COMPARATIVE CASE STUDIES

Work Package 4 – Deliverable 4.3

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<tr>
<td>AIFE</td>
<td>Agency for State Financial Information Technology (FRA)</td>
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<td>CSP</td>
<td>Shared Service Centres (FRA)</td>
</tr>
<tr>
<td>DAF</td>
<td>Directorate for financial affairs (FRA)</td>
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<tr>
<td>GER</td>
<td>Germany</td>
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<tr>
<td>GiS</td>
<td>Geographic Information Systems</td>
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<tr>
<td>eNAP</td>
<td>Electronic Sustainability Impact Assessment (GER)</td>
</tr>
<tr>
<td>EU ETS</td>
<td>EU Emissions Trading System</td>
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<tr>
<td>FIS</td>
<td>Financial information system</td>
</tr>
<tr>
<td>FRA</td>
<td>France</td>
</tr>
<tr>
<td>HUN</td>
<td>Hungary</td>
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<tr>
<td>ICT</td>
<td>Information and communication technologies</td>
</tr>
<tr>
<td>InGFA</td>
<td>Institute for Regulatory Impact Assessment and Evaluation (GER)</td>
</tr>
<tr>
<td>LOLF</td>
<td>Constitutional Bylaw on Budget Acts (FRA)</td>
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<tr>
<td>NAC</td>
<td>National Adaptation Centre (HUN)</td>
</tr>
<tr>
<td>NAGiS</td>
<td>National Adaptation Geo Information System (HUN)</td>
</tr>
<tr>
<td>NCCS</td>
<td>National Climate Change Strategy</td>
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<tr>
<td>NDL</td>
<td>Netherlands</td>
</tr>
<tr>
<td>NOR</td>
<td>Norway</td>
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<tr>
<td>NPM</td>
<td>New Public Management</td>
</tr>
<tr>
<td>OCW</td>
<td>Ministry of Education, Culture and Science (NDL)</td>
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<tr>
<td>Pleio</td>
<td>Plein Overheid (NDL)</td>
</tr>
<tr>
<td>REC</td>
<td>Regional Environmental Centre for Central and Eastern Europe (HUN)</td>
</tr>
<tr>
<td>RIA</td>
<td>Regulatory impact assessment</td>
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<tr>
<td>RVO</td>
<td>Netherlands Enterprise Agency (NDL)</td>
</tr>
<tr>
<td>SCN</td>
<td>Service with a national competence (FRA)</td>
</tr>
<tr>
<td>SDG’s</td>
<td>Sustainable Development Goals</td>
</tr>
<tr>
<td>SIA</td>
<td>Sustainability impact assessment</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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Executive Summary

- This report examines the effects of ICT initiatives on internal collaborative decision-making and policy design by comparing five initiatives in five countries (Germany, France, Hungary, Netherlands, and Norway). The report’s comparative case studies draw on qualitative, in-depth single case studies based on a joint analytical framework using semi-structured expert interviews and document analysis.

- The cases for the comparative analysis were selected on the basis of several similarities. All initiatives aim at (1) providing information to public officials, (2) improving public officials’ awareness for specific policy issues, and (3) improving communication across the public sector and/or with external stakeholders. In addition, they are innovative by utilising new means for providing, collecting and/or preparing data for decision-making and by facilitating the involvement of actors in the policy-making process.

- The five selected cases include three software-based online assessment systems for accounting and budgeting (Chorus in France), electronic sustainability assessment (eNAP in Germany) and climate change impact and vulnerability assessments (NAGIS in Hungary) as well as one online platform (Pleio in the Netherlands) and one inter-ministerial working group (DIGIT in Norway) that contribute to communication and social media activities.

- This report compares the means (e.g. technicalities) of the initiatives, their set-up conditions, actors involved, and their role in the decision-making process. It analyses the scope, formality and intensity of these initiatives as well as their direct and indirect effects on decision-making and their parent organisations.

- The comparative analysis shows that the initiatives have significant effects on internal decision-making, policy design and collaboration within the administrations and with external stakeholders. They facilitate decision-making primarily on the micro level by providing and processing information for public officials. The effects of those initiatives are mainly determined by their set-up conditions, their means, and the actors involved.

