin, 2018). Case studies in social science commonly investigate instances of greater complexity such as policy implications or a communities approach to address an issue (Mabry, 2012). On the one hand, this study aims to shed light on a new approach and program in the digital transformation of federal public administrations. On the other hand, since the approach is unique in its size, time frame, and framework, a single case study seems to be most suitable. As to the author's knowledge, there do not exist similar, comparable cases. Due to the high political relevance and the interviewees request of complete anonymization the author could not discuss the different municipalities and federal states individually as a unit of analysis. The results therefore were analyzed in a general manner. An embedded case study would have allowed to draw country-specific conclusions (Yin, 2018).

As mentioned, this study aims to research the German case, to this point no published scientific literature has focused on. Hence, this study aims to be exploratory. Exploratory case studies allow the researcher to take the context into account, and to study complex phenomena in detail even though only a limited number of actors exist (Gering, 2004).

The selection of the case was made prior to the research background, as this thesis aims to investigate on EfA, and literature is used to guide the research. Hence, the selection of the case is mostly based on practical and pragmatic grounds (Mabry, 2012). Several factors determined the selection of the case. First, the choice depended on the researchers' personal interest and field of expertise to identify a case informative enough to be studied (Mabry, 2012). Secondly, and most important here is the sufficient access to data for the case (Mabry, 2012; Yin, 2018). According to Yin (2018), a researcher should have access to multiple sources of the case, whether it is for interviews, document evaluation, or observation (Yin, 2018). Are these sources not sufficiently provided, one should adjust the proposed research question to one to which has more access to sources (Yin, 2018). Thirdly, another condition is the native and professional speaking language of the researcher. It is recommended to choose a case in which a language the researcher can

master (Mabry, 2012; Yin, 2018). This supports the researcher in making use of the whole range of data provided for the case, and makes them independent of translations (Mabry, 2012). Additionally, while conducting interviews it is beneficial if the parties share a language, as otherwise the dependence on a translator is required (Mabry, 2012). This compromises the research not only by missed meaning between interviewee and interviewer, but further introduces a mediating influence (Mabry, 2012). Hence, the following research studies a case in Germany, as the author's native language is German and the place of birth is Germany. Furthermore, the shared language and network lead to more access to possible interview partners and data sources.

As depicted in Figure 3.1, the decision on the case, the formulation of the research question and the theoretical background of the study were supported by preliminary fieldwork (Mabry, 2012). This procedure is recommended by Yin (2018). Before starting with the fieldwork, theoretical assumptions should be made, but the researcher should not be limited to them. Rather, preliminary fieldwork and theoretical considerations are used to adjust the focus of the study, the proposed research question, as well as the methodological approach (Mabry, 2012; Yin, 2018). Thus, preliminary fieldwork was completed by conducting an interview with an expert. The aim was not only to gain more understanding of the case itself but also to identify the components of the case that would support the guiding inventory list of challenges.

A systematic and concept-centric literature review was conducted according to Webster and Watson (2002). In this context, four streams were followed to identify relevant sources: (1) A literature search in databases, (2) a manual search of selected journals, (3) a manual search of selected authors, and (4) a backward and forward search for the articles identified as applicable in the previous steps above.

The keyword search was conducted in Web of Science, Scopus, and Google Scholar, as the first two cover a broad range of different topics and journals. Google Scholar was included as it can reveal papers of all research domains. However, it has to be noted that Google Scholar does not allow to filter for peer review articles, which leads to the inclusion of grey literature. According to Webster and Watson (2002) grey literature is not part of a systematic and concept-centric literature review. Nonetheless, articles defined as such were included in the literature due to the novelty of the case and to assure to truly cover the concepts, that guide the study of the case. A timeframe of ten years was set as this is considered a good starting point for a backward and forward search. In the search for relevant scientific literature different combinations of the following keywords were used to cover as much as existing research on the topic as possible (see Table 3.1). Articles were excluded after reviewing their titles and abstracts. A total number of 59

academic sources were then considered relevant to the previously introduced research question. As the thesis investigates a case in Germany and the author is a German native speaker, in the search for suitable literature, German keywords were used, and German literature was included as well. In Appendix B, the concept matrix, compiled according to Webster and Watson (2002) is depicted.

Keywords
Federalism, Multi-level governance, government, public administration; Föderalismus
Digital transformation, e*Government, Digitalisierung
Shared services, shared service center
Public sector coordination, collaborative software development, collaborative development
Cloud computing, SaaS, Software as a Service
Challenges, Barriers, Issues, Herausforderungen, Hürden

Source: Author‘s compilation

Table 3.1 Keywords of the literature search

In the second step, the journal ‘Government Information Quarterly’ was scanned for further relevant literature. The journal came up repeatedly in the first step of the literature review and was therefore identified as relevant for the field of research. This manual procedure is recommended by Webster and Watson (2002) to identify relevant articles which were unintentionally excluded by the choice of keywords or simply overlooked.

For the third step, research of the following authors was scanned: (1) Peter, Guy (2) Janssen, Marijn (3) Joha, Anton (4) Mergel, Ines. Like the journals, these authors were mentioned in multiple sources, and several articles were identified as relevant to answer the proposed research question. In order not to miss additional relevant sources contributed by these authors, manual research was conducted. Scanning the listed journals and authors resulted in an additional 13 relevant academic sources. Lastly, the sources were used for backward and forward research, which added another 20 sources to the list.

Concept	**Number of relevant academic sources**
Digital transformation in federalism	17
Shared services	24
Software as a service	10
Public sector coordination	14

Source: Author‘s compilation

Table 3.2 Concepts and number of relevant academic sources

Based on the components of EfA as well as the preliminary interview, the later three concepts were determined. First, EfA is a tool to accelerate public sector coordination. This is realized, for example, through guidelines and a service level agreement (minimum requirements/ Mindestanforderungen) (Heidinger, OZG-AL-Runde, Architekturboard,

2020). Furthermore, EfA contains elements of the concept of shared services. Even though it does not address sharing support services in the area of HR of finance, it shares the service inter-organizationally. Nevertheless, both share the goal of reducing redundancies and cost-cutting (Schulz & Brenner, 2010). The agreed minimum requirements can be defined as a shared service agreement. Lastly, shared services were mentioned in the interview conducted in the preliminary study. The same applies to SaaS, a form of cloud computing. The EfA services are made available to the other federal states through a cloud service, as stated in guiding concepts and documents of EfA as well as by the interviewees. Government as a platform, as proposed by O'Reilly (2011), was further considered as a possible concept to be included, as it assumes that public authorities develop their own applications based on the IT infrastructure provided by the (central) government, as the governments only support. However, while the German federal government has commissioned the FITKO to provide the necessary IT infrastructure such as FIT-Connect and the FIT-Store, these elements have not been finalized. Hence, the elements of government as a platform have not yet been implemented and there is little information about their performance, also was stated later by interviewees. Henceforth, government as a platform was not included as a concept in the following paper but should be part of further research.

Based on the literature review, challenges have been collected that occur in the different concepts. In the first round, a total of 76 challenges in four categories – (1) organizational and strategical, (2), financial (3) technological, and (4) legal - were collected. The structure of the challenges was partly verified by the four dimensions of EfA, which are organizational, legal, financial, and technical. The categories were derived from literature, as these were commonly used while studying on challenges of shared services or SaaS. The 76 challenges were reduced based on the following criteria: (a) Does the challenge adhere to the EfA concept? (b) Duplications of challenges with the same meaning were summarized. This led to a final 30 challenges.

3.2 Data Collection Methods

As qualitative and mixed methods are commonly used for case studies in social sciences, the following research answers the proposed research question with qualitative methods (Mabry, 2012). Three data collection techniques are predominant when using qualitative methods: observation, interview, and document analysis (Mabry, 2012; Yin, 2018). Using multiple sources of evidence can increase the validity of the case study's results (Yin, 2018). For the purpose of this research, the techniques of interviews, observation, and document analysis were considered to be most suitable. However, interviews were the primary data source for this research.

As recommended by Yin (2018), the inventory list of challenges developed in Chapter 2.3 was used to guide the collection of data from multiple sources, the interview, and the analysis of the data (Yin, 2018). Hence, a deductive approach in which theory guides data collection was used to answer the research question (Mabry, 2012).

3.2.1 Documentation

To assure triangulation, data from different persons, entities and documents were collected. Thus, the degree to which each source confirms, elaborates and disconfirms information of other sources was compared and verified. This provides the possibility to prove the accuracy of the collected information (Mabry, 2012).

Documentary information is one of the data sources for triangulation, it typically includes administrative documents, studies, minutes, newspaper articles, or other articles published in mass media. However, the sources of information have to be analyzed carefully as they are not free of challenges, which can lie in an author's bias reflected in the document, or limited access to the documents (Yin, 2018). Publicly available information such as newspaper articles on the EfA approach or press releases from public authorities was used to understand the cases' context and to identify and verify challenges.

3.2.2 Observation

As outlined, multiple resources of information verify the result, hence assure triangulation, and support the researcher to gain further insights into the case (Mabry, 2012; Yin, 2018). As the present thesis is a project of a single person only, it was not possible to conduct the observation by multiple researchers simultaneously as recommended by Yin (2018). Due to the COVID-19 pandemic, no observations could be conducted on the EfA projects themselves. However, to gain more information, especially from sources that were not available for interviews, a presentation on "EfA - a reality check" was included as an observation. The presentation was given by a representative of the Federal Ministry of Interior and init AG. It was organized by the NEGZ network and took place on the 30th of April 2021 from 12:30 AM to 01:30 PM (CET) via Zoom. As the presentation was made publicly, it was analyzed subsequently. However, this observation was solely used for triangulation rather than adding new data.

3.2.3 Interview

Interviews aim to gather responses from case study participants. The responses can be either verbal or nonverbal; however, interviews for case studies are mostly conversational (Yin, 2018). Accordingly, the following research aims to collect data

through interviews. Semi-structured interviews were considered the most favorable approach to answer the research question. While structured interviews follow a strict guideline of questions with no room for additional and further demands, and unstructured interviews are conducted without any set of questions determined on in advance, semi-structured interviews consist of a basic course of questions but leave room to ask more or fewer questions (Meuser, 2019). So, semi-structured interviews are interviews where the questionnaire is standardized; however, it is up to the interviewee how to answer them (Meuser, 2019). Furthermore, semi-structured interviews allow the researcher to "go deep" by exploring the topic through a wide range of possible answers (Lazar, Feng, & Hochheiser, 2017). Information that otherwise might be lost in structured interviews can be captured, as interviewees are free in their answers and the researcher is able to ask follow-up questions (Yin, 2018). In this, researchers must have the ability to recognize the importance of new input to be able to pursue these new lines (Mabry, 2012). Other challenges of semi-structured interviews are not to jump to conclusions as well as to avoid searching for confirming or disconfirming of the theory or hypothesis (Mabry, 2012). Lastly, the separation from task and context of the interviewees' statements limits the completeness and correctness of the data received (Lazar et al., 2017). It is reasoned that, as the interview takes place in an artificial environment, as a result the interviewee is struggling to recall the problems (Lazar et al., 2017). Nonetheless, in contrast to unstructured interviews, semi-structured interviews provide a better comparability between the interviewees through the question guidelines, as everyone still answered the same set of questions or talked about similar topics (Meuser, 2019).

The present thesis interviews experts to answer the research question. Experts are defined as people who have special and deep knowledge of the explored topic (Gläser & Laudel, 2009). Expert interviews are used to gain more insight into complex issues that can only be provided by them (Gläser & Laudel, 2009). Thereby, experts are not the object of the investigation, the focus is rather on the products or processes of the research that the experts are or were part of. For example, in the present case the focus of the research on the EfA approach and its further investigation, experts working with and being concerned with EfA are interviewed and considered as experts. These experts can provide unique insights regarding the world of ideas, attitudes, and emotions (Meuser, 2019).

To properly answer the research question, experts working in the OZG coordination teams of their respective federal states were requested. Additionally, associations of federal states and municipalities as well as organizations responsible for the OZG and hence EfA on the federal level were contacted. It was aimed to collect a diverse set of experts in regards to technology, organization, financial and law. The person should work in the context of the OZG and be part of EfA projects. Further, they should have

experiences in digitizing the German public sector. First, the OZG-Informationsplattform with its integrated marketplace for subsequent use, was used to identify contact persons and their email addresses. As not all the required information was provided here, the contact field of the official websites was used, to get in touch with the remaining organizations. Hence, a prepared text was sent to the respective person or organization, explaining the purpose of the study, their possible contribution to it, and an offer to share the results afterward. The text sent on the April 27, 2021 is depicted in Appendix C. Out of the 24 contacted people and organizations, six responded not at all, three responses were negative; 15 replied positively. Due to the time frame and scope of this paper, a total of ten interviewees was considered appropriate. Hence, five interviews were canceled. The decision on the cancelation was based on their availability and their expertise, as it was aimed to achieve a diverse set of interviewees. Therefore, ten interviews were conducted. All interviewees requested the question guideline in advance, so a document was created providing information on the interview and the interviewer as well as the question guideline (see Appendix D).

	#	**Level**		
		Municipal	Federal state	Federal
Part of the team responsible for OZG coordination and program management	5		X	X
Responsible for legal issues concerning EfA and OZG implementation	2		X	X
IT service provider	3	X	X	

Source: Author‘s compilation

Table 3.3 List of interview partners

3.2.3.1 Guiding Questions

As mentioned above, a question guideline or a protocol of topics is a recommended tool for data collection for a case study (Yin, 2018). This guideline aims at directing the researcher’s thinking and so can be considered as a “mental agenda” for the interview (Yin, 2018). However, in semi-structured interviews it is not required to strictly stick to this mental agenda; rather the interviewer can react spontaneously to responses by reordering the questions or coming up with new ones on the spot (Lazar et al., 2017). The protocol does not only provide a guideline for the interviewer but also the interviewee. Contrary to an unstructured interview, the interviewee is made to stick to the topics of the researcher (Meuser, 2019). Nonetheless, interviews that are only guided by a set of questions and do not adhere to fixed ones concealing certain challenges. Depending on the interviewee it can be difficult to manage the interview if the discussion becomes boundless (Lazar et al., 2017). The interviewer has to find the right point to interrupt and come back to the original topic. Even though semi-structured interviews are

considered to be more difficult than surveys, however, surveys do not sufficiently support answering the present research question. Especially as the following study is considered an exploratory case study, interviews are preferred over surveys due to their flexibility in exploring the so far unresearched issue. The guiding agenda of this thesis is depicted in Table 3.4.

Other reasons for question-guided interviews are that, on the one hand, they ensure that the researcher is prepared and adequately competent to talk about the topic under discussion. On the other hand, they do not degrade the expert status of the interviewee and allow them some freedom to further expand on her or his opinion (Meuser, 2019).

#	**Question/ Topic**
1	At the beginning, briefly introduce yourself, your organization and your role in relation to OZG and EfA.
2	Where do you see the biggest challenges in the application of EfA?
3	What do you think are the organizational and strategic challenges?
4	What do you think are the technological challenges?
5	What do you think are the financial challenges?
6	What do you think are the legal challenges?
7	We have until now only talked about the challenges. However, as a concluding question, do the opportunities of EfA outweigh the challenges? And can EfA thus contribute to sustainable and accelerated digitization in Germany?
8	Finally, do you have anything else that we didn't cover in the interview but that you would like to leave me with?

Source: Author‘s compilation

Table 3.4 Guiding agenda of the interviews

The interviews took place between May 3rd, 2021 and May 18th, 2021 and lasted between 42:59 and 63:55 minutes. They were mostly conducted via video calls on Skype or Zoom. The interviews were recorded with the participants' agreement in order to transcribe them and execute a content analysis. The recordings were deleted after the successful transcription and the transcripts were anonymized. A total list of all interviewees is depicted in Appendix E. Here a general overview of the data used for the content analysis is provided.

3.2.3.2 Rules of Transcription

In general, the transcript does not aim to summarize or grade the interview, but rather simply provides a detailed and verbatim written version of the recorded interview (Gläser & Laudel, 2009). Hence, everything is written down, even if the researcher does not regard the section as relevant.

In which detail the transcription is done, whether for example, pauses and changes in voices are marked in the transcripts, is defined by rules of transcription (Gläser & Laudel,

2009). As the present study focuses on a German case, interviews are conducted in German and transcribed in the recorded language. Hence, the transcription rules recommended by Kuckartz (2016) were applied. This approach was also chosen as it is recommended for interviews with question guidelines. Additionally, it aims to prepare the transcription for qualitative content analysis (Gläser & Laudel, 2009). Rules of transcription assure comparability between the information in the transcript, as they follow the same rules without preference on any interview (Gläser & Laudel, 2009).

#	**Rule**
1	It is transcribed verbatim, i.e. not phonetically or summarized. Existing dialects are not transcribed as well but translated as accurately as possible.
2	Language and punctuation are slightly smoothed, i.e. approximated to written German. For example, "Er hatte noch so'n Buch genannt" → "Er hatte noch so ein Buch genannt". Sentence structure, definite and indefinite articles, etc. are retained even if they contain errors.
3	If a thought was interrupted in the middle, the new and old sentence are separated by ellipsis dots (...) placed in brackets.
4	The interviewer's affirmative or confirmatory utterances (mhm, aha, etc.) are not transcribed if they do not interrupt the interviewee's flow of speech.
5	Interjections from the other person are placed in brackets.
6	Sounds made by the interviewee that supports or clarify the statement (such as laughter or sighing) are noted in parentheses.
7	Paragraphs of the person interviewing are indicated by an "J:", those of the person(s) interviewed by a unique abbreviation, i.e. "I4;".
8	Each speech contribution is transcribed as a separate paragraph. Speaker changes are made clear by pressing the Enter key twice, i.e. a blank line between the speakers, to increase readability.
9	Incomprehensible words are indicated by (unv.)
10	All information that allows conclusions to be drawn about a respondent is anonymized.

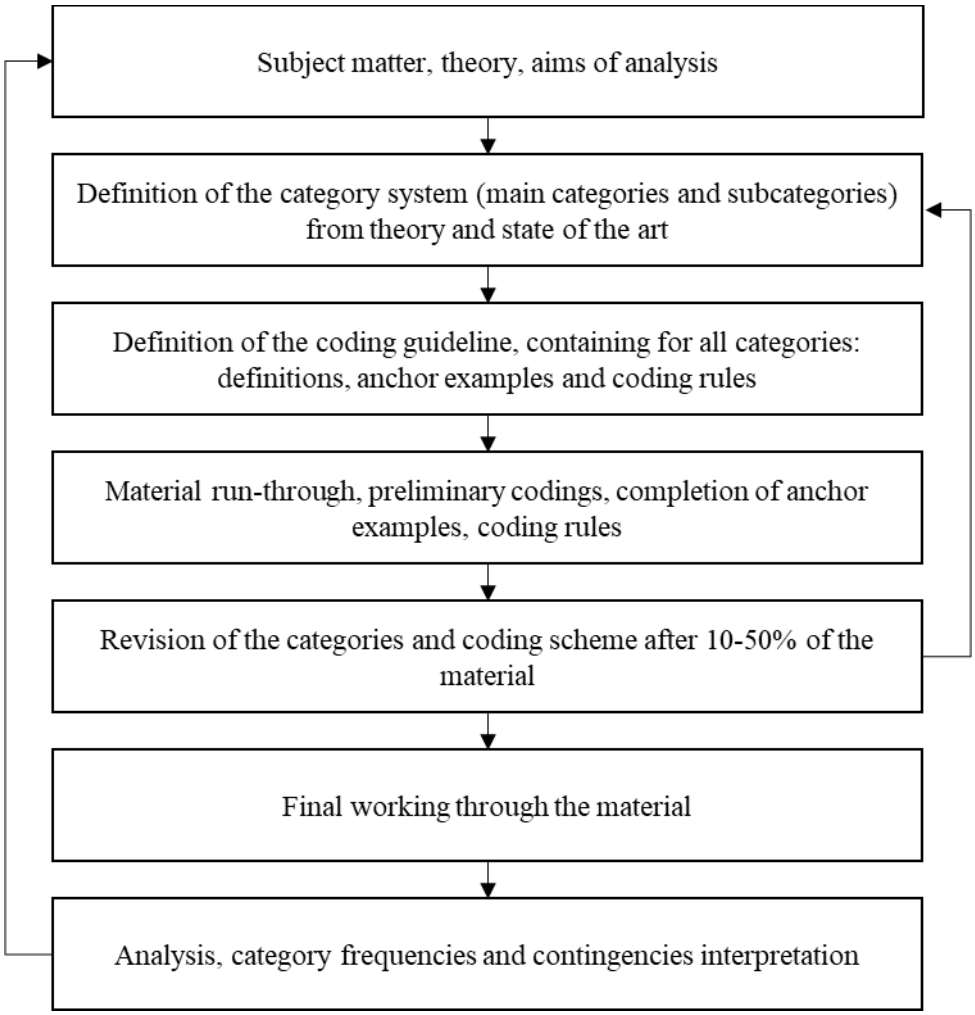
Source: Derived from Kuckartz (2016)

Table 3.5 Rules of transcription

3.3 Data Analysis Method

The qualitative content analysis was chosen to analyze the data collected in the semi-structured interviews, documents, and observation. The approach was chosen corresponding to the nature of the research question and the quality of the interview material. During a content analysis, interview sequences and their contextual significance are defined, captured, and described through categories (Gläser & Laudel, 2009). The codes can be justified either through a theoretical foundation or during the reading of the text (Gläser & Laudel, 2009). The content analysis in the present paper aimed to extract findings regarding the challenges of the EfA approach from the data sources in a systematic and rule-oriented analysis based on the deductive category application. A deductive approach was chosen as the interviews were guided by the inventory list and the categories were defined according to it. Thus, a procedural model of deductive category application was followed, proposed by Mayring (2015) and Mayring (2000).

The individual steps of analysis and their order are depicted in Figure 3.2. As mentioned, according to deductive category application, prior categories were formulated, and theoretically derived in Chapter 2.3. Based on the content structure, achieved by coding the text, an analysis can take place, for example to find similarities and differences through comparison (Gläser & Laudel, 2009).



Source: Mayring (2015, p. 376)

Figure 3.2 Process model of deductive category application

First, based on the guiding inventory list of priorly formulated challenges, theoretically derived aspects of analysis were defined as categories; thus the goal of the analysis was concretized in the form of categories. The defined categories were: (1) organizational and strategical, (2), financial (3) technological, and (4) legal. A further category of 'perceived opportunities of EfA' was added as interviewees stressed the importance of the opportunities. This category will be included in the depiction of the results in Chapter 4. For each category coding rules and anchor samples were established. Memos were used for this purpose as they are "informal analytic notes about […] the theoretical connections

between categories" (Chun Tie, Birks, & Francis, 2019, 4). The central instrument of analysis is the category system. Hence, category creation and validation are crucial steps of the content analysis and should be done with particular attention (Mayring, 2015). To determine under what circumstance a text passage can be coded with a category, coding rules, definitions, as well as anchor examples were documented in the coding agenda.

To analyze the interviews in a methodologically controlled approach, a software tool for qualitative methods research, MAXQDA (Version 2020-03-03), was applied. In the first step, the interview transcripts were coded iteratively. In Appendix F the coding system used in MAXQDA is depicted. The first interviews were preliminarily coded and anchor examples were supplemented with results of the first transcripts. After the first two interviews, the coding rules were reviewed, added, and deleted. All interview transcripts were finally coded iteratively. Thus, in the first round all organizational and strategical challenges were coded, in the second the technological and so forth. Mayring (2015) suggests that the coding analysis should be carried out by multiple researchers. The present paper is unable to fulfill this requirement, which presents a limitation to the research. As this is the thesis of the author, only one researcher was able to code the interview transcripts. However, the limitation is considered as minor, as each interview was read more than once through the iterative approach. This enables the author to review and verify the coding decisions. Additionally, an audit trail was maintained using the comment function in MAXQDA to document analytical decisions regarding ambiguous and borderline cases. In the last round, the researcher paid special attention to the audit trail, to draw final coding decisions.

The results of the qualitative content analysis laid the ground for the interpretation of the material (Gläser & Laudel, 2009). However, as mentioned earlier, the interviewees requested a complete anonymization as it is a politically discussed topic. In the results sections every hint regarding the interviewees location of workplace is removed. To stay politically neutrally, all mentioning’s of the concrete names of the federal states was replaced with federal state A, federal state B and so forth. In addition, in one interview it was requested, that no direct quotes will be used in the present thesis. Hence, information from this interview were summarized in the author’s own words.

4 Results

4.1 Case Description EfA

As mentioned above, e-Government developments in federalism are rather slow and face multiple challenges. Germany reacted 2017 to its slow development with the Onlinezugangsgesetz (OZG). The law demands that multiple public authorities need to execute the digitalization of 575 public services according to the OZG by the end of 2022. However, so far experts do not expect that the goal of the OZG can be reached, and they further maintain that challenges existing due to federalism are not solved by it, but are rather made only more visible now. Among them are data protection regulations as well as a lack of budget, user acceptance, lack of digitization expertise in the administration, and standardized IT solutions (Hustedt & Trein, 2020). One problem, for example, is the decentralized government which impedes cooperation and communication among the multiple authorities (Mergel, 2021). Therefore, different authorities digitize the same services, and the same solution is executed in multiple places. As a consequence, more time, financial and human resources are needed and used up than necessary. Additionally, federal states and municipalities are limited in their budgets. Especially the fixed budgetary cycles challenge the realization of the OZG because while short-term liquidation of a greater amount of money is possible, middle- and long-term financing are rather difficult. At the same time though, middle- and long-term liquidation are more important when realizing the OZG. Lastly, the implementation deficits also originate from a lack of inclusion and referencing of municipalities (Mergel, 2019). Mentioning the municipalities explicitly and thereby including their interests would advance the digital transformation as of the three levels, municipalities have the most direct contact with citizens and are the executing branch of the OZG (Jakob & Krcmar, 2018; Mergel, 2019).

To meet those challenges, a concept for the cooperative implementation of the OZG based on a division of labor was designed. Article 91c of the Basic Law, adapted in 2009, sets the cornerstones of federal collaboration (Anonymous interviewee 7, 2021; Mergel, 2021). It states that, “the Federal Government and the federal states may cooperate in planning, establishing and operating the information technology systems required for the performance of their tasks” (Article 91c (1) Basic law). This further enables the federal government and the federal states to define standards and security requirements necessary for communication between the information technology systems (Article 91c (2) Basic law). However, this does neither include the 11.000 municipalities nor does it stipulate the adoption of the cooperatively developed standards in the municipalities. So far a strict top-down approach is not possible, due to Article 28 (2) of the Basic Law which states

that municipalities have the right of self-administration. However, part of the adaption of the law is the establishment of centralized steering entities: the IT Planungsrat and the FITKO. As a political steering committee the IT Planungsrat is responsible for coordinating the collaboration on IT developments between federal and federal state level. The FITKO is subordinated to the IT Planungsrat and its level of operation.

EfA is based on this collaborative and joint approach. It aims to develop services once and re-use them in every other municipality with a few adjustments. EfA in its early stages did not follow a SaaS approach. The goal was to define and depict a service only once. The federal digitization lab took over the responsibility to describe a service in detail (Anonymous interviewee 6, 2021). This description consisted of artefacts such as an instruction of procedure and data field description. The idea was that every federal state could hand over the description to its IT service provider or the respective organization responsible for software development. The developer would rebuild the exact service based on the description, and the service would be hosted and operated locally. However, for several reasons this did not work out: Firstly, the description was missing details about the layout of the service (e.g. is the button left or right). Further, it was not possible to centrally build a service to be reused in the federal states without including their opinions (Anonymous interviewee 6, 2021). Lastly, there was no conclusive definition what EfA is exactly, for example minimum requirements did not exist.

With the onset of another crisis, the COVID-19 pandemic, new regulations and a change in principles were released because here digital transformation is detected as a tool to tackle the COVID-19 crisis, especially in the fields of education, health, and economy. The adoption of a recovery package in 2020 was used to foster the transformation towards e-Government in Germany. The recovery package offers additional access to financial resources, in total a sum of three billion Euro is made liquid for the purpose of digitizing. However, the financial aid is only handed out if the service to be developed can and will be subsequently used. To deal with this, three possible models have been outlined by the federal government which distinguish whether it is viable to develop and operate digital solutions across federal states or individually in the federal states (IT-Planungsrat, FITKO, & BMI, n.d.). The decision of which model to use is based on legal, technical, and organizational aspects (IT-Planungsrat et al., n.d.). One of these three models is “Einer-für-Alle/Viele”. EfA is chosen if the laws are federal or differ only minimally among the federal states. Regarding the technical aspect of EfA, the developing authority should be integrated into common interfaces such as XFall. Finally, from an organizational point of view, EfA allows for a high as well as a low implementation complexity. Solutions developed with the EfA model should thus be usable across all federal states (IT-Planungsrat et al., n.d.).

The basic idea of EfA remains the same: One or an alliance of federal states digitize services in such a way that others can re-use the online process without having to develop their own solution so that not each federal state has to develop from scratch each service for itself, rather the states together can coordinate and divide the work (BMI, n.d.). However, the latest EfA approach as a requirement for the recovery package differs from the earlier one. The main difference is that while before every federal state hosted and operated the service locally, now this is done centrally and only once. The definition and requirements of the EfA approach released in 2020 are described below in more detail.

There is a distinction between the "Umsetzungsland" (UL) and the "Anschlussland" (AL). The UL is the federal states developing the digital service or process in cooperation with its IT service provider. The developed service will later be permanently hosted by the UL and its IT service provider. The UL does not necessarily have to be a single federal state, but can also be a cooperation of federal states, developing the service together. The developed service will be provided as a SaaS (Anonymous interviewee 6, 2021; BMI, 2020a; Document 2, 2021). The AL is the federal state reusing the developed service, which can to some degree be adjusted to the local circumstances. While the expenses of operating and continued development are split between the connected federal states, the costs of the development are paid by the UL (BMI, n.d.). However, the development and operation of the first year are supported financially from the recovery package when following the EfA approach (BMI, 2020b).

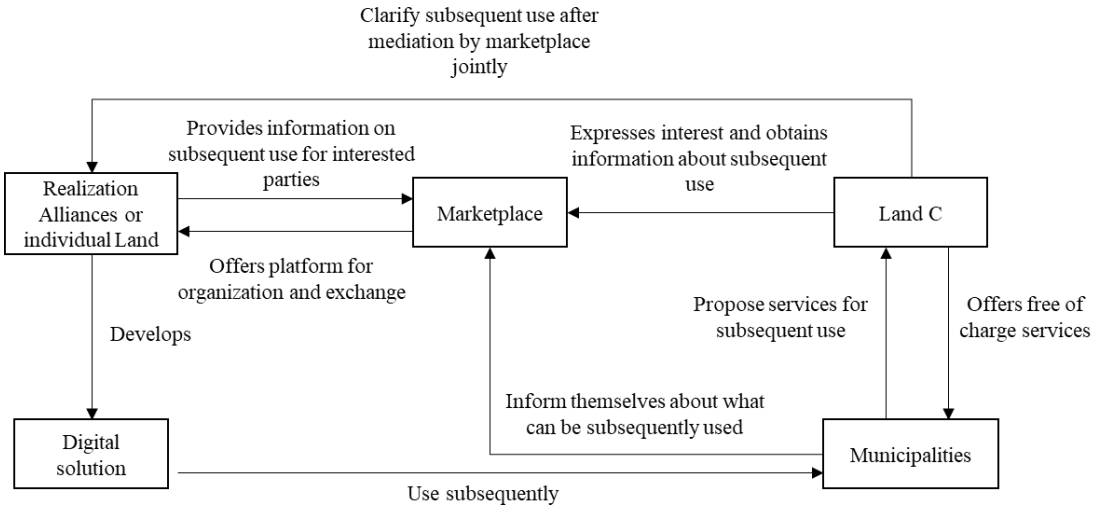
All services are connected to a federal platform, where the citizen can access the services with its interoperable user account. Depending on the post code or name of the municipality that is entered, the design of the user interface can be adapted by displaying the respective colors and logos of the federal state or municipality. To this end, it is important that services are developed in a plain user interface design. Additionally, the logic of the process of the service is provided preferably simply and uniformly. The logic and relevant fields of service are decided on uniform federal regulations (BMI, 2020a). This is required as EfA does not aim to change the competences within the federal states or municipalities. Data entered on the federal platform are standardized to be sent to the system of the respective authority (BMI, 2020a). Data are standardized based on either existing or new standards that will be developed such as FIT-Connect (BMI, 2020a). To assure data security and safety of the data transportation and encryption, existing technologies are used which were specially developed for the public administration in Germany and are based on internationally accepted IT standards (BMI, 2020a).

EfA consist of four dimensions: (1) organizational, (2) legal, (3) financial, and (4) technical which the federal states must take into consideration. First, the federal state has

to assure having an adequate organization that is able to digitize according to EfA as well as to re-use EfA services. Second, the federal state needs to provide the legal framework for the application of EfA. Third, the UL must decide how to divide the costs for development, operation, and advancement. Lastly, the UL has to make sure that the AL will be technically able to connect to the service.

For the purpose of coordination, communication, and information collection, a platform is created called “der Marktplatz der Nachnutzung” (marketplace for subsequent use). federal states can use it to form alliances and cooperations to jointly develop and digitize a service. Furthermore, UL can use the platform to provide information on digitizing services. Among them is information on the date when the service will be available and the method of dividing financing of operations and advancement. Additionally, UL can view the AL which show interest in re-using the digitized service. AL can use the platform to inform themselves about options to use subsequently and show interest in them. Contact data is provided for each service to enable AL to directly contact the UL.

Hence, EfA provides three explicitly stated advantages. First of all, because not every country has to develop each service, time, resources, and costs can be saved. Furthermore, the services are identified to be more user-friendly, as they are unified across the country. Thus, a citizen moving to another federal state or municipality will not have to adjust to a new user interface and process of the platform and services. Additionally, financial support from the federal level is provided to federal states with otherwise limited budgets.



Source: Nachnutzung im Modell „Einer-für-Alle“(n.d.)

Figure 4.1 Ideal model of the marketplace of EfA

4.2 Challenges of EfA

The results, based on the coding and analysis of the expert interviews' transcripts on the challenges of EfA, are summarized in the following chapter. The findings are organized along the categories derived from the coding systems based on the findings of the literature review. Hence, challenges relate to organization and strategy, economy, technology and legislation. It was confirmed in the interviews that the challenges are interdependent as assumed in Chapter 2.3. One challenge was connected to two or more categories. For example, a technical challenge often resulted in an organizational challenge. Further, a minority of challenges identified do not apply exclusively to the EfA approach. Some of them are also generally faced when digitizing the public sector. However, they were still considered to be important as they impact the realization of the EfA approach to a high extant.