- The comparative analysis shows that changes in formal procedures and structures through such ICT initiatives are more likely if the use of the initiative is mandatory. In addition, the analysis reveals that leadership support is crucial for the success of an ICT initiative.

- Regarding the effects of the initiatives on their parent organisations, the report finds that the examined initiatives rarely lead to changes in formal responsibilities, and mainly contribute to the output legitimacy of the organisations.
1 Introduction

Information and communication technologies (ICTs) have accompanied public administration for many years. Rapid technological developments and new challenges for modern governments have led to an increased use of ICT tools in executive policy-making. The strength of such tools lies especially in increasing transparency and effectiveness as well as bringing all relevant actors closer together, thus promoting internal collaboration for policy design (Kamateri et al., 2015).

ICT tools offer the opportunity of innovative policy-making through collaborative solutions of complex policy problems (Ahrweiler et al., 2015). They affect the design and implementation of internal policies within governments by facilitating and promoting interactions between policy actors. However, studies on their impact for the internal collaboration of officials in the decision-making process are rare (Criado and Villodre, 2018). There is a lack of comparative case studies that consider several actors as well as several collaborative means, also acknowledging the design and technical properties of such ICT tools.

A comprehensive comparison of case studies offers the opportunity to identify similarities and differences between the cases, and thus a better understanding of ICT tools and their impacts on policy design (Achen and Snidal, 1989; Siefken, 2007). This report seeks to close this knowledge gap by examining and comparing actors and actor constellations, as well as collaborative means of five novel ICT-related initiatives for internal policy design in Germany, France, Hungary, Netherlands, and Norway. The key aim is to analyse how these initiatives contribute to innovative collaboration in intra-governmental policy design.

This report is structured as follows. First, its conceptual foundation and case selection are presented (chapter 2). Chapter 3 informs on our methodological approach as well as the data used. In chapter 4, the cases are described and compared in detail, focusing on the set-up conditions, actors, and actor constellations, as well as collaborative means. Taking into consideration the relevance of actors and collaborative means, chapter 5 analyses the different effects of the initiatives on decision-making and identifies lessons learned. In chapter 6, the organisational effects of the ICT-related initiatives are discussed and crucial lessons identified.

The report concludes that the observed initiatives have a significant effect on decision-making, policy design and collaboration within the public sector. The comparative analysis shows that in the selected cases, the effects of ICT initiatives on internal policy design are mainly determined by the set-up conditions, the behaviour of the involved actors, and the means of the initiatives (e.g. the technicalities). While administrative traditions may shape the set-up conditions of the initiatives, e.g. by simplifying the mandatory use for all public servants, the effects on decision-making in the examined cases can be assessed as rather limited.
2 Research question and case selection

Work package 4 of the TROPICO project addresses innovative practices of internal collaboration for policy design within public administrations. Hence, the aim of this report is to examine the influence of innovative instruments such as ICT solutions on internal policy design, decision-making processes and on collaboration within the public sector. The focus lies on the usage of ICT for policy formulation, the preferences and capabilities of different administrative actors as well as the means (e.g. technicalities) for internal collaboration within the public sector. Therefore, the research question addressed in this report is:

*How do innovative ICT-related initiatives affect intra-governmental policy-making?*

To answer this research question, we studied several aspects of the introduction and practical use of novel ICT-related solutions. Based on a common case study protocol that was used by all contributing partners (see Appendix II), we identified the tool's *means*, the *context factors* and the relevant *actors* in a descriptive analysis. In the second step, we analysed how the identified factors, actors and means are linked to *decision-making, internal policy formulation* and *innovative collaboration*. We differentiated effects on decision-making processes versus effects on the organisation. The effects on the decision-making process were analysed for their *scope, formality* and *intensity* (Boston and Gill, 2011; Christensen and Lægreid, 2015). Scope refers to the effects of tools in the policy design phase. Formality refers to effects on formal structures and procedures and intensity to the strength of the collaboration. With regard to the effects on the organisation, we examined *effects on the internal organisation* (e.g. lines of formal responsibility), *the politics-administrative dichotomy*, *the effectiveness*, and *the legitimacy of the organisation*.