All the following statements result from the data analysis of the documentation, observation and semi-structured interviews. Due to the scope of the thesis not all statements are supported by a direct quote. As the authors as well as the interviewees are German, interviews were conducted in German. The direct quotes were translated into English by the author. Due to the scope of the paper not all identified challenges are explained in great detail. A complete list of the identified challenges and corresponding challenges from the research background is depicted in Appendix G.

4.2.1 Organizational and Strategical Challenges of EfA

Each interviewee was able to attribute several organizational and strategical challenges. The first of these is a challenge that can rather be considered as overlapping, as it touches on all four categories, the challenge of the integrating of the diversity and multiplicity of the solutions that appeared over the past year. This does not only include the application, but further interpretation of laws, process designs, organizational structure, and various departments and their focus area.

"Everyone has chosen a slightly different approach, historically, and that leads back to this story that everyone has solved certain problems for themselves." (Anonymous interviewee 6, 2021)

Additionally, interviewees working on the federal states level mentioned the identification of suitable EfA services as a challenge. After all, each of the 575 services as stated in the OZG-Umsetzungskatalog have to be digitized in the context of the OZG. These services are categorized according to circumstances in life and business as well as thematic fields. Each federal state is responsible for designing the service for one or more

of these thematic fields. The responsibility of the federal state lies in the digitization of all services.

Nonetheless, not all these services are suitable to be provided by the EfA approach. First, there has to be made an assessment based on the criteria described in Chapter 4.1. This decision process is rather seen as slowing down the digital transformation and it is not always entirely obvious if a service is suitable for subsequent use (Anonymous interviewee 9, 2021).

"First of all, the essential question is to identify the services that could be EfA compliant. For many services, there are country-specific features that cannot simply be re-applied elsewhere and, depending on the subject area, there may be more services delivered by EfA or compliant with EfA or, in some cases, very few." (Anonymous interviewee 5, 2021)

Besides, as the federal state has limited resources it is not able to realize the digitization of all EfA services all at once, and so it will prioritize services. Mostly services are de-prioritized that are, for example, not requested frequently. However, while a service might not be popular in one federal state, it could be important to another one.

"Some federal states just declare, „This is de-prioritized in our country because such cases don't occur in our area. That does not happen here. That is why we de-prioritize it." (...) But if, for example, a federal state says we don't want to do that, then that has no priority for us. Then those who want to join have to consider what to do next, whether to develop their own service or what?" (Anonymous interviewee 1, 2021)

Furthermore, accountability and responsibility challenges were identified as organizational challenges.

"Of course, I would say what can typically be stated for all authorities are questions of responsibility. That is always a major discussion process" (Anonymous interviewee 3, 2021)

One problem is that multiple platforms are used for communication across federal states and departments. However, it is not always stated clearly and kept up to date who are the people of contact, responsible for the development of a service. The author experienced this challenge herself, when contacting people over the OZG-Informationsplattform. One of them appeared to be no longer responsible.

"There are different communication channels. Sometimes there is a central program (...) where some of the information should be centrally collected. In some cases, however, the

information is also passed on to the individual ministries, depending on the topic, so that there are very different procedural statuses. Particularly because the leaders of the thematic fields also have different procedures regarding in which process step they involve the other federal states." (Anonymous interviewee 8, 2021)

Further, in every federal state, the responsible organization is called differently, processes are placed in different institutions, and this challenges the process of communication across federal states. However, communication and coordination among the federal states is an important part of EfA. Therefore, it is important for its realization to be able to reach out to government officials from other departments or federal states.

"So, at the moment, the challenge is who communicates with whom and who is responsible for what. It's not easy at the level between the federal states to really reach out to the 16 other partners, to see who is responsible. because there are small states, there are territorial states, too, so digitization bodies are also called differently everywhere." (Anonymous interviewee 1, 2021)

Additionally, it is not clarified who is responsible to reach out to the other federal states for an EfA service, whether it is the digitizing office of the federal state or the ministerial department, using the service subsequently or offering it.

As the EfA approach success is dependent on the contribution of all involved actors, it is important that they are aware of their accountability and see the urgency to act. While divesting from its accountability has been a general challenge for digital transformation in the public sector, this issue has been reinforced by EfA. EfA promises them a solution, which they can use subsequently and hence do not have to act on their own (Anonymous interviewee 9, 2021).

"Of course, that takes a lot of convincing because some processes have existed for decades. It is not always easy to convince the administration itself that this is necessary and must be done. And the next step is, that after we have been able to convince them that this must be done, we then take the step that they must participate, too. On the one hand, this applies to federal departments. On the other hand, it also applies to individual states or even certain authorities. They see themselves less central to the implementation, but rather state that they're willing to wait for the federal government should take the accountability for development and implementation, but they don't want to get much involved in this process. And that is always a big hurdle for individual administrative services." (Anonymous interviewee 3, 2021)

As stated by another interviewee (Anonymous interviewee 7, 2021), this especially occurs on the municipality levels, as they do not feel addressed by the OZG and EfA. Hence, they do not feel obligated to act or take over financial accountabilities for developing and implementing digitized services.

Conversely, while some do not accept their accountability in the joint process, others do not want to hand over responsibility. The federal state does no longer have the control over the course of development and must trust others to create the best possible outcome.

"So the organizational challenge is clearly that you have to give away responsibility." (Anonymous interviewee 6, 2021)

The last aspect of the accountability challenge is that there are multiple unsolved questions such as: How is the accountability split between the federal states? Who is legally liable? Who is accountable for errors and ongoing issues? However, it has to be mentioned and considered that these challenges do not necessarily have to occur when one follows the Wegweiser "Einer-für-Alle/Viele" (guide of the approach). In here, all roles and the respective responsibilities and procedures are described in great detail.

Another set of organizational and strategical challenges is the lack of an implementation strategy. Interviewees observed that EfA has not been thought through completely, and as there is a missing strategy, government officials have to solve additional problems on top of the program or project management (Anonymous interviewee 9, 2021). There are three areas in which questions arise because of the missing clear strategy. First, while the development of an EfA service is supported extensively by the EfA guide as well as the minimum requirements of an EfA service, the interviews revealed that the later implementation in the AL are rather unclear. As there is no official document of a timeline stating when the EfA services will be finalized and ready for subsequent use, public officials do not know how to proceed (Anonymous interviewee 9, 2021). The lack of the implementation strategy is here a challenge as no further planning is possible while experiencing a high time pressure to meet the deadline at the end of 2022 (Anonymous interviewee 9, 2021).

Secondly, public officials are confronted with a varied set of unresolved questions, some of them are listed below.

"Now, for example, federal state A builds the service for housing allowance and federal state B wants to use that. What do you have to do? So, what contract constellations must there be with federal state B? Who actually has a contract with whom? What does it all say? Who pays for it? What does he pay? When does he pay it? How often does he pay?

Why does he pay it at all? And in return the question, but federal state B also offers services to federal state A, how does that fit together? Is there a financial offset afterwards? Will the responsibility be broken down individually? Who is legally liable? Who is addressed when citizens have a problem? Who receives it? There is an unbelievably large number of questions that need to be addressed." (Anonymous interviewee 6, 2021)

There is also no implementation strategy of how to connect a municipality to the EfA services (Anonymous interviewee 10, 2021).

"If EfA is to be pursued in the form discussed so far, there needs to be at least a clarification of what is specifically meant by the provision of online services according to the EfA approach. At present, the details are very unclear from the municipal point of view and hinder the technical implementation in the municipalities." (Document 3, 2020)

For now, the financial support from the federal level for the EfA approach is only made available to the federal states. There are legal challenges, too, which will be discussed later, that were solved by in-house tendering of the services offered by the FITKO. However, as the municipalities are not part of the FITKO, they cannot profit from the solution offered by the federal level to the federal states.

"The federal government's position is that it is also possible to pass on services to the municipalities without having to comply with the procurement law, provided that it is done free of charge. We don't have any problems here in terms of procurement law. The states tend to have reservations about this because it is not quite clear to them or they cannot yet estimate what the costs would be on their side. The states themselves have to realize a little bit what the costs would be.(...) And since they don't know exactly what this finally means for them, they are rather skeptical about the integration of municipalities via the FIT-Store and are currently developing their own approaches." (Anonymous interviewee 3, 2021)

The federal level, then, does not specify overall what the implementation strategy of the EfA approach for municipalities looks like.

"There is no answer to the question, how do municipalities get their service" (Anonymous interviewee 6, 2021)

Thus, the municipalities do not know what exactly they have to do to connect themselves to the EfA services, how a specialized procedure integration could look precisely, what costs they have to expect if they use services subsequently (Anonymous interviewee 4, 2021).

"Things about which there is currently still no ready information, which just makes for much uncertainty, because you do not know for 100% what you're running into." (Anonymous interviewee 4, 2021)

As one interviewee summed up, there is a huge organizational and administrative effort required to address all 11.000 municipalities; not only the communication is a challenge but also the multiplicity of contracts and agreements that must be made to be able to use the service subsequently. Hence, it's not only a question of who is paying for the service, its development, implementation and advancement, but also who is paying for the municipalities and the organizational effort (Anonymous interviewee 3, 2021).

This is connected to the third area of challenge, the lack of a strategy how the program will continue in 2023, as the services all must be developed by the end of 2022 and the financial support through the recovery package will stop.

"Yes, the bad thing is just this not knowing and everything. It just always says everywhere that everything only runs until 2022. The federal states are saying, 'If there are any costs coming our way, then we must know that, because the budget for 2023 is being planned now and I just have to know that soon.' We have to make provisions and simply plan for it." (Anonymous interviewee 2, 2021)

Most interviewees explained that the missing concept of what will be happening organizationally, legally and financially after 2022 is a major challenge. However, it was also stated that the federal level sees the digital transformation as an ongoing process rather than the need for a clear roadmap of the future progress.

"I'd say the federal level has a perspective initially until the end of 2022 - that's their work assignment. They don't see that as the end of digitization, but rather as the beginning, and everything that comes after that is an ongoing process that will continue to be needed. They see themselves as supporting the federal states in many areas" (Anonymous interviewee 3, 2021)

The assumption that less customization is a challenge of EfA, however, could only partly be confirmed.

"That it doesn't have a uniform style. So you don't have one country portal and every service looks the same." (Anonymous interviewee 2, 2021)

However, while this is described as a challenge, it was stressed by many interviewees that EfA does give an opportunity for more customization. When being responsible for digitizing all 575 services for themselves, government organizations do not have the

financial and human resources to do this in a user centric approach for all of them. With EfA, they can focus mostly on the services in their thematic field. Furthermore, it is stated that the services should be developed in such a way that every municipality and federal state can customize it with its own colors and emblems.

Another organizational challenge described by nine interviewees is the lack of shared interests. EfA attempts to bring together different actors, who until now have worked independently. The multiplicity of interests is a challenge for the required coordination with EfA.

"The interest situation is yes, we have an interest situation on federal level, an interest situation on state level and on state level there are already 16 situations, and then of course the municipalities, which are also a concert of over 11,000 different interests that must be served" (Anonymous interviewee 10, 2021)

While all federal states are conscious of being obliged to digitize according to the OZG till the end of 2022, the expectations vary significantly. Interviewees reported that some departments want to cooperate extensively and be included in the whole development process, while others just want to receive the service at a certain time. This once leads to an unbalance of representation of interests, but further can slow down the development process as too many strong interests have to be considered and especially managed.

"There is one group of experts that tries to get around it somehow, saying, well, we don't see the need at all. And then there is another part that says, well, we want the process as it is now to be digitized one on one. And then, of course, there are others who say that digitization is an opportunity for us to rethink and reorganize the process and streamline it so that we really do have a really good digital application and then digital processing downstream, and that we are now taking advantage of the opportunity that is being offered to us. But there are huge differences […] This game is played at the municipal level, of course, but also at the state level and at the federal level." (Anonymous interviewee 10, 2021)

Further, it is difficult to build a shared mindset for the diverse interests, with actors now working together in structures they have not experienced before. Federal and federal states, as well federal states and their ministerial departments, mostly worked separated from each other. They did not have existing structures to build on.

"It was difficult to create joint federal-state structures in the first place." (Anonymous interviewee 3, 2021)

"Communication with the federal states is very difficult, really difficult. Because they have their own structures, their own strategic goals, and have invested a lot of money in their own structures. There is no great willingness to get rid of things for the greater good that were perhaps developed with a lot of money and now develop something else. Everyone wants to hang on to their individual solutions, and that is not possible. (Anonymous interviewee 7, 2021)

Additionally, interviewees reported that cooperation can be difficult, as everyone is used to do everything their own way, but under EfA they must change processes or accept solutions developed elsewhere. This is especially difficult as the processes and requirements for a service differ between the federal states and municipalities.

"And this convincing or moving of the expertise to accept solutions from third parties and also to put their own processes on hold or adapt them is a great challenge. Because the administrations are not really used to this in this form. So each administration makes the solution as it sees fit." (Anonymous interviewee 6, 2021)

"I think the bigger challenge is acceptance. The services provided by others must also be accepted. The fact that something was not invented locally cannot call the entire business process into question. A tree felling permit that was developed in full compliance with the law in one state is valid elsewhere. The respective specifics must be mapped through parameterization. This process of realization must be communicated to one's own organization." (Document 2, 2021)

"Then you have eighty-seven thousand housing allowance offices that all have an opinion on how to design the housing allowance application. And to reconcile those and say, I'm creating the conceptual possibility that input can be provided there. There are also legitimate demands on such a service, which are then made, but you can't allow every variant." (Anonymous interviewee 6, 2021)

However, not only government organizations have different interests, but also the specialized procedures providers. All services need an application programming interface with the specialized procedure which is used in the municipality. However, there exist a multiplicity of specialized procedure providers, with different interests and varying willingness to cooperate. As stated by anonymous interviewee 4 (2021), this is a challenge in that especially municipalities end up in a dead end who made a contract with providers who refuse to cooperate and insist on developing their own front-end-services.

Lastly, interviewees describe that there exist diverse interests regarding the understanding of the reason of digitization. Accordingly, it is challenging to convince especially the

departments on local level that digitization is rather good and does not imply that they will lose their jobs. While this can also be viewed as a general challenge in the context of the OZG, it adds complexity to EfA because federal states dependent on the collaboration with municipalities and other federal states departments. If the federal state would develop an EfA service, but the other federal states and municipalities do not see the necessity of it, resources have been wasted and no money from the recovery package could be received.

"This is a challenge simply because in the context of the OZG, they can no longer avoid the digitization processes. This is first and foremost an organizational and thereby a communication issue of advancing, to bring the topic to this point and also to promote it so that it is seen as an opportunity and not as a problem." (Anonymous interviewee 8, 2021)

Another challenge that the federal states face due to the financial support of the EfA approach is how to proceed with projects that were started before the recovery package was released.

"What will happen to the old projects, what will happen to the people who do old projects, who also put their heart and soul into it. (...) Projects that are already, let's say, 90 percent finished, preliminary projects have been run and so on. The employees of the authorities have been motivated, and now they often have to be told to stop: Stop! We don't know how we can continue to finance this, because it is now supposed to run via EfA. We are also within an authority, so that sometimes there is simply frustration in saying: Stop, stop, you won't get any more money." (Anonymous interviewee 1, 2021)

Consequently, through EfA new highly financed and prioritized projects and allocations of roles arose, which is leading to a shift in power and work.

4.2.2 Financial Challenges of EfA

While in the long run digitization can save resources, in the short term, additional resources have to be made liquidated to afford the transformation.

"I'll put it this way: the entire digitization process is not free of charge, of course, and it also ties up a lot of financial and also human resources." (Anonymous interviewee 3, 2021)

There are four financial challenges mentioned by the interviewees. First, the recovery package does financially support only the federal state or alliance of federal states developing the service. So far, it is not clear who must pay for the connection. Hence, the

adaption costs are a challenge in the realization of the EfA approach. For a successful transition, the EfA service must be connected to the specialized procedures. However, this requires multiple human as well as financial resources.

"You will have to adapt a specialized procedure on one side or the other. In any case, there will also be costs for basic services. That means the provision of a service account and the payment procedure, in particular, because you will also have to enable various payment service providers to be used for the payment procedure. So adjustments will have to be made to the specialized procedures." (Anonymous interviewee 8, 2021)

As stated by other interviewees, it is not completely clarified who is responsible for bearing the costs originating from the transition whether the AL must pay for the additional resources, or if parts of that are borne by the UL. A further and an even greater financial challenge are the adaption costs for the municipalities as they are not able to profit from the recovery package. Hence, the question arose, whether they will have to pay for the service, for the connection and the general transition themselves or whether their federal state will support them, even offer it for free (Anonymous interviewee 3, 2021; Anonymous interviewee 6, 2021). This is a challenge insofar as many municipalities are already in debt and understaffed. Partly, they are also missing the necessary expertise, which will then have to be bought from outside (Anonymous interviewee 1, 2021; Anonymous interviewee 3, 2021; Anonymous interviewee 4, 2021).

"There is no answer to the question, how do municipalities get their service" (Anonymous interviewee 6, 2021)

Besides, the future costs of the EfA service are also stated as a challenge. So far, there are no empirical estimates how expensive the whole service will be, since there has been no service involving multiple municipalities, across several federal states and over a longer period. Up to now, there are only EfA services being rolled out in pilot regions. However, for a federal state to decide whether it wants to join the development of the service or agree to subsequent use later, it is crucial to have information on the future expenses. As this is still a black box, federal states tend to decline an offer. Interviewees stated that this was not a major issue before the broad practice of EfA, as costs of the digital transformation were relatively foreseeable and calculable (Anonymous interviewee 9, 2021).

"The federal states themselves have to realize a little bit what the costs are. These are, of course, development costs, operating costs, and may be other costs." (Anonymous interviewee 3, 2021)

Even though the EfA manual states possibilities on how to split the costs, this still seems an unsolved issue and hence a challenge for the federal states. As EfA services are provided as SaaS there are different possibilities, such as a monthly payment, payment per application and others. Further, in Germany there exists the Königsteiner Schlüssel, which defines how much each federal state is involved in any joint financing, based on their internal revenue and number of inhabitants. Still, questions such as below came up over the course of the interviews.

Who pays for it? What does he pay? When does he pay it? How often does he pay? Why does he pay it at all? And in return the question, but federal state B also offers services to federal state A, how does that fit together? Is there a financial offset afterwards?" (Anonymous interviewee 6, 2021)

"There is currently an intensive discussion in the federal states and municipalities about the subsequent operating costs. This has not yet been fundamentally clarified. Normally, the one who orders, pays. There's a lot in favor of that. After all, the one who pays and shares a solution with many parties pays less than the one who does it alone." (Document 2, 2021)

Additionally, the application of the Königsteiner Schlüssel to EfA is categorized as a challenge. It is questionable how fair this distribution of costs would be; a federal state using a service subsequently does not imply that this service will be implemented across the whole federal state. Expanding on this, only a small number of municipalities could agree to use the EfA service, thus leaving the federal state with high costs but little to no effective usage (Anonymous interviewee 9, 2021).

Lastly, two additional challenges regarding a lack of or rather the need for human resources were stated by the interviewees. As the public sector is not the most attractive employer, especially on the municipality level, it is widely understaffed. However, challenges regarding human resources appear as well in small federal states, such as Bremen or Hamburg (names are chosen independently from the interviewees)[1]. While in the large federal states there exist whole departments for some topic fields, there is not even one equivalent position in a small federal state. Hence, they do not have the man- or woman-power to realize the digitization of all services by themselves. Nevertheless, in this situation the federal states can benefit from the EfA approach and form alliances with others. A joint government development can lead to more expertise.

[1] A direct quote and source are omitted at this point, as it would lead to the identification of the interviewee(s).

The second, human resource challenge relates to the service being hosted centrally for the matter of support, for example. While an IT service provider used to be solely responsible for the support of one federal state, it is now responsible for the support of up to 16 federal states and the federal level. Hence, processes must be optimized and additional employees have to be hired. But it is not stated clearly, where do they come from, who pays for them, and which additional cost does that imply.

4.2.3 Technological Challenges of EfA

Almost all interviewees, but especially the experts regarding technological issues, stressed the great technological challenges that EfA is facing. The concept and idea of EfA requires new and further technologies and IT infrastructures.

"One is that EfA has requirements or demands on the technology or the infrastructure that have not yet been fulfilled there. This involves issues such as the routing of applications, the processing of payment services and the like. As of today, there is simply no solution for coordinating this nationwide." (Anonymous interviewee 6, 2021)

Above all the other technological challenges there is the issue of a diverse and complex IT infrastructure in Germany. Most technological challenges discussed in the following resulted partly from the diverse IT landscape.

"We have IT infrastructures everywhere that have grown over the years and they have to deal with them. […] IT realities and the IT structures and IT architectures in the various countries, including in the various municipalities as local authorities, are different to the highest degree." (Anonymous interviewee 7, 2021)

"There are different technological solutions in the various countries for implementing individual services, whether they have already been digitized in a different way or partially digitized." (Anonymous interviewee 3, 2021)

The IT landscapes grew independently from each other over the past years. However, EfA now requires that services developed by a UL can also be used subsequently by their AL. As stated by the KGST:

"With 11,000 municipalities in 16 German states, this results in a large number of very different procedures. Even online services provided by EfA solutions are repeatedly encountering different municipal procedures and e-government portal technologies in practice and, if the current framework conditions are retained, must be implemented individually in each case." (Document 3, 2020)

Here, especially two barriers are highlighted. First the different municipal procedures. As shortly discussed in Chapter 4.2.1 there exist a variety of specialized procedures as well as specialized procedure providers.

"Based on EfA, it is already the case that a specialized procedure connection is aimed for, but then of course the specialized procedure manufacturers' landscape is also totally diverse. For example, NRW uses four different specialized procedures for driver's licenses. Then there are, I think, another four different specialized procedures." (Anonymous interviewee 4, 2021).

Further, the KGST mentions the diversity of e-Government portal technologies. This plurality results from not only federal states building their own portals, but also municipalities operating their own. Additionally, some federal states host multiple topic related portals (Anonymous interviewee 4, 2021). The reason for the independent growth of the number of portals is that everyone developed their own digital services in the context of the OZG and almost no cooperative development existed before EfA was financially supported. To properly offer the essential services, portals were developed.

"Yes, and every state, every municipality operating their own portals do this in a completely different operating environment, different form management systems, so everything is completely different. And yet, in the end, all systems should be able to talk to each other. That's a big technical challenge." (Anonymous interviewee 7, 2021)

"I think NRW alone has four different portals that are topic-related. Sometimes it is the case that you, as a public servant, have to collect the incoming applications via three different accesses." (Anonymous interviewee 4, 2021)

Another example is the authentication of the citizen via a user account. Even though the user accounts are interoperable, their integrated mailboxes are not. Because of a missing interoperable mailbox, the citizen is not able to send the application or receive an answer (Anonymous interviewee 4, 2021). This challenges the authentication and identification of citizens, when aiming to fill out an online application.

"In addition, we have also failed to implement a uniform user account for citizens in Germany. That means there are citizen accounts in the respective federal states and there is a citizen account at the federal level." (Anonymous interviewee 7, 2021)

Due to the heterogeneity of the IT landscape in Germany, there is a need for technical standards and interoperability (Anonymous interviewee 7, 2021). Based on the diversity of these components, further technological challenges occur regarding API, data routing, parametrization, and missing and incomplete registers.

First, so far there is a diversity and lack of API. Every portal and specialized procedure have their own API, which EfA services must be able to connect to. If this is not possible and an interim solution must be used, the service cannot be employed without media discontinuity.

"These specialized procedures all have application program interfaces that vary depending on the specialized procedure. Meaning that if you compile application data via an online service, they must be transformed in such a way that the individual specialized procedure in the authorities can also process the whole thing. Because the basic goal would not just be to digitize what the, let's say, applicant, citizen or similar intends to do in the context of the application or whatever procedure he intends to use, which then arrives at you as a municipality, and you print it out as a PDF. Of course, that certainly doesn't help. Ideally, you as a municipality, for example, or even as a state authority, already have a specialized procedure with which you can continue to process directly digitally. And it is precisely this application program interface that is one of the problems that arising here." (Anonymous interviewee 8, 2021)

Hence, in order for public authority to make use of the digital service and achieve a complete digitalization, API have to be developed which are standardized, defined and contain binding agreements (Anonymous interviewee 7, 2021). Further, the format of the application data that are transferred must be standardized, so that every specialized procedure is able to read and process the data.

"You must have a standardized data set so that you can communicate with the specialized procedures providers, because if they have a service, then that service, that application service, has to be able to potentially communicate with umpteen different specialized procedures nationwide." (Anonymous interviewee 7, 2021)

Additionally, there do not exist standardized API for the e-payment systems required for a successful realization of the EfA approach, as not all services offered by a public authority are free of charge. Most federal states have already developed their own e-payment system. Developing API for each of the e-payment systems to assure correct payment routing could run short in time (Anonymous interviewee 8, 2021). However, it is not solely a challenge on the federal states level, but as well on the municipality level.

"The countries have clarified this for themselves. So, federal state A knows how to address its municipalities. And federal state A also knows how to route funds within the state so that they arrive at the appropriate department. But this is a solution for federal state A. And you can't just scale it up and say yes, then I'll provide federal state B or federal state C with the same solution. And for this we need a new component, a central

federal component, which, for example, now provides payment routing information. Without a federal central component, each service must somehow solve this for itself. And if everyone, does it, then I'll have 300 different solutions for making payments. That is not efficient. And that is the challenge on the technical side." (Anonymous interviewee 6, 2021)

Routing does not only seem to be a challenge regarding payment services. Multiple interviewees validated that the greatest technological challenge in the realizations is the routing of the data, which includes the Zuständigkeitsfinder[2], which is an application that defines the responsible organization for the request as well as the data routing itself, i.e. is the way data are transported to the defined destination.

"Actually, everything always revolves around the routing of certain information or the holding of certain meta data. Since it is usually about teaching the service to localize itself. That is, the service must somehow know when I fill out the application in city A that the application must then somehow be sent to city A. If I call the same service from city B, then the application must be sent to city B. Likewise, the money must be sent to city B. And the phone number of city B must be displayed. And the street directory of city B must be loaded and so on. This is localization information and that's what most technical problems are about, this form of questioning. So how do I get the service, in its various aspects, to be able to be used in a localized way." (Anonymous interviewee 6, 2021)

In the following, first the challenge of the Zuständigkeitsfinder is elaborated on. The Zuständigkeitsfinder is mostly integrated in portals, and information from it can be integrated in the specialized procedures. Thus, the application and data collected must be transferred to the responsible authority and into their specialized procedure. It is the responsibility of the Zuständigkeitsfinder to identify the authority. This is possible as it contains the information of public services, for example the costs of the service or which laws apply for it (Anonymous interviewee 6, 2021). The challenge is the process of identification and results from the strong federal structure in Germany.

"In other words, the fact that some of the states have very different administrative structures and that the responsibilities are also regulated very differently means that this is very complex for such a technical system. And so far, there is no comprehensive, standardized technical system to solve this problem of determining responsibilities." (Anonymous interviewee 8, 2021)

This issue is partly solved by the DVDV (Deutsches Verwaltungsdiensteverzeichnis (German Administrative Services Directory)), which enables the identification of sender

[2] The author could not identify an appropriate English equivalent.

and recipient for a public service. Based on the DVDV address, data packages can be sent safely and legally compliant between departments, supported by the technical protocol standard OSCI-Transport. For this purpose, the XÖV standard was developed. It is the standard defining the form and content of the data packages to assure the transport of it. Nevertheless, so far there only exists a limited set of XÖV standards for public services. This challenges the EfA approach insofar as for all other services a XÖV standard must be developed. Not only is this defined as a rather time consuming and grand project which will be hard to finalize before 2022, but one must further identify a federal state taking over responsibility for the development.

"If I have a XÖV standard I can access this infrastructure. I can say, great, I have an XÖV standard, I would like to be deposited in the DVDV. The problem is that doesn't exist for everything. There is no XÖV standard for every administrative act." (Anonymous interviewee 6, 2021)

"In the DVDV, there are currently registered only, I think, the foreigners' authorities, the residents' registration authorities, the registry offices and the maintenance advance offices. That is, first there would still have to be done technical rework so that there is an entry concept initially. And then, of course, everyone needs the appropriate certificate so that they can also collect and decrypt the messages in this OSCI Intermedia. Then, of course, there is the technical issue again, even if you can then pick up the messages, the XÖV interfaces are often not yet available, and then a generic XFall arrives. The question is whether this can simply be processed further in the procedure. Probably not at the beginning. And then you will have to turn what comes in into a PDF and first manually process that." (Anonymous interviewee 4, 2021)

Moreover, while there exists only a limited number of XÖV standards, there remain several standards developed on the municipality and federal states levels individually.

"There are different standards that have been used, and merging these different standards is actually not very easy. That always means that we have to look at the application program interfaces between the federal states, that a lot of effort has to be put into making the different systems fit, and especially under EfA we expect that." (Anonymous interviewee 3, 2021)

Besides OSCI there exist additional data routing options such as XTA and FIT-Connect. All of them have their weaknesses which challenge the realization of the EfA approach (Anonymous interviewee 8, 2021). First, the OSCI infrastructure is not equally well developed across the federal states. The different preconditions of the federal states imply a high future administrative investment (Anonymous interviewee 8, 2021). Further, FIT-

Connect is at present not finalized and no data is available on its functionality and performance. So far, FIT-Connect can therefore not be used (Anonymous interviewee 8, 2021).

Further, a parametrization challenges has been identified. Through parametrization all relevant elements and features of a service regarding the specifications of a municipality or federal state are identified and summarized (Anonymous interviewee 1, 2021). This is especially important for software developers and to enable customization of the provided services. However, there does not exist a form of register which summarizes all elements (Anonymous interviewee 8, 2021).

"Many online services need to be parameterized, e.g., information about the authority, charge level, threshold and limit values, and there is still no uniform methodology or uniform data sources. This means that, for example, using municipalities many different parameterization environment of the individual online services must be served." (Anonymous interviewee 8, 2021)

In Germany the federal level is creating the laws; local levels, however, have the freedom of interpreting the law. Hence, every public administration has developed solutions according to what they interpret as to be most appropriate for a service. This results in a diverse landscape of different forms with different data fields. Consequently, municipalities and federal states, as well as their departments, have different levels of digital maturity.

"The fact is that not every federal state has the same structure, and countries also currently have very different levels of maturity, that is digital levels of maturity." (Anonymous interviewee 1, 2021).

This situation challenges the realization of the EfA approach to that extent that AL have different expectations of the service delivered by the UL or have varying experience in developing services that would in line with the expectations of departments with a high digital maturity and capable of integrating services into their existing infrastructure.

"In some areas, any standardization was completely disregarded at the beginning, which has since been put into perspective a little bit, but yes, I think this is a challenge for every federal state because they have to design completely new processes." (Anonymous interviewee 8, 2021)

4.2.4 Legal Challenges of EfA

There are two great legal challenges that have to be faced when realizing the EfA approach. All of them were mentioned by eight interviewees. The jurisdiction and application of the current law challenge EfA as the law either implying a high administrative effort or requiring a change of laws. The two laws that are referred to (1) data security (Datenschutz) and (2) public procurement law (Vergaberecht). Below, these are first introduced, followed by underlining their way of challenging EfA.

In terms of data protection, according to the law only the body responsible for processing the application is usually permitted to process these application data by the statutory regulations (Anonymous interviewee 7, 2021). However, as EfA aims at developing, operating and hosting services only once centrally, the data are collected and processed also only at one location.

"Normally, this is the case when I process user data as an IT service provider, this is the case (...). I'll stay with BAföG[3] as an example. When you fill out the BAföG application, you enter your name, your address, a whole lot of highly sensitive data that run through the IT service provider's computer center. They process this data, IT-wise. However, the IT service provider does not own this data and is not authorized to collect it; authorized is the BAföG office." (Anonymous interviewee 6, 2021)

Staying with the example from the interviewee, as the IT service provider collects the data from the BAföG application in a centrally operated service, outside of federal state or the regional authority, and forwards this data to the BAföG office for processing the application, then this is data processing for which there is initially, legally speaking, no legal authorization according to the GDPR.

"You can get around the fact that you have no legal basis for the data processing by saying that the authority responsible for processing this data, and which therefore has a legal basis for processing this data, commissions you as the institution that operates this centrally hosted service with this data processing. This is data processing on behalf of the competent authority, and you do not need a legal basis or consent for this, because you are only doing this on behalf of the competent authority. However, this means that if they now centrally host a service and potentially up to 11,000 participants in Germany can and should use this service, then as service provider they actually have to conclude contract data processing agreements as a service provider with 11,000 municipalities.

[3] Bundesausbildungsförderungsgesetz: is the agency that processes applications for government assistance to students and pupils for their education.

That's not quite as practical, and it's also cumbersome, because you have to do that for every service you offer." (Anonymous interviewee 7, 2021)

While the challenge of data protection is being solved, a new administrative challenge arises, which is impossible to handle. For this the interviewees voiced the need for a more practical solution to ensure data protection and assure defined jurisdiction and application of the current law.

The second legal challenge results from the public procurement law, which represents a licensing obstacle. When digitizing public services, the resources of public authorities, especially expertise regarding project management and IT, are not always sufficient. Thus, the missing expertise is brought in from outside, through consultancies, IT service providers or other supporting organizations (Anonymous interviewee 3, 2021). In the case of EfA this implies the following. Federal state A develops an EfA service with its IT service provider. As this service costs money for the operation and maintenance, the federal states and municipalities reusing it must pay for the service, according to the agreed model. Hence, the service is offered as a SaaS rather than open source.

"Now, however, the federal state or the municipality cannot simply reuse this service without having to comply with procurement law; instead, they would actually have to strive for a contract award procedure. Of course, this is hardly feasible, which is why it is necessary to organize how the individual regional authorities can manage such a subsequent use of an EfA service in compliance with procurement law without running into problems under procurement law. This needs to be clarified." (Anonymous interviewee 7, 2021)

The federal level has already developed a solution, the FIT-Store, which itself is not free of limitations.

"The model of the FIT-Store solves the obstacle well in the way that it was said we adapt the whole procurement law to the so-called in-house capability of the model. In-house capability insofar as it is said that we have here the 108 GWB and section 6 there and then the FIT-Store can profit insofar as the sponsors of the FITKO, federal and state governments, can here act free of procurement law. And that then makes the exchange above board concerning individual benefits, thus making it relatively simple to grant, to stop, to pay out the benefits without touching the procurement law. Basically, however, this has left a gap that still needs to be closed at the moment. Namely, how do we now deal with the question how we can also let the municipalities benefit, because in-house allocation is only possible if we do it through the sponsors of FITKO, that is, the federal

and state governments. The municipalities, however, are not sponsors of FITKO." (Anonymous interviewee 3, 2021)

This also means if federal state B as AL reuses the EfA service in compliance with procurement law, the municipalities cannot automatically reuse the service without executing their own tendering procedure (Anonymous interviewee 8, 2021). This would only be possible if the federal state is bearing the costs of the service for all its municipalities. However, for now this seems to be too risky for them as they cannot estimate the upcoming costs of such a service (Anonymous interviewee 3, 2021). Hence, the public procurement law remains a challenge for the realization of the EfA approach.