We conducted case studies in five different countries: Germany, France, Hungary, the Netherlands, and Norway (see Appendix I and table 1). The case studies cover three different online assessment tools, one online platform, and one inter-ministerial working group.

*Table 1: Selected case studies*

<table>
<thead>
<tr>
<th>Country</th>
<th>Administrative Tradition</th>
<th>Name</th>
<th>Type</th>
<th>Main task</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER</td>
<td>Continental</td>
<td>eNAP</td>
<td>Online assessment tool</td>
<td>Electronic sustainability assessment</td>
</tr>
<tr>
<td>FRA</td>
<td>Napoleonic</td>
<td>Chorus</td>
<td>Online assessment tool</td>
<td>Electronic financial information system</td>
</tr>
<tr>
<td>HUN</td>
<td>Central and Eastern European</td>
<td>NAGiS</td>
<td>Online assessment tool</td>
<td>Electronic climate change impact and vulnerability assessments</td>
</tr>
<tr>
<td>NDL</td>
<td>Continental</td>
<td>Pleio</td>
<td>Online platform</td>
<td>Collaboration and innovation platform</td>
</tr>
<tr>
<td>NOR</td>
<td>Nordic</td>
<td>DIGIT</td>
<td>Inter-ministerial working group</td>
<td>Facilitating strategic use of social media</td>
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</tbody>
</table>
The German case study examines the electronic sustainability assessment tool eNAP that was launched in March 2018. The tool assists government employees in assessing the ecological, social and economic impact of legislative projects based on the goals of the Sustainability Strategy. eNAP is one of the first ICT-tools across European countries that was designed to facilitate the sustainability impact assessment (SIA). By digitally processing data and information on the sustainability development goals, the tool supports public officials in the decision-making process in an innovative way (WP4_GER).

**Chorus**, the ICT tool from France is used cross-sectorally to support public officials in accounting and budgeting. It was launched in 2007 and is a financial information system (FIS) that is used to collect, trace, store, and interpret financial data and allows policy-makers to know exactly and in real time the financial situation of the state, a ministry or a given policy programme. Through this real-time approach the innovative tool supports evidence-based decision-making and provides a common basis for the cross-sectoral collaboration within the public sector (WP4_FRA).

The Hungarian case study deals with the ICT tool NAGiS (National Adaptation Geo-Information System). The tool aims to facilitate policy-making, strategy-building and decision-making processes by using geo-information that assists policy-makers in assessing climate change impact and vulnerability assessments. Climate change adaptation is a complex task that involves the response to multi-sectoral and multi-layered challenges, which are difficult to quantify and assess. The tool not only processes data and information digitally, but also enables the involvement of a wide range of external stakeholders. Therefore it is innovative because it provides information to public officials in a new (digital) way and it connects actors who did not collaborate with each other before, or did so only to a limited extent (WP4_HUN).

The ICT platform from the Netherlands and the inter-ministerial working group from Norway contribute to (internal) communication and social media activities. Their aim is to improve communication within the ministerial bureaucracy and to some extent with external stakeholders, with a special focus on social media. Pleio is an online open-source collaboration and innovation platform for public officials in the Netherlands. The platform was launched in January 2011 and aims to improve collaboration within the ministerial bureaucracy by connecting public officials and by supporting them in exchanging their knowledge with each other. It is an innovative platform “of, for and by the government” which aims to improve collaboration by collecting feedback from public officials and citizens and offering innovative, new channels of communication (WP4_NDL).

The Norwegian case study addresses the inter-ministerial working group DIGIT. It was set up in 2015 and has gradually become a permanent “resource-group” (WP4_NOR, p. 3). One of its key tasks is to provide input for Norwegian ministries’ work towards social media arenas such as
Facebook or Twitter. The working group aims to strengthen the collaboration between the ministries and to facilitate a more strategic use of social media (WP4_NOR). It should be noted that DIGIT is not an ICT tool. Rather, it is an organisational solution established to cope with the emergence of new expectations and demands in the organisational environment following the increased use of new modes of ICT-based communication among citizens and users of public services. Nevertheless, it can be compared with the other cases, since it also aims to promote and improve policy design via innovative methods of collaboration linked to ICT.

The cases were selected on the basis of the following similarities. All case studies address ICT-related initiatives for internal (and external) collaboration in policy design and aim at:
1) supporting evidence-based policy design by providing information to public officials,
2) increasing public officials’ awareness for a specific policy issue, and
3) improving communication across the public sector and/or with external stakeholders.

The results of the academic expert survey (D4.2) showed that experts see the greatest effects of ICT tools in terms of information processing and the involvement of external actors. This informed our case selection insofar as all examined cases deal with information processing and some of them with external actor involvement. Choosing such cases, we expect to observe that effects on policy design and decision-making unfold.

In addition, all initiatives are considered innovative, since they use new and modern means for providing, collecting or preparing information and data digitally as well as enabling the involvement of actors which were previously not part of the policy-making process (see section 4.1 for more information). Furthermore, the initiatives have in common that they are used across sectors and therefore cannot be exclusively assigned to one policy sector. The Dutch platform “Plein Overheid” (Pleio), for example, is used for communication between teachers and for the exchange of tax officials and can thus potentially influence policy-making in both the education sector and the financial sector (WP4_NDL).

In order to achieve these aforementioned goals, the five initiatives differ in their means, their set-up conditions, and actors involved. In addition, the context factors for the provision and use of the initiatives also vary, which can be linked to the different administrative traditions of the selected countries (see Info box 1).
Info box 1: What are administrative traditions and how do they differ from each other?

Public sectors across Europe are characterised by similarities, but also significant differences in their values and logics of action. Comparative public administration research groups European countries into different administrative traditions: Continental, Napoleonic, Central Eastern and Nordic (see Painter and Peters, 2010; Kuhlmann and Wollmann, 2013).

- **Continental (Germany, Netherlands):** The continental tradition is characterised by a strong body of public law governing the administration. Subnational administrations play an important role and the central administration is considerably weaker than in states with a Napoleonic tradition. The administration works in cooperation with non-state corporations that have a legal status and e.g. represent economic and social groups.

- **Napoleonic (France):** The Napoleonic tradition is defined by a unitary organisation of the state, a distinctive nation-building role of the government and a technocratic orientation towards decision-making. A complex hierarchy of regulations, administrative notes and constitutional law is predominant and the administration is closely bound to the law.

- **Central Eastern (Hungary):** The countries of the Central Eastern tradition are still partly influenced by a soviet tradition. However, this influence varies between the countries. For example, Poland and Hungary are strongly influenced by the Continental tradition, based on their geopolitical location. Hungary in particular adopted the German administrative model e.g. through the introduction of constitutional jurisdiction.

- **Nordic (Norway):** A special characteristics of the Nordic tradition is the strong state-welfare orientation as well as its open government approach, which is marked by freedom of information, transparency and citizen participation. Due to their highly decentralised administrative structure with traditionally strong local self-government, the countries of this tradition are in some cases even more "decentralised" than federal states, despite their unitary state structure.

The results of the academic expert survey (D 4.2) of WP4, and the literature and report review (D2.1) of WP2 indicate that administrative traditions may shape the use and introduction of ICT initiatives and their effects on policy design in the public sector. In the literature, administrative traditions are considered to have significant influence on the course and success of administrative reforms (Painter and Peters, 2010; Pollitt and Bouckaert, 2011). Administrative traditions influence how a reform is perceived by relevant stakeholders including the government itself and how (successful) reform activities are carried out. Reform ideas are more likely to be adopted if they match the dominant values and ideas of a tradition. This can lead to large differences in the implementation of similar reforms between countries of different traditions (Bach et al., 2017). Therefore, we expect to find indications of an influence of the traditions on the use and effects of ICT initiatives. However, the influence of the traditions on the implementation of ICT initiatives may be lower compared to other administrative reforms.

The digitalisation of bureaucracy poses similar problems and challenges for countries of all traditions. First, digitalisation is a new phenomenon for all countries. None of the administrative traditions has many years of experience in dealing with this issue. It is therefore reasonable to assume that no major differences have yet emerged in the values of the traditions with regard to digitalisation. Second, governments may not regard digitalisation exclusively as a technical reform, but as a reform that has the potential to fundamentally change administrative processes and structures and is accompanied by social change. Therefore, governments may
be open to the introduction of ICT tools and initiatives, regardless of their administrative traditions and their attitude towards technological innovation.