An additional challenge concerns the requirement of written form (Schriftformerfordernis), which is the requirement to hand in an application in a specific written form, otherwise it cannot be processed, legally speaking. An example would be:

"If you have a road haulage company, you need a permit for each transport, for each vehicle. And there is explicitly stated in the law, that this must be printed on yellow paper of at least 400 grams per square meter with the following form to be used and this must in any case be personally collected, delivered etc." (Anonymous interviewee 4, 2021)

This challenge applies as well in the general process of digitizing the public administration. An added complication is that there sometimes are uniform federal laws, but the enforcement lies with the states and the tasks in turn fall to the municipalities (Anonymous interviewee 5, 2021). Hence while the above example might be applicable for federal state A, the regulations can differ in federal state B. Always only to a certain extent and in the boundaries of the given law, but due to the freedom of scope the application form can differ.

"We now have to look at our standards and where written form requirements are formulated, we have to get them out of the legal regulations so that a digital application is also possible." (Anonymous interviewee 7, 2021)

The distinct interpretation of laws leads to two other challenges to EfA services. First it must be assured that the EfA service is in line with the current law of the federal state using the service subsequently. Afterwards, in case a federal state changes a federal state law, the applicability of the service has to be reviewed (Anonymous interviewee 8, 2021). Second, the laws also define the level of authentication that is necessary for the respective service. For example:

"Federal state A says we need a high confidence level for the driver's license in any case, and federal state B says we should substantially reduce it, while federal state C says we

should do it under the normal confidence level. (...) But the quintessence of the whole thing is that you have to hang on to certain trust levels somewhere centrally." (Anonymous interviewee 4, 2021)

This challenges the realization of the EfA approach insofar as, if the level of confidence differs across federal states for one service, an agreement on a unified level must be found so that every federal state is able to use the service subsequently.

Lastly, AL and UL conclude an administrative agreement. However, the question remains open whether federal states can exit these agreements, for example if a municipality only wants to use the EfA service temporary. Some municipalities are already in the process of developing their own procedures which might be further developed digitally and more suitable for them than the EfA service. Nonetheless, until this service is finalized, they want to use the offered EfA service (Anonymous interviewee 4, 2021).

4.3 Perceived Opportunities of EfA

As EfA is regarded as 'the' opportunity to achieve a sustainable and accelerated digitization in Germany, an additional question was added to the interview guide. This decision was motivated by the preliminary interview, in which the interviewee already stressed the high potential of EfA. It was validated further in the course of the main interviews as most interviewees highlighted the importance to not only talk about the challenges, but include the opportunities as well. However, it should be noted that the following results are not based on a theoretical foundation and cannot be defined as comprehensive or complete, as only one final question addresses the topic. Nonetheless, the author is convinced that they are important enough to be included and can provide an important basis for further research. Hence, this chapter aims to summarize the relevant results from the interviews.

"It is important to me that you also take into account the opportunity that EfA simply presents. […] I would even go so far as to say that this (EfA) is the only chance we have of achieving completely digitalized citizens' offices." (Anonymous interviewee 7, 2021)

"I would also like to emphasize the opportunities which this brings with it. I already mentioned earlier that this is something historically unique that we can experience - this cross-level cooperation between the federal government, the states and the municipalities has never existed before." (Anonymous interviewee 3, 2021)

First, EfA is viewed as a chance as it strengthens the user centricity and the right of every citizen to receive the same quality of service across the nation. More resources can be focused on one thematic field of services, which enables the use of user experience design

in the development of services (Anonymous interviewee 4, 2021). Furthermore, until now it was highly dependent on the place of residence which level of service one would receive. EfA enables the provision of equal levels of services across the nation and therefore avoids discrimination.

"But what good does that do me if a service is offered digitally in city A? That doesn't even help the neighboring district [...] I believe that this is definitely a booster, so to speak." (Anonymous interviewee 2, 2021)

Second, while EfA presents financial challenges regarding the ambiguity and distribution of costs, it was stated that EfA is a chance to save resources as everyone is collaborating and splitting the work among themselves (Anonymous interviewee 4, 2021). Hence, not each actor has to digitize the 575 OZG services or rather 4,500 individual services for themselves but can rather focus on thematic field of responsibility (Anonymous interviewee 7, 2021).

"Of course, you could always say that everyone somehow does his own thing. Then we would have many parallel processes in Germany that would tie up many resources, both financially and in terms of personnel. And it is precisely through EfA that we have a relief of finance and personnel." (Anonymous interviewee 3, 2021)

Lastly, EfA is considered to be a chance to break down existing silos and lead to more coordination between the federal states, between municipalities as well as federal level and federal states (Anonymous interviewee 3, 2021; Anonymous interviewee 4, 2021). As mentioned, this is the first time that there exists such a collaboration between the different levels and departments. Hence, these interviewees see EfA as a chance to learn to work together and get to know each other.

"And rather than, because you have had no contact, grumble about each other and complain, then it is somehow easier to just pick up the phone or write an email or whatever." (Anonymous interviewee 3, 2021)

Not only does one know the person of contact, but EfA is also seen as an opportunity to establish lasting coordination structures that grow beyond the topic of digitization.

"Perhaps this also has spill-over effects into other areas. I think that people in these federal states have thought far too much in silos. Because people have always been afraid of this coordination and back and forth. People are always afraid of chaos. But with EfA, chaos is created first." (Anonymous interviewee 1, 2021)

Additionally, the lessons learned from EfA can be used later, to achieve and optimize the spill-over effect of coordination, leading to a lasting improvement of the public sector.

"And I think that we have now opened the door at least a crack with the digitization of public administration. This is a good blueprint that can also be used for other processes far away from public administrative digitization." (Anonymous interviewee 3, 2021)

Especially the COVID-19 crisis has demonstrated that it is important for different departments, such as the local health authorities, that not only the staff can communicate among each other but also the IT systems, thus breaking down existing silos.

"Because EfA naturally also promotes standards and harmonization, promotes interoperability." (Anonymous interviewee 7, 2021)

However, it has to be stated that the answers generally were not overly optimistic. While all where convinced that EfA will strengthen cooperation between the different authorities and build an important basis for further collaborative development and division of work, some were skeptical whether EfA was the best solution here. In view of the OZG deadline (end of 2022), EfA was seen more as an interruption of the ongoing process that had just started to run smoothly in some federal states, and rather as adding new challenges to the already complicated digital transformation (Anonymous interviewee 9, 2021).

5 Discussion

5.1 Summary of Main Findings

The purpose of the present thesis was to identify the challenges of the EfA approach employed to foster digitalization in Germany. This objective was chosen after the approach started to be increasingly used and attract attention following a financial support from the federal government. The paper aims to reveal the challenges at an early stage as well as to give an overview of the existing challenges so far. To answer the proposed research question *What are major challenges of realizing the EfA approach?* an explorative single case study was chosen, as it is considered an appropriate approach to study objects in-depth, especially in less researched areas and contemporary phenomena (Mabry, 2012; Yin, 2018). Three sources, observation, documentation, and semi-structured interviews, were used for data collection and analysis. The challenges identified through the literature review guided the semi-structured interviews. Hence, the inventory list was used as well for the data analysis and the structure of the empirical results. For conducting the structured content analysis, the software MAXQDA was used, whereby the interviews were coded iteratively.

The results of the research can briefly be summarized as follows. EfA means that a federal state or alliance of federal states is developing and operating a service centrally. Afterwards, it will be made available to other federal states and municipalities for subsequent use. Challenges of EfA were identified in all four categories, based on the conducted interviews. However, it has to be taken into account that the results are constrained by the point of time the interviews were performed. Up to the present none of the interviewees have taken part in a successful subsequent realization of the envisaged digitalization under EfA nor does there exist such a case. Hence, the results are based on present challenges regarding the development and search for suitable services as well as assumed challenges, based on the experts' knowledge. Therefore, it is possible that more challenges occur during the further course, and other challenges identified in this paper will not prove relevant. Nevertheless, the author is convinced that the research question can be answered despite the limitations and will provide useful knowledge for further research and has practical implications.

Under the organizational and strategical aspects several challenges were stated by the interviewees. The biggest challenge identified here was the lack of strategy to address and include the municipalities. Up to now it has not been specified how the municipalities can make usage of the EfA services, what their role in the development will be, how the implementation will be financed and processed legally compliantly. Other challenges

addressed the ambiguity of the future process after 2022 because the recovery package solely supports the development of EfA services only until then. After all, at present no decision has been made, for example, whether there will be further financial funding or new laws and requirements. Further challenges regarding accountability and responsibility could also be identified. Among them interviewees highlighted the challenge of handing over responsibilities. So far federal states and municipalities have worked according to their structures and processes. They are convinced that their way of doing things, is the best possible. Handing over responsibility and so partly losing control over the process and the result of digitizing a service is thus identified as a challenge. Even though they will be able to cooperate and be part of the development processes, which requires increased coordination as well as compromises, federal states will have to trust each other, in that others can create suitable digital services as well. This is interrelated with another organizational challenge, missing shared mindset and diverse interests. It results from a lack of experience in horizontal as well as vertical coordination. So far, there have existed no structures and processes for the purpose of coordination. Additionally, as already mentioned, every federal state has their own established structures and processes, which now must be merged with those of other states.

The challenges identified in the technological category mostly result from either missing, diverse, complex, or the multiplicity of IT infrastructures in Germany. Because of the existence of, for example, 17 user accounts and multiple and diverse specialized procedures and specialized procedure providers, the creation of API is a major challenge. While this does not simply require intense efforts in coordination due to the heterogeneity of specialized procedure provider in the federal states, it is further unresolved who will be responsible and bear the cost. In this way the challenge is also connected to the organizational dimension. Data routing was identified as an additional great technological challenge for several reasons. While there exists an XÖV standard for systematic data transfer within the public administration, so far it does not exist for all public acts. Although the DVDV, the German authority dictionary, can be used for the identification of the sender and receiver one can only be registered in the DVDV, however, if there exists a standard. Hence, the first challenge of the data routing is to identify where the application data must be sent to. Further, while there are different transmission components to assure that data are encrypted and reliably delivered, they are not without limitations. Like DVDV and XÖV, the OSCI-transport has not been expanded nationwide. Another transmission component is the FIT-Connect; however, it has not been finalized and is therefore not yet in use. Lastly, as every municipality has their own emblem, color code, layout etc., the design of the EfA service should be adaptable depending on in which municipality the application is filled in. So far there does not exist a standardized data set which summarizes all the information required. Taking all this

into account, the conclusion can be drawn that the main technological challenge is the lack of standardization and interoperability.

Thirdly, under the financial aspect of challenges regarding adaption costs were mentioned the most often. In this case, transition is defined as the connection and implementation of a developed EfA service in other federal states. As shown above, appropriate standards and API must be created for a successful realization of the EfA approach. However, it is neither clear how expensive the connection will be nor who will be responsible for paying it. Further, as there exist no reference example, there is ambiguity about future costs, especially regarding the operation, enhancement and support. As in contrast to the early stages EfA services are scaled up, it is assumed that additional and unknown costs will arise. Another question stated as a challenge was the lack of human resources and expertise. While this challenge was not identified in the research background, it was still considered as relevant as it was mentioned by five sources. It refers on the one hand to the need for additional human resources for developing and implementing the EfA service. Not only public authorities require more staff, but also IT service providers. At the same time there exist only a limited set of people on the market holding the required expertise. Hence, there is a competition for them.

Lastly, several legal challenges were stated. The jurisdiction and applicability of the public procurement law was mentioned by nine sources. This presents as a challenge because EfA services are offered as SaaS and hence the federal states pay the other one for the use of it. This entails that a country wants to reuse an EfA service, it must follow an official tender process to comply with the procurement law. This is accompanied by high administrative efforts, and in general judged as not feasible. While there is one proposed solution that all EfA services might be offered as an in-house product, which is the FIT-Store offered by the FITKO, they can only be used by the federal states. Municipalities will not be able to benefit, as they are not part of the FITKO. Consequently, the challenge remains. The data analysis revealed further challenges regarding data protection and compliance. As the EfA service is hosted and operated centrally and only once, the authority officially processing the data must give the IT service provider or any other authority responsible for hosting the service permission to do so. Therefore, commissioned data processing contracts must be signed between the parties involved to comply with the data protection regulations. However, as the first legal challenge, this entails a high administrative effort. For each service, each of the 11,000 municipalities must sign a contract with, e.g., the IT service provider. This would mean an additional organizational as well as financial challenge, as it requires financial and human resources. Other legal challenges, such as requirement of written form, ensuring accountability of service provider and data ownership were also identified.

Nonetheless, while this study focused solely on the challenges, all interviewees stressed the opportunities of the EfA approach. While one interviewee would go so far to say that EfA is the only opportunity for a sustainable and accelerated digitization in Germany, others where rather skeptical regarding its positive effect. However, all interviewees are convinced that EfA has a positive long-term effect on the collaborative development of different departments. As the interviewees state this to be the first time that simultaneously a vertical and horizontal coordination takes place in Germany, they express hope that EfA will build a foundation for future collaborations. Based on the lessons learned, these could also be expanded to outside the topic of digitization.

Even though the thesis is not free of limitations, it still provides for future research. It follows a discussion of the results in light of the research background (Chapter 2.2 and 2.3). Further, the theoretical and practical contributions of the present paper as well as its limitations and suggestions for future research are discussed in the following.

5.2 Discussion of the Results Considering the Research Background.

5.2.1 Setting EfA in the Context of Public Sector Coordination Literature

In order to get a clear vision on the collaboration mechanisms used, EfA in the context of public sector coordination will be discussed here. Looking at the case description of EfA it becomes visible that most of its goal and composition are associated with the concept of coordination and collaborative development. EfA aims to serve a higher goal in fostering digitalization as one or an alliance of federal states develop a service which can be subsequently used by the others. It is assumed that this would lead to cost, resource, and expense reduction. Hence, one could argue that EfA rather follows the approach of a positive and strategic coordination, seeking for a solution suitable for all participants as well as the coordination required to reach the broader goal (Peters, 2018). As interviewees stated, in the past the IT landscape has been rather fragmented, and most issues resulted from a lack of coordination. It can be assumed that EfA will now lead to an increase of collaboration and hence a less fragmented IT landscape.

One could argue too, that further complexity is added to the process of coordination with EfA not only requiring horizontal coordination but also vertical. Horizontal coordination takes place between different departments and organizations on the same level (Bouckaert et al., 2010). The results of the analysis suggest that EfA requires on the one hand close collaboration between a diverse set of departments in one federal state, for example the department for digitalization and the department for integration politics. Further, it needs these departments to closely collaborate with other departments outside their federal state. Additionally, vertical coordination is required. Vertical coordination across levels is

needed as the municipalities must be included. They mostly execute the service, and the federal level must be involved as well, as they do not simply provide the financial benefit, but also expertise, as stated by interviewees (Bouckaert et al., 2010). A further requirement is that EfA should mostly be used when the law or its interpretation is similar among the actors involved; this usually applies for the laws passed by the federal government. Findings suggest that laws must be adapted to realize digitalization and especially EfA, thus it is essential to coordinate with the federal level. Furthermore, as argued by Boudreau and Bernier (2017), vertical coordination or governance is required as it provides the ability to manage collaboration and provide a clear framework. This can, for example, happen through centrally provided interoperability standards (Boudreau & Bernier, 2017). While in theory EfA includes vertical coordination in elements such as the FIT-Store or FIT-Connect; in practice, however, so far these standards do not exist so far, which results, again, in isolated solutions.

The approach chosen for the EfA model introduced with the recovery package mostly overlaps with the NTM. However, overlaps can further be identified with the MTM and HTM, which supports the statement that the mechanisms should not be viewed separately and are used in combination (Bouckaert et al., 2010). In the following EfA will be discussed in the light of the three coordination mechanisms (see Chapter 2.2.1).

The overall framework of EfA consists of the financial aids for federal states, coupled to minimum requirements. While it is not possible for the federal government to use its authority to steer the process of digitization entirely, it still can make use of laws and budgets as control strategies. Hence, power in the case of EfA is exerted through the provision of financial resources. Based on the rules to which the monetary resources are bound, the government can control the ongoing development of the digitization process. Simultaneously it also has to be noted, as stated by Bouckaert et al. (2010), that the public sector requires rules that function as a guidance in governing processes. However, in other studies using the same trilogy such as the one from Chantillon, Crompvoets, and Peristeras (2017), it was stated that there is too much authority and wishes for more autonomy were expressed. Interviewees in the present study as well reported issues regarding a lack of autonomy, rules and especially centralized standards. It can therefore be argued that an HTM was rather used to promote a network approach to realize EfA services.

As already stated for the case of EfA only a limited usage can be made of HTM since EfA solely sets financial incentives rather than take over full control, and organizations are still capable to determine the realization of EfA themselves. NTM can on the other hand be identified as the dominant mechanism in the realization of EfA. While the

financial aid, the minimum requirements as well as the published guide on EfA (Wegweiser) provide incentives and guidance from the federal level, it is due to the federal states to decide if they make use of these. Further, a certain freedom of design is left with the federal states. It can be rather argued that their interaction is voluntary, and collaboration happens through resource exchange, in the form of exchanging services for example. However, Bouckaert et al. (2010) highlight the importance of mutual trust for NTM to be successful, which requires time to develop. As findings revealed, so far there does exist a lack of trust between the participants. It can be argued that this is caused by the so far mostly non-existent collaboration between the governments. Hence, one could claim that in view of the time limit of the realization of EfA a network approach is not completely appropriate as it needs time to establish stable patterns of cooperative interaction. As discussed in the paragraph above, more hierarchical elements could support the process and reduce challenges.