The cases for this report were selected on the basis of the previously presented criteria, taking into account combinations of features that are as relevant as possible (Rosenbohm, 2016). Using a mixed selection strategy, by selecting cases showing both differences and similarities, the heterogeneity of the examination can be illustrated in the comparative analysis (Frendreis, 1983). More importantly, ICT initiatives for policy formulation are still relatively rare and new. Many tools are either just implemented or in the piloting and development phase. At the time of case selection, most countries had relatively few, (somewhat) mature, ICT solutions designed for more innovation and collaboration in the policy formulation phase to choose from, which is why we were limited in our choice.¹

This case selection strategy and the comparative case study method in general have limitations. The different characteristics of the ICT initiatives, especially with regard to their means, lead to a limited comparability of the cases. As with many case studies, the “small N, large number of variables” (Frendreis, 1983) problem limits the generalizability of the results. This means that many potentially relevant variables are examined on the basis of a small number of cases and therefore only limited conclusions can be drawn about other cases. Nevertheless, this report identifies certain patterns across all cases from which lessons can be derived. In addition, the report provides a comparative and in-depth insight into the heterogeneous, and relatively young field of ICT-related initiatives for internal collaboration in public administrations.

3 Method and data collection

To examine the relevant actors, their preferences and capabilities as well as the variety of means of the ICT initiatives for internal collaboration, one case study was conducted in each of the five countries, addressing ICT-related initiatives in internal policy design (see Info box 2). In the following, we explain the method and the data in more detail.

¹ It is relevant to note the difference between digital tools to expand the data and evidence as input to executive decision-making processes (or what is publicly discussed as big data analytics or the utilization of artificial intelligence within governments) from the ICT initiatives of relevance in this report – which are explicitly dedicated to foster internal collaboration and innovation during policy design.
Info box 2: What is a case study?

A case study is a qualitative research method for in-depth examination of a study (case), which is frequently used in the social sciences. They are characterised by four main characteristics:

1) a small number of cases integrated into real-world contexts,
2) a large number of empirical observations per case,
3) different and mostly non-standard observations,
4) an intensive reflection on the relationship between concrete observations and abstract concepts/theories

Case studies refer to real world cases, which means that the researchers usually have very little influence on the object under investigation, unlike, for example, they would have on the design of an experiment. The investigation of more than one case makes it possible to carry out a comparative analysis along shared analytical dimensions. Due to the small number of cases, but large number of observations per case a deep understanding of the cases can be obtained (Blatter et al., 2018). At the same time, comparative case studies are bound by certain limitations. Due to the usually small number of cases, the results can only be generalized to a limited extent. In addition, case selection plays an important role as it has an influence on the significance of the results and may even distort them (Frendreis, 1983; Rosenbohm 2016).

The cases in this study can be divided into two groups according to the implementation or start-up time for the ICT-related tool examined. The case studies on Chorus (since 2007), NAGiS (since 2010) and Pleio (since 2010) investigate ICT tools that have been in operation for nine or more years. In contrast, the inter-ministerial working group DIGIT (since 2015) and the ICT tool eNAP (since 2017) are much more recent initiatives, resulting in shorter observation periods of four and two years. Table 2 gives an overview of the data used in each case study. As a result, especially for the second group, some data is not available (yet) (e.g. user statistics) and the effects on decision-making may not be fully pronounced yet. The data basis for all five case studies is provided by expert interviews with developers, managers, and users of the ICT tools as well as drawn from document analysis.

Table 2: Overview of the data collection

<table>
<thead>
<tr>
<th>Name</th>
<th>Examination period</th>
<th>No. of experts</th>
<th>Interviewees</th>
<th>Document analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>eNAP</td>
<td>2017-2019</td>
<td>10</td>
<td>• Public officials from coordination units for SIA</td>
<td>• official documents and press releases</td>
</tr>
<tr>
<td>Chorus</td>
<td>2007-2019</td>
<td>8</td>
<td>• Officials from AIFE, DAF and the Ministry of Public Accounts</td>
<td>• Legal texts, public documents, articles</td>
</tr>
<tr>
<td>NAGiS</td>
<td>2010-2018</td>
<td>12</td>
<td>• Actors involved in the creation and use of the tool</td>
<td>• 43 official documents</td>
</tr>
<tr>
<td>Pleio</td>
<td>2010-2018</td>
<td>5</td>
<td>• Key actors in the history and present of Pleio</td>
<td>• blog posts, statistical reports, Pleio newsletters, Pleio annual report</td>
</tr>
<tr>
<td>DIGIT</td>
<td>2015-2018</td>
<td>5</td>
<td>• Five of the six members of DIGIT</td>
<td>-</td>
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The number of conducted expert interviews ranged from five to 12. The case study protocol (see Appendix II) guided the conduct of the expert interviews, covering topics of interest for the comparative analysis. In all cases except DIGIT, document analyses were carried out in addition to the expert interviews. The research material for the case study on DIGIT is based on one focus group interview, which was conducted with five of the six members of DIGIT as well as a meta-analysis of previous studies on the use of social media by the Norwegian ministries (WP4_NOR).

For the German case study, ten expert interviews were conducted with employees from different coordination units for the sustainability impact assessment. Moreover, documents and some additional press releases on eNAP were analysed, although the total number of documents was rather limited. Most likely this is a result of the tool being relatively new, and first introduced in March 2018 (WP4_GER).

The case study Chorus is based on an analysis of legal texts, public documents on ministries and administrative service websites and articles about Chorus, as well as eight expert interviews. Actors from three different agencies were interviewed: AIFE (Agency for State Financial Information Technology), the agency that is in charge of the design, implementation, development and maintenance of Chorus, DAF (Directorate for financial affairs) in several ministries (Armies, Education, and Ecological transition), which are in charge of the development and maintenance of Chorus, and the Ministry of Public Accounts, which is in charge of the financial planning and execution of Chorus (WP4_FRA).

For the case study on NAGIS, in total 43 official documents were reviewed, focussing on the impact of the ICT tool on policy-making and collaboration. Based on this, a stakeholder map was created, outlining the actors that at this stage were deemed crucial to the tool's development. Afterwards, 12 actors, which had been involved in the creation and use of the tool, were interviewed. All interview data is stored in protected cloud storages or storage platforms (WP4_HUN).

In the Dutch case, five interviews were conducted with key actors from the initial and the current phase of Pleio, e.g. the current president of the Pleio Foundation and the technical and community manager of the Pleio Platform. Additionally, different documents e.g. public blog posts, statistical reports, the Pleio newsletters and the annual reports of Pleio were examined (WP4_NDL).

4 Case descriptions

In the following subchapters, we present the case studies in detail. First, the means and technicalities of the ICT initiatives and their link to decision-making will be presented. Subsequently, setup conditions under which the solutions were created and implemented will
be examined. Afterwards the key actors/users of the initiatives are analysed. Additionally, this chapter will present and discuss the actors’ constellations and the actors’ capabilities.

4.1 Means and technicalities
The technicalities and means of the five ICT initiatives are linked to decision-making and internal policy design. Due to the fact that DIGIT is a working group and not an ICT-based tool per se, this section will mainly deal with the other four tools (for a summary, see table 3).

The technicalities of the ICT tools differ across cases. While Chorus is software-based, eNAP, NAGiS and Pleio are mainly web-based. Most of NAGiS’s functionality is available on the Internet through the NAGiS Portal. Some applications also offer the possibility to download a desktop application. With the exception of eNAP, which only allows sustainability impact assessment within a website framework, Chorus, NAGiS, and Pleio are sub-divided in various applications for diverse purposes.

eNAP supports public officials to carry out the sustainability impact assessment (SIA) according to the German Sustainable Development Strategy. For this purpose, the user is shown 38 areas with a total of 66 key indicators derived from the 17 SDGs. When carrying out the SIA, the user has to decide whether each of the 38 areas might be of relevance for the legislative draft. To that end, eNAP provides the user with definitions, statistics and further information on the key indicators. When classifying an area as relevant, the user briefly has to explain the relevance with regard to the respective key indicators. Additionally, the user also has to assess the proposal’s relevance for the six “principles of sustainable development” as laid down in the strategy. The SIA can only be completed with eNAP if each area has been classified as ‘relevant’ or not. Afterwards, a summary of the assessment’s results can be downloaded and used as a basis for the cover note of the legislative or regulatory draft (WP4_GER).