Lastly, the MTM will be discussed. Based on the results of the data analysis it can be concluded that EfA does not make use of methods of the market mechanism. While the price, and moreover the aspect of profitableness, is a determining factor for the AL to subsequently use a service developed by the UL, many other elements of MTM do not overlap. The EfA approach plans to have one provider and many purchasers, in MTM around an equal number of both are required for coordination by price mechanism and competition. This constrain of EfA leads to a lack of freedom of choice from the user side. Until now it is planned to have only one EfA service, and not multiple ones competing against each other. One interviewee highlighted this as a challenge. This interviewee further stated that so far it is not clear whether participants can enter or exit a contract, meaning that a municipality or federal state cannot choose to use a service only temporary. Lastly, as extensively described by interviewees there exist no transparency regarding the prices and quality of the EfA services. The respondents do not view the minimum requirements as sufficient to fulfill performance expectations.

5.2.2 Challenges of Public Sector Coordination Tools (Shared Services and SaaS) Applied in the Context of EfA.

The following chapter aims to discuss the analysis results by comparing them to the suggested challenges in the public sector coordination tools shared services and SaaS found in the scientific literature.

In scientific literature, Janssen and Wagenaar (2004b) outlined the issue of identifying suitable services to be shared. They highlight the importance of the need of input from expertise in three fields, technological, business processes, and architecture. As findings

have revealed, identifying services suitable to be developed and operated as EfA services is difficult and time consuming. While there is clear guidance on the criteria an EfA service should meet, it rather needs extensive knowledge for a decision to be made. As discussed by Janssen and Wagenaar (2004b) this is important to ensure that the services can be implemented and integrated into existing IT architectures. In the context of EfA, this is not only time consuming but also complicated as it is rather difficult to collect all the required information and find experts in each field. This requires a lot of effort in communication among the federal states and municipalities. An aspect not covered by scientific literature is the prioritization of challenges. As through EfA there is one provider and many users, users are dependent on the prioritization plan of the provider. Hence, the provider (a federal state in this context) could choose a different prioritization for the development of services than the one required by other federal states. As there do not exist multiple providers on the market, the users can only choose to either develop the service on their own costs or wait for the EfA service to be ready for subsequent use.

These findings are consistent with the previous scientific literature, where as a possible challenge of SaaS is the wait-and-see attitude (Haag et al., 2014; Nezhad et al., 2009). As the services which must be digitized according to the OZG by the end of 2022 are divided by thematic fields for which a federal state holds the lead management, other governments feel less responsible for developing the services, as they could be offered as an EfA service. One could argue that thereby resources are saved and one's reputation is not endangered (Nezhad et al., 2009). While in scientific literature there does not exist a suggested solution for the later issue, Janssen and Wagenaar (2004b) propose group support systems to support the process of identifying fitting services[4].

Besides the wait-and-see attitude, other challenges regarding accountability and responsibility were identified in the course of this thesis scientific literature and data analysis. Literature discussed in the research background only set a minor focus on missing or unclear contact persons, or the lack of defined responsibilities for communication. Because organizations used to rather operate in silos with their own strict structure of accountabilities, there are no established structures of horizontal or vertical communication outside of the organizations (Cooke, 2006; Knol & Sol, 2011). In the context of EfA there is presented a similar challenge. There is no clear guidance on who is responsible for getting in touch with the other parties. Further, it is rather difficult to identify the contact person if information is required (e.g. for the process of service identification), or services are to be bought or sold from other federal states. The reason for this challenge lies in the different structures of federal states and their diverse and

[4] For further information see Janssen, Marijn; Wagenaar, René (2004). Developing Generic Shared Services for e-Government. *Electronic Journal of e-Government*, 2(1), pp. 31–38.

different placing of the digital team. On top of that, multiple communication channels are used. However, as discussed in scientific literature, clarity of roles and contact persons as well as ownership of problems is one success factor for government collaboration (Cooke, 2006; Gil-Garcia, Guler, Pardo, & Burke, 2019). As proposed by an interviewee, the challenge of clearly assigned and allocated responsibilities could be met by a centrally provided communication infrastructure. While these are only considered a minor challenge in theory, Raudla and Tammel (2015) also highlight the challenge of shared accountability. In shared service arrangements, accountability occurs as an issue as there is a lack of clear lines of accountability enabling blame-shifting. These findings are consistent with the results of this thesis, in which it was found that there are unsolved questions regarding the split of accountability as well as issues of who is accountable for errors and ongoing issues.

Findings also suggest that there is so far no clear implementation strategy for the EfA services, neither for the federal states nor the municipalities apart from the question what will happen after 2022, when the recovery package comes to an end and the closing date of the OZG will have been reached. Consequently, many issues are being left unsolved, resulting in an increased effort for the project managers. However, due to the OZG there is time pressure on the federal states to digitize the services, leaving more room for misunderstandings and uncertainties. This challenge was similarly emphasized by Wagenaar (2006), who states that there are two approaches, top-down or bottom-up. While a top-down approach aims to be implemented fast (big-bang), it also must be closely guided and pressurized. A bottom-up approach is rather more incremental than a big-bang, and only soft pressure is applied from the central government. As EfA does not allow for incremental implementation, its ‘strategy’ can rather be defined as big-bang, which carries risks. As highlighted by Wagenaar (2006), due to the pressure and fast implementation, issues cannot be detected in advance. However, while EfA aims to be implemented fast, it lacks a clear strategy of implementation.

What is described by Peters (2018) as a turf issue, that organizations fear their budget, policies or personal to be endangered by coordination, similar could be observed in the analysis of this thesis results. Especially on the level of municipality, people resist to change, and do not see the advantages of digitizing the process but rather regard it as a threat. Analogously, it can be noted that governments on the federal states level do not easily let go of responsibility and control and are rather skeptical that others would develop a service ‘for them’. The participants do not feel assured that the federal state responsible for the service will deliver it according to their standards and expectations. One could argue that there are not solely a lack of shared mindset and too many diverse interests, but that these result from a lack of trust. This challenge was similarly

emphasized by Wouters et al. (2020), Becker et al. (2009) and Boudreau and Bernier (2017). Boudreau and Bernier (2017) describe this issue as “powerful service agencies anxious to retain their autonomy” (2017, p. 611). Here the participants expressed the concerns that there are rarely immediate gains and instead detriments to service and data quality. While it is acknowledged that it is rather difficult to implement and develop solutions in a diverse IT infrastructure, it is also stated that the organizations have to learn to trust each other. However, as noted in the EfA case, trust has so far not been established as only little federal states or departments have cooperated with another. Especially Becker et al. (2009) highlights the importance of prior cooperation between the organizations for the success of shared services. One could argue that as these do not exist, stakeholder and expectation management should be crucial components when realizing EfA (Wouters et al., 2020). Additionally, it has to be pointed out that cooperation is further challenged by the established diverse structures, processes and organizations.

This lack of uniformity is also reflected in the IT infrastructure in Germany; there exists a multiplicity and variety of services among the federal states. But also within a federal state there is a diversity of solutions having each been set up in isolation. These findings are in line with the Knol and Sol (2011) study, where, for example, one interviewee stated that they needed to bring 16 different systems together, which they considered complicated. The study concluded that the required analysis, improvement, standardization and harmonization adds complexity to the development process.

Challenges identified in this thesis result from the complex and diverse IT infrastructures, such as the issue of interoperability which is complicated by the isolated solutions. The lack of interoperability of the services in Germany adds complexity to the development process. To enable data portability, special API as well as other standards must be created that enable every special procedure to connect to the EfA service. As discussed by Tsaravas and Themistocleous (2011), a lack of interoperability otherwise leads to a data lock-in, meaning that data cannot be transferred.

Findings also suggest that interoperability is hindered by the lack of existing of a single and comprehensive repository. This issue was mostly addressed by experts in technology when they stated that there is so far no repository which summarizes all the parameters and information on every municipality, federal state and federal. This would include opening hours and phone numbers, prices and responsibilities of the service as well as the department’s specific layout of websites. This aspect has been observed as well by Boudreau and Bernier (2017). While in theory this issue could simply be solved by creating a single repository by gathering the relevant data, several rounds of negotiations

where required in Quebec to finally lead to such a repository. This delayed the implementation. However, the lack of a single source of all information required signifies a challenge to the data routing as well. One could conclude that a general lack of various standards, which are required especially for SaaS, is missing in Germany so far due to the lack of horizontal and vertical cooperation. Hence, as a first step a basis for EfA has to be developed.

Some findings on financial challenges are in line with insights by Benlian and Hess (2011), who state economic risks or hidden costs as an issue. An example mentioned are costs for customization. Similar, the recovery package solely pays for the development and the first year of operation, and it does not pay for the implementation in the AL. Hence, if there are additional costs incurring due to the requirement of customization for implementing the service, these are not covered. Moreover, when consenting to subsequently use a EfA service, information on these costs is not available. The AL faces the challenge of economic risk and cannot provide the financial resources that are required.

Related to this issue of costs, are the transition costs. In the data analysis several transition costs are identified that have not been covered so far, and add further costs to implementation of such services. These are costs for restructuring of processes, additional hiring of personal for project management, development and implementation purposes and so on. These findings are similarly emphasized by Diez and SIlva (2013) who state that existing systems have to be adapted in order to implement SaaS services.

Similar to the findings of Boudreau and Bernier (2017), who observe the fragmentation of laws in Quebec as a challenge, this thesis also identifies the realization of EfA challenged not only by the multiplicity of the diverse laws but also their interpretation. The EfA service hence has to be developed in such a way that it is either in line with all federal state and municipalities interpretation of federal laws, or laws will have to be adapted.

5.2.3 Perceived Opportunities of EfA in the Context of the Advantages of Public Sector Coordination Tools

This chapter aims to view the findings of the additional added question in the interviews in the context of the provided in the research background. As only one final question addressed this topic, the chapter is rather short. Nonetheless, a discussion of the results on this question was considered valuable for the research.

Many perceived opportunities outlined in the results could be consistently found in the discourse of the literature on shared services and SaaS. Mentioned by several interviewees, EfA is perceived as an opportunity for further vertical and horizontal collaborations. This complies with the theoretical assumption of Becker et al. (2019) that concludes that successful collaborations are conditioned by prior cooperation between the actors. Thus, it can be argued, that the experience on collaborative development gained by EfA will lay determining foundation for the future.

Further, the interviewees mentioned that they hope EfA services will result in reduced costs. This advantage was similarly emphasized in the research background of shared services, e.g. by Janssen & Wagenaar (2004a), and SaaS, e.g. by Tsaravas and Themistocleous (2011). It is argued as fewer things must be done, these can be executed more efficiently and less resources are required overall. Findings reveal as well that duplications will be reduced and interoperability increased by the realization of EfA. Hence, achieving the proposed assets of public sector coordination (Mergel, 2019; Peters, 2018).

5.3 Theoretical and Practical Implications

This paper has made contributions to the existing theoretical literature. First, it adds to the scientific literature on public sector coordination focusing on the collaboration tools of SaaS and shared services. To the authors knowledge there does not exist a broad research synthesizing existing knowledge of these concepts. While there had been multiple studies regarding shared services as a collaborative government structure, literature on SaaS in light of a tool for collaboration has been limited, partly due to the novelness of the concept. Therefore, the paper contributes to a more complete picture. Recent case studies, such as the one from Boudreau and Bernier (2017) on a case in Quebec and, Wouters et al. (2020) on the case of digital invoicing services in Belgium, also aimed to identify challenges of government collaborations. This research contributes to their findings, as contrary to them, the focus was on the collaborative program (EfA), which includes several services and different constellations of actors. Further, the research is broaden by the German case. Thus the main asset of the present paper is its thorough description and scale. Even though different cases as well as frameworks have been used, the results are overlapping with the ones from the present thesis.

Further, it provides insights on the EfA approach in Germany, emphasizing on its realization challenges. Thus, the thesis lays ground for further research in the field of public sector coordination as well as on the EfA approach itself. The present study has highlighted through in-depth interviews the complexity of the EfA approach, and hence public sector coordination strategies to digitize in federalism. Especially the existing

diverse and multiplicity of IT infrastructures, organization structures and processes, which developed over the past years, revealed to be the origin of most challenges.

Lastly, as mentioned the thesis adds a foundation for later research and it can be used to theorize more in-depth on the EfA approach. Either it could be focused on and researched more in-detail one of the four dimensions of challenges, or a similar study could be conducted by 2022. This study could provide insights how the challenges identified in the respective research were solved. Hence, the exhaustive analysis and explanation of the results of this research could be beneficial.

Further, there are important practical implications from this study, for example for public servants and project managers. The research shows that challenges in the organizational and strategical, financial, technological, and legal categories occur in the realization of the EfA approach. The insights gained from this study could be applied to other countries which have also built up a similar advanced bureaucracy and IT legacy systems in the past.

To continue, the study provides a thorough overview of the existing challenges for realizing the EfA approach. A broad range of challenges could be covered, with experts from all three federal levels which additionally are either specialized in technological, legal or organizational aspects of public sector digitalization in Germany. So far, there does not exist such a thorough review. Applying insights from this study, practitioners from the federal level could use the results of this thesis to gain an overview of the challenges and receive support with centralized solutions, where possible; for example, as suggested by an interviewee, a centralized approach to solve the issue of the commissioned data processing could be developed and provided. The results of the paper can provide first guidance on important aspects while developing the solution.

Further, government officials and project managers from the federal states level can benefit from the results in two ways. First, UL can prepare themselves for the development process, collect questions still to be resolved, and acquire additional financial and human resources for solving challenges such as the creation of API. Secondly, AL can also use it as a preparation to form an agenda of things that need clarification. Therefore, the thesis result offers a basis for knowledge transfer and exchange between the federal states. Additionally, a thorough and broad summary of possible challenges is provided, where solutions still need to be found.

Third, a detailed case description and documentation of the EfA approach is offered, which can inform and assist future project managers or public servants developing and implementing EfA services.

5.4 Limitations and Further Research

In spite of following a theory based and structured methodological approach, the current study is not free of limitations which restrict the interpretation and generalization of its findings. As there could no suitable theoretical concept depicting EfA be identified, a guiding inventory list of challenges was compiled by a thorough literature review. Hence, different concepts were used to identify a wide set of challenges that could occur in the case of EfA. A framework which is highly cited and commonly used in the respective literature would have led to a higher validity and a complete picture of the results. The perceived problem was that as concepts could be left out, important challenges of EfA could be missing in the inventory list and so further concepts were considered to be included. However, a comprehensive review of the respective articles and the concepts' challenges in the public sector revealed that no additional challenges could be identified. As a consequence the author considered the inventory list of challenges complete for the scope of this paper. Furthermore, it can be argued that the categories of the challenges were confirmed by the interviewees responses and as all four of them (organizational, financial, technical, and legal) correspond with the dimensions of EfA (BMI, 2020a). Lastly, as the interview questions were formulated openly, the interviewees had room to talk about challenges not mentioned in the inventory list. However, the majority of challenges coming up in the interviews confirmed the theoretical assumptions.

Furthermore, the literature review can be regarded as a category of limitations. First, the choice of the database limited the number of sources identified. Even though the chosen databases Web of Science and Scopus provide a wide range of articles and journals, only a limited set of relevant articles could be indexed. Future research might include additional databases, such as PsychInfo, to identify further resources that are not available in either of the databases used in this study. Moreover, the main research took place in a chosen timeframe from 2010 till now. This frame was set to ensure a degree of recency of research. Still, relevant papers could have been published before 2010 which did not come up in the initial or backward search.

Nonetheless, to cover a larger range of articles Google Scholar was viewed additionally, which led to more relevant sources for this study. However, Google Scholar has a few limitations in itself and there is an on-going debate about its place in research (Haddaway, Collins, Coughlin, & Kirk, 2015). First, literature search in Google Scholar is restricted by only allowing a basic Boolean logic. Hence, the search results are mostly very numerous. Another limitation of Google Scholar is the sorting function of results. Even though it is possible to sort it by relevance or date, it is not transparent by which means

the relevance is judged and ordered (Haddaway et al., 2015). Other databases such as Web of Science allow the researcher to sort by ‘times cited’, hence identifying the most relevant literature in the field. However, as papers from Web of Science or Scopus can be found on Google Scholar, it can be used to identify articles, for example while looking for full text documents (Haddaway et al., 2015). Actually, Web of Science redirects to Google Scholar to look up the full text.

Despite the limitations of Google Scholar, the research is not restricted by its usage in the literature review. First, the present study followed the recommended approach, to screen the first 200 to 300 search results (Haddaway et al., 2015). Reviewing the first results can favour a more extensive search. Simultaneously, Google Scholar can be identified as an additional useful tool for a systematic search of literature when it is not used alone. Lastly, the present study documented the search results in a transparent and systematic procedure, which reduced the limitations of Google Scholar.

As the present paper aimed to be exploratory and so shed light onto a novel and not previously researched phenomena, the research is generic rather than focused. Hence, the result of the data analysis of the documents, observations and semi-structured interviews are limited due to the broad topic. Interviewees answered the questions somewhat perfunctory due to the range and number of questions asked. It was not possible to ask in-depth questions on each challenge, due to the scope of the paper and the capacity of the interviewees. Nonetheless, as the interviewees were experts in different fields, an expert in law answered more question on legal issues, while an expert in IT answered mostly questions regarding technological challenges. Further, as this research could not be based on previous research identifying the most valuable and crucial challenges this required further investigation. This research therefore aimed to fill the gap and give an thorough overview of the existing challenges. Future research now can use this study as a foundation and investigate in-depth each of the challenges. The present study provides a basis for multiple possible future research. For example, future research can at a later point of time conduct an in-depth research on one EfA service. Another perspective would be to only research the marketplace, as a platform for coordination. In sum, even though this research is rather generic, it clearly identified a further need for research on the topic as well as highlights the importance of research in this area.

Another limitation of the research is the time it was conducted in. As mentioned before, when the study was performed the EfA approach was still in its early stages. The public authorities were still trying to figure out how to coordinate and allocate resources. Thus, the examples of services developed and implemented due and with EfA were rather few and consequently reports on hands-on experience from the experts interviewed are

missing. Nonetheless, the results are not exclusively based on assumptions but are based on experiences with ongoing EfA projects. After all, the interviewees are experts in digitalization projects in Germany. Their main job and passion are to work in, coordinate, organize, develop and maintain digitalization projects. Consequently, their statements are based on experience and sound knowledge.

As for the literature review, a structured methodological approach was used as well for collecting analyzing data, especially regarding the interviews. However, the analysis is not free of limitations, as no interviewee confirmation was conducted due to the experts' limited availability after the interviews because of the rising time pressure while realizing the OZG and EfA. The participants declined to review the result of the research, which would have ensured an accurate representation of their statements because they currently experienced high time pressure to finish the EfA projects and prepare for the deadline at the end of 2022. Thus, their suggestions of improvement could not be integrated into the results part. However, as most challenges were confirmed through multiple interview partners or documents, it can be assumed that this limitation has no sever effects on the result. This assumption is supported as the analysis was conducted in a thorough and structured manner.

An additional limitation of the interviews is the provision of the question guide in advance. This could have limited to the research to that effect that the interviewees were biased or prepared the answer they wanted to provide in advance. Hence, there is a chance that not all challenges were revealed, and the advantages provided by semi-structured interviews limited. However, the question guide does not necessarily has a negative influence. Providing a question guide can also give the participants the advantage to reflect on the questions in advance, which leads to a more complete picture of the results.

With some interviewees stating, that they see EfA as an opportunity to enhance vertical as well as horizontal coordination and establish long lasting cooperation's, future studies can aim to determine whether these cooperation's' really did continue or if the only driver was the EfA approach. A similar study, based in the United States of America, revealed that many of the cooperation's are not sustainable over a long time and are defined as unstable (Aldag & Warner, 2018)

6 Conclusion

e-Government has been on the rise over the past years becoming more important for public authorities to invest in. Through IT the public administration can be more efficient and accessible for its citizens (Mergel et al., 2019). However, during the process of digitalization several challenges occur, which mostly result from a lack of coordination. This issue is mostly observed in federalism, as increased coordination on the horizontal and vertical is required. An increased public sector coordination could therefore lead to a more efficient and sustainable digitization. Such a collaborative approach is implemented in Germany. Due to the COVID-19 crisis a recovery package was released in 2020, which included financial aid from the federal state for the development of e-Government services. In order to gain access to the monetary resources, the service must fulfil the criteria of reusability. This model is called EfA, which states that if a service is suitable, it should be developed by the UL in such a way that the AL can subsequently use it. As EfA in its size and scale has not existed so far, and there do mostly not exist prior experiences in collaboration in Germany, the following thesis aimed to research the major challenges of EfA.

To properly answer the research question (*What are major challenges of realizing the EfA approach?)*, a systematic literature review according to Webster and Watson (2002) was conducted. An inventory of possible challenges was derived and classified in four categories: organizational and strategical, financial, technological, and legal. The data was collected through semi-structured expert interviews, observation, and documentation. Subsequently, a qualitative content analysis was performed. Based on the inventory of possible challenges the data sources were coded in the software tool MAXQDA. The analysis revealed several challenges such as: (1) a lack of a clear strategy for the implementation of the services, in the short term mainly on the municipality level, in the long term mainly on the federal states level regarding financing, (2) desire for autonomy of public authorities and lack of trust resulting from an absence of previous collaborations, (3) adaptation to the variety of established structures and processes, (4) development of a shared IT infrastructure based on the multiplicity of existing ones, (5) lack of standards, (6) data routing, (7) lack of a reference example to calculate total costs, (8) fair distribution of costs, (8) jurisdiction and applicability of public procurement law, and (9) fulfilment of data protection requirements . Most challenges were discussed in detail.

Even though this study is not free of limitations, this paper offers valuable insights for German government officials into the challenges of EfA. This paper did not aim to falsify or verify an existing theory, but to shed more light on the newly introduced approach to

collaboration within Germany. Future research can use this study as a foundation for further investigations, answering questions of EfA's profitableness or whether it could contribute and foster collaborative development in the horizontal as well as in the vertical in the long term. Additionally, as this research was conducted at a time when the identification of challenges was based on limited practical knowledge, future research could at a later stage investigate, whether these challenges did happen or if they might be viewed as minor in retrospective.

In all, despite its limitations, the study contributes not only to existing literature on public sector coordination, shared services and SaaS, but identifies as well major challenges in the context of organizational and strategical, financial, technological, and legal categories.

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Innovation for Democracy, Government and Governance. *Lecture Notes in Computer Science* (181-195). Berlin, Heidelberg: Springer Berlin Heidelberg.

Appendix

A List of Challenges and their Origin

Challenge	Shared Services	Software as a Service
Organizational and Strategical		
Identification of services	X	X
Accountability and Responsibility	X	X
Lack of vision, robust business cases and roadmap	X	
Shift of norms	X	
Balance between centralization and decentralization	X	
Less customization opportunities	X	
Diverse interests, missing shared mindset	X	X
Shift of work and transfer of personnel	X	
Reinventing the wheel	X	
Turf issue	X	
Technological		
Availability of Technology	X	X
Complex and diverse processes and IT systems	X	
Reliability of data		X
Data Portability and Interoperability (of legacy systems)	X	X
Performance unpredictability		X
Software licensing		X
Access control and security		X
Identification and authentication		X
Security and privacy		X
Lack of standards	X	X
Lack of technical expertise and experience	X	
Different starting point from their current state	X	
Integration of software from various service providers	X	X
Financial		
Adaption costs		X
Economic risks	X	X
Legal		
Ensuring accountability of service providers		X
Data ownership		X
Quality assurance		X
Jurisdiction and applicability of law		X
Data protection and compliance		X

Source: Author's compilation

Table 0.1 List of challenges and their origin

B Concept Matrix

Article	Search String and/ or source	Applicable concepts			
		FaDT	**SS**	**SaaS**	**PSC**
Aldag, A. M., & Warner, M. (2018). Cooperation, not cost savings: explaining duration of shared service agreements. *Local Government Studies*, *44*(3), 350–370.	"shared services (googlescholar)		X		
Armbrust, Michael; Fox, Armando; Griffith, Rean; Joseph, Antohony D.; Katz, Randy; Konwinski, Andy et al. (2009): Above the Clouds: A berkeley view of cloud computing. *Dept. Electircal Eng. And Comput. Sciences, University of California, Berkeley, Rep. UCB/EECS*, 28(13)	Backward or forward search			X	
Becker, J., Niehaves, B., & Krause, A. (2009, August). Shared service center vs. shared service network: A multiple case study analysis of factors impacting on shared service configurations. In *International Conference on Electronic Government* (115-126). Springer, Berlin, Heidelberg.	"shared services" (googlescholar)		X		X
Benlian, A., & Hess, T. (2011). Opportunities and risks of software-as-a-service: Findings from a survey of IT executives. *Decision Support Systems*, *52*(1), 232–246.	"software as a service" AND "risks" (webofscience)			X	
Boeckeler, G., & Hasecker, A. (2021). Digitale Identitäten – Herausforderungen im E-Government. In C. Etezadzadeh (Ed.), *Smart City – Made in Germany: Die Smart-City-Bewegung als Treiber einer gesellschaftlichen Transformation* (85–94). Wiesbaden: Springer Fachmedien Wiesbaden GmbH; Springer Vieweg.	"herausforderung der deutschen Verwaltungsdigitalisierung" (googlescholar)	X			
Boon, J., & Verhoest, K. (2018). On the Dynamics of Reform Resistance: Why and How Bureaucratic Organizations Resist Shared Service Center Reforms. *International Public Management Journal*, *21*(4), 533–557.	"shared services" AND "government" (scopus)		X		

Boston, J., & Gill, D. (2011). Working across organisational boundaries: The challenges for accountability. In B. Ryan & D. Gill (Eds.), *Future state: Directions for public management in New Zealand* (212–246). Wellington: Victoria Univ. Press.	Backward or forward Search		X		
Bouckaert, G., Peters, B. G., & Verhoest, K. (2010). *Coordination of public sector organizations: Shifting patterns of public management*. Londong: Palgrave Macmillan.	Author or Journal search				X
Boudreau, C., & Bernier, L. (2017). The implementation of integrated electronic service delivery in Quebec: the conditions of collaboration and lessons. *International Review of Administrative Sciences, 83*(3), 602–620.	Backward or forward search				X
Chun, S. A., Luna-Reyes, L. F., & Sandoval-Almazán, R. (2012). Collaborative e-government. *Transforming Government: People, Process and Policy*, *6*(1), 5–12.	"collaborative developement" AND "e-Government" (webofscience)				X
Cooke, F. L. (2006). Modeling an HR shared services center: Experience of an MNC in the United Kingdom. *Human Resource Management, 45*(2), 211–227.	Backward or forward Search		X		
Cordella, A., & Willcocks, L. (2010). Outsourcing, bureaucracy and public value: Reappraising the notion of the "contract state". *Government Information Quarterly*, *27*(1), 82–88.	Author or Journal search	X			
Dhar, S. (2012). From outsourcing to Cloud computing: evolution of IT services. *Management Research Review*, *35*(8), 664–675.	"cloud computing" (webofscience)			X	
Diez, O., & Sllva, A. (2013). Govcloud: Using Cloud Computing in Public Organizations. *IEEE Technology and Society Magazine*, *32*(1), 66–72.	"cloud computing" AND "public sector" (webofscience)			X	
Dunleavy, P. (2008). *Digital era governance: IT corporations, the state, and e-government*. Oxford: Oxford University Press.	Backward or forward search	X			

Gantman, S. (2017). IT Outsourcing in the Public Sector: A Literature Analysis. *Journal of Global Information Technology Management, 14*(2), 48–83.	Backward or forward search	X			
Gauß, V. (2020). The Challenges of Digitalization for the (German) State. In D. Feldner (Ed.), *Redesigning organizations: Concepts for the connected society* (207–214). Cham: Springer.	"digital transformation" AND "federalism" (googlescholar)	X			
Gil-Garcia, J. R. (2012). Towards a smart State? Inter-agency collaboration, information integration, and beyond. *Information Polity, 17*(3,4), 269–280.	Backward or forward search				X
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.	Author or Journal search				X
Haag, S., Eckhardt, A., & Kronung, J. (2014). From the Ground to the Cloud—A Structured Literature Analysis of the Cloud Service Landscape around the Public and Private Sector. In R. H. Sprague (Ed.), *47th Hawaii International Conference on System Sciences, 2014* (2127–2136). Piscataway, NJ: IEEE.	"cloud computing" AND "public sector" (googlescholar)			X	
Hafizi, R., Miskon, S., & Rahman, A. A. (2014). Shared service in E-government sector: Case study of implementation in developed countries. In *2014 International Conference on Advanced Computer Science and Information Systems (ICACSIS)* (75–81). Piscataway, NJ: IEEE.	"shared service centers" AND "public sector" (scopus)		X		
Hafizi, R. (2016). Analyzing sharing experiences in government sector based on shared service perspectives. *Journal of Theoretical and Applied Information Technology, 88*(1), 123–134.	"shared service centers" AND "public sector" (scopus)		X		

Hafizi, R., Rahman, A. A., Miskon, S., Ali, N. M., Abdullah, N. S., & Huspi, S. H. (2017). Transformation of Shared Service Typology Arrangement using Watson ans Mundy's E-Government Framework. *PACIS 2017 Proceedings*, 232.	"shared service centers" AND "public sector" (scopus)		X		
Hildenbrand, T., Rothlauf, F., Geisser, M., Heinzl, A., & Kude, T. (2008, March). Approaches to collaborative software development. In *2008 International Conference on Complex, Intelligent and Software Intensive Systems* (523-528). IEEE.	Backward or forward search				X
Hustedt, T., & Trein, P. (2020). Koordination und Integration im E-Government. In T. Klenk, F. Nullmeier, & G. Wewer (Eds.), *Handbuch Digitalisierung in Staat und Verwaltung* (Vol. 23, 1–10). Wiesbaden: Springer Fachmedien Wiesbaden.	"herausforderung der deutschen Verwaltungsdigitalisierung" (googlescholar)	X			
Jaeger, P. T. (2002). Constitutional principles and E-government: an opinion about possible effects of Federalism and the separation of powers on E-government policies. *Government Information Quarterly, 19*(4), 357–368.	Backward or forward search	X			
Janssen, M, & Wagenaar, R. (2004a). An analysis of a shared services centre in e-government. In: *37th Annual Hawaii International Conference on System Sciences, 2004*, 10.	Author or Journal search		X		
Janssen, M, Kamal, M, Weerakoddy, V, & Joha, A. (2012). Shared Services as a Collaboration Strategy and Arrangement in Public Service Networks. In: *2012 45th Hawaii International Conference on System Sciences*, (2218-2227).	Author or Journal search		X		X
Janssen, M., & Joha, A. (2006). Motives for establishing shared service centers in public administrations. *International Journal of Information Management, 26*(2), 102–115.	Backward or forward Search		X		
Janssen, M., & Joha, A. (2011). Challenges for adopting cloud-based software as a service	Author or Journal search			X	

(SAAS) in the public sector. In *ECIS 2011 Proceedings*, 80.					
Janssen, M., Joha, A., & Zuurmond, A. (2009). Simulation and animation for adopting shared services: Evaluating and comparing alternative arrangements. *Government Information Quarterly*, *26*(1), 15–24.	Backward or forward Search		X		
Janssen, M., & Wagenaar, R. (2004b). Developing generic shared services for e-Government. *Electronic Journal of E-Government*, *2*(1), 31–38.	Author or Journal search		X		
Juell-Skielse, G., Lönn, C.-M., & Päivärinta, T. (2017). Modes of collaboration and expected benefits of inter-organizational E-government initiatives: A multi-case study. *Government Information Quarterly*, *34*(4), 578–590.	Author or Journal search				X
Kersting, N., & Graubner, D. (2020). Die digitale Transformation der deutschen Verwaltung Analysen zu Marktversagen und Daseinsvorsorge in Zeiten der Covid-19-Pandemie. In *Zukunft denken und verantworten* (231-252). Springer VS, Wiesbaden.	"herausforderung der deutschen Verwaltungsdigitalisierung" (googlescholar)	X	X		
Klös, H. P. (2020). *Nach dem Corona-Schock: Digitalisierungspotenziale für Deutschland* (No. 14/2020). IW-Policy Paper.	"herausforderung der deutschen Verwaltungsdigitalisierung" (googlescholar)	X			
Knol, A. J., & Sol, H. (Eds.) (2011). Sourcing with shared service centers: challenges in the dutch government. *ECIS 2011 Proceedings*, 199.	"shared service" AND "government" (googlescholar)		X		
Kuhn, P., Balta, D., & Krcmar, H. (2010). Was sind Herausforderungen proaktiver Verwaltungsleistungen in Deutschland? In *15th International Conference on Wirtschaftsinformatik* (554–559), Potsdam, Germany.	"herausforderung der deutschen Verwaltungsdigitalisierung" (googlescholar)	X			
Lasar, A. (2019). Die Herausforderungen der Kommunen im Rahmen der Digitalisierung. In A. Schmid (Ed.), *Verwaltung, eGovernment und Digitalisierung: Grundlagen, Konzepte und Anwendungsfälle*	"herausforderung der deutschen Verwaltungsdigitalisierung" (googlescholar)	X	X		

(101–111). Wiesbaden: Springer Fachmedien Wiesbaden; Springer Vieweg.					
Lee, S. M., Tan, X., & Trimi, S. (2005). Current practices of leading e-government countries. *Communications of the ACM, 48*(10), 99–104.	Backward or forward search	X			
Malone, T. W., & Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Surveys, 26*(1).	Backward or forward search				X
Mergel, I. (2019). Digitale Transformation als Reformvorhaben der deutschen öffentlichen Verwaltung. *Der Moderne Staat – Zeitschrift Für Public Policy, Recht Und Management, 12*(1-2019), 162–171.	"digital transformation" AND “federalism” (googlescholar)	X			X
Mergel, I. (2021). Digital Transformation of the German State. In S. Kuhlmann, I. Proeller, D. Schimanke, & J. Ziekow (Eds.), *Public Administration in Germany* (331–347). Cham: Springer International Publishing.	Author or Journal search	X			
Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly, 36*(4), 101385.	Author or Journal search	X			
Nezhad H.R.M., Stephenson B., Singhal S., & Castellanos M. (2009). Virtual Business Operating Environment in the Cloud: Conceptual Architecture and Challenges. In: Laender A.H.F., Castano S., Dayal U., Casati F., de Oliveira J.P.M. (Eds.) *Conceptual Modeling - ER 2009. ER 2009. Lecture Notes in Computer Science, vol 5829*. Springer, Berlin, Heidelberg.	Backward or forward Search			X	
Nieves, E., Shockey, C., & Knudsen, E. (2011). Prerequisites for Assessing Whether to Engage in Collaborative Software Development in a Government Setting. *Journal of Information Technology & Politics, 8*(1), 83–92.	“collaborative software development” AND “government” (googlescholar)				X
Paagman, A., Tate, M., Furtmueller, E., & Bloom, J. de (2015). An integrative literature review and empirical validation	“shared services” (googlescholar)		X		

of motives for introducing shared services in government organizations. *International Journal of Information Management, 35*(1), 110–123.					
Peters, B. G. (2018). The challenge of policy coordination. *Policy Design and Practice, 1*(1), 1–11.	Author or Journal search		X		X
Raudla, R., & Tammel, K. (2015). Creating shared service centres for public sector accounting. *Accounting, Auditing & Accountability Journal, 28*(2), 158-179.	Backward or forward search		X		
Scharpf, F. W. (1988). The joint-decision trap: lessons from german federalism and european integration. *Public Administration, 66*(3), 239–278.	Backward or forward search	X			
Scholta, H., Niemann, M., Halsbenning, S., Räckers, M., & Becker, J. (2019). Fast and Federal—Policies for Next-Generation Federalism in Germany. *Proceedings of the 52nd Hawaii International Conference on System Sciences.* 3273–3282.	"e-Government" AND "federalism" (googlescholar)	X			
Schulz, V., & Brenner, W. (2010). Characteristics of shared service centers. *Transforming Government: People, Process and Policy, 4*(3), 210–219.	Backward or forward search		X		
Soalheira, J., & Timbrell, G. (2014). What is Shared Services? In T. Bondarouk (Ed.), *Shared services as a new organizational form*. Bingley, U.K.: Emerald Group Publishing Limited.	Backward or forward search		X		
Tsaravas, C., & Themistocleous, M. (2011). Cloud computing and egovernment: A literature review. In A. Ghoneim (Ed.), *Informing Responsible Management: Sustainability in Emerging Economies* (154–164). Athens, Greece: EMCIS.	"cloud computing" AND "e-Government" (scopus)			X	
Ulbrich, F., Schulz, V., & Brenner, W. (2010). Generic Management Challenges of Adopting IT-Shared Services. *AMCIS*, 271–281.	Backward or forward search		X		
Wagenaar, R. W. (2006). Governance of shared service centers in public administration. In M. S. Fox (Ed.), *Proceedings of the 8th international*	Backward or forward Search		X		

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Wang, S., & Wang, H. (2015). Shared Services Management. International *Journal of Information Systems in the Service Sector, 7*(2), 37–53.	"shared services" (googlescholar)		X		
Wouters, S., Janssen, M., & Crompvoets, J. (2020, August). Governance Challenges of Inter-organizational Digital Public Services Provisioning: A Case Study on Digital Invoicing Services in Belgium. In *International Conference on Electronic Government* (223-235). Springer, Cham.	Author or Journal search				X
Zwattendorfer, Bernd, Stranacher, Klaus, Tauber, Arne, & Reichstädter, Peter. (n.d.). Cloud Computing in E-Government across Europe. In *Technology-Enabled Innovation for Democracy, Government and Governance. Lecture Notes in Computer Science* (181-195). Berlin, Heidelberg: Springer Berlin Heidelberg.	"cloud computing" AND "e-Government" (googlescholar)			X	

FaDT = Federalism and digtial transformation; SS = Shared services; SaaS = Software as a service; PSC = Public sector coordination/ collaborative development

Source: Author's compilation

Table 0.2 Concept matrix

C E-Mail Template for the Request of an Interview

Sehr geehrte [*insert name here if known*],

mein Name ist Julia Kirchner und ich studiere im vierten Master-Semester Public Sector Innovation and eGovernance, welches ein Joint Erasmus Mundus Master Program der Universitäten KU Leuven, WWU Münster und TalTech ist.

Im Zuge meiner Masterarbeit beschäftige ich mich mit dem OZG und EfA. Ich widme mich der Frage welche Herausforderung EfA birgt. Dabei möchte ich gerade jetzt am Anfang der Umsetzung einen wissenschaftlichen Einblick geben welche Hürden bei der Umsetzung auftreten können.

Gern würde ich mit Ihnen zu diesem Thema in einem Gespräch (telefonisch oder per Videocall) austauschen. Das Interview wird ca. 45-60 Minuten dauern, wobei ich dies auch flexibel auf Ihre Verfügbarkeit anpassen kann.

Darüber hinaus kann ich, falls erwünscht, Ihnen die Fragen im Voraus zukommen lassen. Falls Sie an den Endergebnissen der Arbeit interessiert sind, würde ich selbstverständlich Ihnen diese als Austausch zukommen lassen.

Falls Sie Interesse haben laden Sie mich doch gerne zu einem Termin auf Skype, Zoom, MS Teams oder einem andere Medium ein. Ich kann Ihnen die folgenden Zeiträume anbieten: [*insert possible dates here*]. Falls ein anderer Termin Ihnen besser passt, schreiben Sie mir doch gerne, ich bin recht flexibel.

Ich würde mich sehr freuen, wenn Sie mir weiterhelfen könnten und vereinbare gerne einen für Sie passenden Gesprächstermin.

Vielen Dank und Grüße,

Julia Kirchner

Telefonisch erreichbar unter 01737511578

P.S.:

Sind Sie nicht der/die richtige Ansprechpartner*in, würde ich mich freuen weitergeleitet zu werden.

D Information for the Interview and Question Guideline Provided to the Interviewees

Informationen zum Interview am [*insert Date and time of interview*]

Vielen Dank für Ihre Bereitschaft ein Interview mit mir über die Herausforderungen von EfA zu führen. Im Folgenden finden Sie noch eine kurze Einleitung zum Interview sowie den Fragenkatalog auf Seite 2.

Noch einmal zu mir, mein Name ist Julia Kirchner und ich studiere im vierten Master-Semester Public Sector Innovation and eGovernance, welches ein Joint Erasmus Mundus Master Program der Universitäten KU Leuven, WWU Münster und TalTech ist. Im Zuge meiner Masterarbeit beschäftige ich mich mit dem OZG und EfA. Ich widme mich der Frage welche Herausforderung EfA birgt und wie diese angegangen werden können. Dabei möchte ich gerade jetzt am Anfang der Umsetzung einen wissenschaftlichen Einblick geben welche Hürden bei der Umsetzung auftreten können.

Semi-strukturiertes Interview:

Bei dem Interview handelt es sich um ein semi-strukturiertes Interview. Deshalb sind die folgenden Fragen sehr oberflächlich gestellt und dienen lediglich als Leitfaden.

Aufnahme des Interviews:

Gerne würde ich das Interview aufnehmen und werde Sie auch persönlich am Tag des Interviews nach Ihrem Einverständnis fragen. Wissen Sie bereits jetzt, dass sie dem nicht zustimmen, würde ich mich über eine kurze Mitteilung freuen. Das würde es mir ermöglichen, mich entsprechend darauf vorzubereiten. Eine Aufnahme wäre hilfreich, da sie mir ermöglicht inhaltlich nicht auf meine Notizen vertrauen zu müssen und alles genau wieder geben zu können. Selbstverständlich wird die Aufnahme nach erfolgreicher Transkription direkt von allen Speichermedien gelöscht.

Anonymisierung:

Das Transkript des Interviews wie auch meine Masterarbeit wird komplett anonymisiert. Das heißt weder auf Sie als Person noch Ihre Organisation wird in einem Dokument verwiesen. Falls Sie wünschen, nicht anonymisiert zu werden, teilen Sie mir das gerne mit.

Ich freue mich sehr auf den Austausch mit Ihnen.

Fragenkatalog:

1. Stellen Sie zu Beginn sich, Ihre Organisation und Ihre Rolle in Bezug auf das OZG und EfA kurz vor.

2. Wo sehen Sie bei der Anwendung von EfA die größten Herausforderungen?

3. Welche organisatorischen und strategischen Herausforderungen gibt es Ihrer Meinung nach?

4. Welche technologischen Herausforderungen gibt es Ihrer Meinung nach?

5. Welche ökonomischen Herausforderungen gibt es Ihrer Meinung nach?

6. Welche juristischen Herausforderungen gibt es Ihrer Meinung nach?

7. Zwar haben wir jetzt nur über die Herausforderungen geredet. Trotzdem als abschließende Frage, überwiegen die Chancen von EfA den Herausforderungen? Und kann EfA somit zur nachhaltigen und beschleunigten Digitalisierung in Deutschland beitragen?

8. Haben Sie abschließend noch etwas das wir nicht im Interview behandelt haben, Sie mir aber gerne noch mitgeben möchten?

E List of Data Used for the Content Analysis

Interviews

#	# of interviewees	Date	Length	Medium	Topic
1	1	03.05.2021	01:03:38	Zoom	Challenges of EfA
2	1	06.05.2021	01:03:23	MS Teams	Challenges of EfA
3	1	06.05.2021	00:46:43	Phone Call	Challenges of EfA
4	2	07.05.2021	00:58:47	Zoom	Challenges of EfA
5	2	10.05.2021	00:42:59	Webex	Challenges of EfA
6	1	10.05.2021	01:03:55	Skype	Challenges of EfA
7	1	11.05.2021	00:45:07	Phone Call	Challenges of EfA
8	1	12.05.2021	00:53:20	Skype	Challenges of EfA
9	2	18.05.2021	00:53:20	Skype	Challenges of EfA
10	1	18.05.2021	00:44:30	Skype	Challenges of EfA
11	1	06.04.2021	01:05:42	MS Teams	Preliminary Interview

Source: Author's compilation

Table 0.3 List of interviews used for the content analysis

Observation

#	Date	Length	Medium	Topic
1	30.04.2021	01:00:00	Zoom	EfA im Praxischeck – Welche Hürden stehen im Weg? Welche Chancen werden realisiert?

Source: Author's compilation

Table 0.4 List of observation used for the content analysis

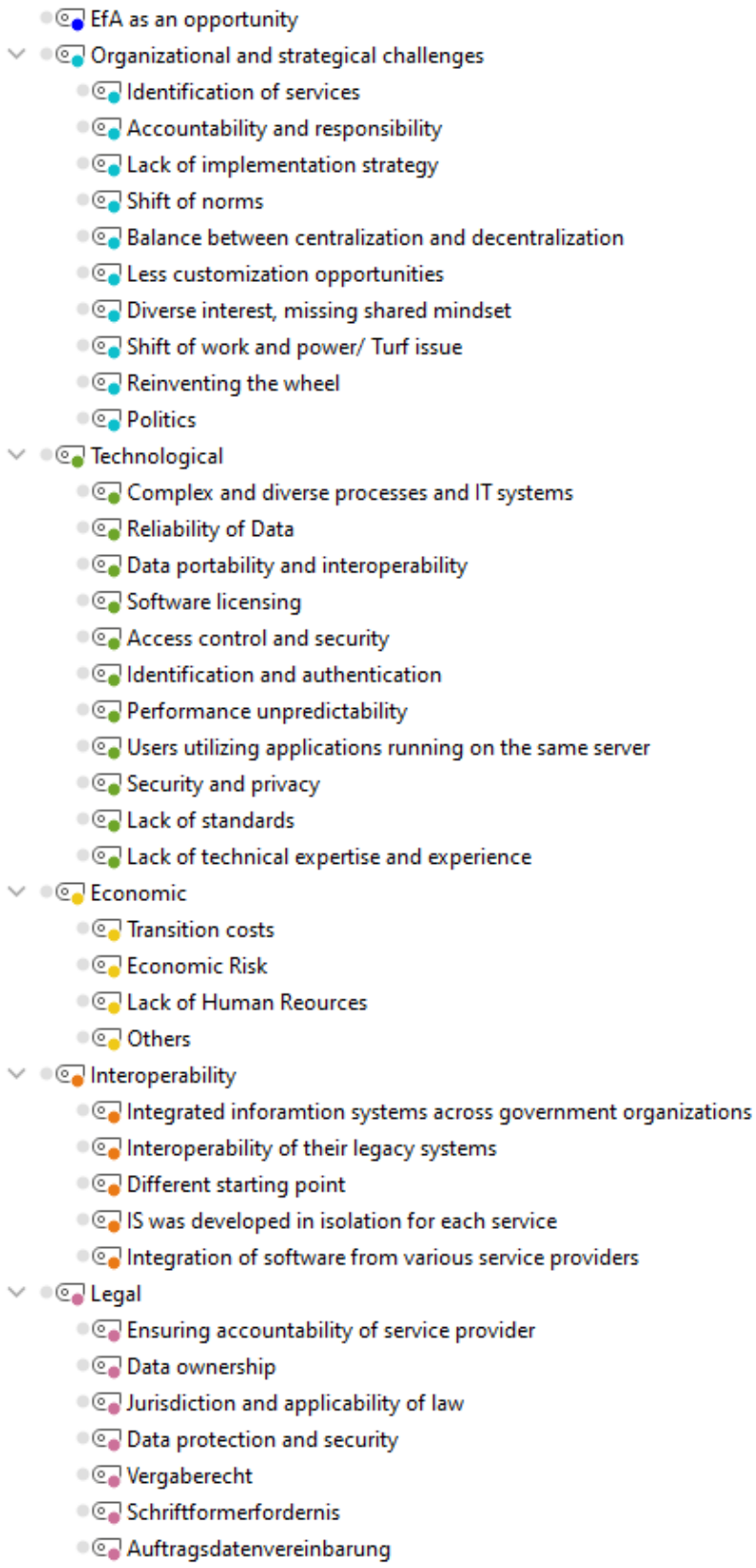
Documentation

#	Date	Author/ Organization	Documentation type	Topic
1	16.03.2021	Becker, Florian Dataport	Professional article	Einer für alle: Das Musketier-Prinzip als Schlüssel zur behördlichen Digitalisierung
2	18.03.2021	Merschmann, Helmut Riedel, Jörn Kommune 21	Interview	EfA-Prinzip: Von Einzeltaten zu Gemeinschaftslösungen
3	26.11.2020	KGSt	Position paper	Anforderungen an das OZG aus kommunaler-fachlicher Sicht zur Diskussion im Kommunalgremium des IT-Planungsrats

Source: Author's compilation

Table 0.5 List of documentation used for the content analysis

F Coding System



Source: Screenshot MAXQDA project

Figure 0.1 Screenshot of the coding system

G Complete List of Challenges

Challenge from the interview	Challenge from the research background	#[5]
Organizational and strategically		
Identification of services suitable for subsequent use	Identification of services	3
Identification of people of contact/ person in charge	Accountability and Responsibility	3
Accountability for things that have to be developed additionally and are not supported financially by the recovery package	Accountability and Responsibility	5
Awareness and acceptance of accountability and responsibility	Accountability and Responsibility	5
Handing over responsibility	Accountability and Responsibility	3
Unclear how to split accountability	Accountability and Responsibility	2
Wait and see attitude	Accountability and Responsibility	3
Implementation of the EfA service in the AL	Lack of vision, robust business cases and roadmap	4
Connection of the municipalities to the service	Lack of vision, robust business cases and roadmap	8
Uncertainty about the happenings after 2022	Lack of vision, robust business cases and roadmap	4
Expectations regarding the online service provided differ as the digital maturity levels between the federal states differ as well	Shift of norms	2
Expectations to and from the federal government, the expectations of the degree of centralization	Balance between centralization and decentralization	1
Incoherent user interfaces as developed by different federal states in different styles	Less customization opportunities	1
Legacy structures, processes and forms	Diverse interests/ missing shared mindset	4
Creation of joint structures	Diverse interests/ missing shared mindset	4
Diverse and multiplicity of opinions	Diverse interests/ missing shared mindset	7
Understanding of the need to digitize	Diverse interests/ missing shared mindset	6
Acceptance management	Turf issue	4
Unfinished projects that are no longer financed	Shift of work and transfer of personnel	1
Trust that the other party will deliver in time and the expected quality/ loss of control	Shift of work and transfer of personnel	4
Reorganization, job and project creation	Shift of work and transfer of personnel	1
No existing established EfA service	Reinventing the wheel/ Lack of vision, robust business cases and roadmap	3
Technical		
Imposes requirements or demands regarding technology that do not exist	Availability of Technology	2
Complex and diverse processes and IT systems	Complex and diverse processes and IT systems	8
Data routing	Data portability and interoperability	6
Performance management and scalability issues	Performance management and scalability issues	3
User accounts	Identification and authentication	3
Processing of Data in different federal states than its collection	Security and privacy	3
Lack and diversity of standards	Lack of standards	7

[5] Total number of document, observation and interview mentioning the challenge.

Lack of knowledge regarding the whole bandwidth of technologies, standards and special procedures	Lack of technical expertise and experience	2
Financial		
Ambiguity of responsibility to pay the connection of the EfA service to the AL	Adaption costs	8
Ambiguity of future costs/ no reference example	Economic risks	5
Ambiguity how to split the costs	Economic risks	4
Lack of human resources		5
Legal		
Verwaltungsvereinbarung	Ensuring accountability of service providers	2
Nutzungsrechte	Data ownership	1
Vergaberecht	Jurisdiction and applicability of law	9
Schriftformerfordernis	Jurisdiction and applicability of law	3
Auftragsdatenvereinbarung	Data protection and compliance	6

Source: Author’s compilation

Table 0.6 Complete list of challenges

Declaration of Authorship

I hereby declare that, to the best of my knowledge and belief, this Master Thesis titled "Einer-für-Alle/Viele: Challenges of the Musketeer Approach in Digitizing Germany" is my own work. I confirm that each significant contribution to and quotation in this thesis that originates from the work or works of others is indicated by proper use of citation and references.

Stuttgart, 31. May 2021

Julia Felicitas Kirchner

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