Chorus, the financial information system of the French central state administration, is based on SAP software and covers the following functional areas:

1) Allocation of resources: Chorus makes it possible to draw up annual and infra-annual budget forecasts according to the objectives pursued and the resources allocated. The tool distributes resources to all levels of central government administration according to budget files.

2) Expenditures: This includes the payment of purchases made by the state. Chorus makes it possible to track the entire process from the legal obligation to make a certain payment to the actual payment.

3) Asset management: The ICT tool manages the French state’s asset. It optimises asset management by better understanding government assets and future spending.
4) **Non-tax revenues**: The software collects and integrates data from the three major non-tax revenue categories: non-state third parties (e.g. private companies), state-owned organisations and income received in cash.

5) **Three types of accounting systems** (general accounting, budget accounting and cost accounting): Chorus records all sources of revenue and expenditure relating to the general budget, subsidiary budgets and special accounts. The tool additionally monitors all cash transactions and current account management at the *Banque de France* and integrates all the necessary data into the central government’s main account. In addition, Chorus has various other applications, for example, Chorus Pro is the digital invoicing application of the French state. The application is already partly mandatory and will be progressively made mandatory for all other companies (WP4_FRA).

**NAGiS** is a Geographic Information Systems (GIS) application that assists climate change adaptation policy-making in Hungary. The NAGiS portal is based on an open source content management platform. The features of the tool can be divided into freely accessible applications and applications that can be accessed by authorisation only. Openly accessible features and content include articles, scientific papers and short reports, e-services (browser-based map application), a browser-based NAGiS Metadata explorer, Web Map Service for Desktop GIS environments and interactive inquiry and visualisation. The metadata tool contains all the indexes used in the system, which can be searched by author, theme, rating categories, and keywords. The main feature of the NAGiS portal is the web-based map visualiser, which can be accessed without registration. It is provided by an open source solution and users can add different layers to visualise the different impacts of climate change. Another important feature, which can be accessed via login, is the GeoDat explorer. Through this, the users can directly access the geodata. Moreover, the application produces tables and graphs as input for additional analysis. Most NAGiS applications can be used in a desktop application in addition to the web-based NAGiS Portal (WP4_HUN).

**Pleio** is a web-based network and social media platform that is based on open source, also to keep financial resources low. Currently, the platform collaborates with the Canadian government to develop a python backend. In 2010, the technicalities were delegated to a private company. The technicalities allow any organisation to create subpages or new applications. However, these must be made available to all users in a shared appstore. Some of the functionalities of the platform are rather similar to commercial social media applications. Particular advantages of the platform are its easy access, user-friendliness, short development time of new applications, and interactivity. In addition, creating new applications is easy because the building blocks are ready and usually only the frontend has to be edited. Some examples of applications developed by Pleio in the first years are the social intranet, learning environments and document management, video conferences, online groups as well as participation websites. In 2018 Pleio had around 214 active applications, whereby collaboration
platforms are by far the largest number (62%), followed by communication websites (16%). The size and the complexity vary strongly between the different applications (WP4_NDL).

A closer look at the funding of the different ICT initiatives reveals two groups. eNAP, Chorus and DIGIT are mainly or exclusively financed by the national budget, while NAGiS and Pleio depend on further financial support. Since 2010, environmental protection has lost importance in Hungary, accompanied by a serious loss of resources. Therefore, and at the initiative of NAGiS, the National Adaptation Centre took the lead and turned to the Regional Environmental Centre for Central and Eastern Europe (REC), an international intergovernmental organisation that coordinated funds from Norway/EEA grants in Hungary. Hence, since 2013 NAGiS is financially supported by the REC (WP4_HUN). Just like NAGiS, Pleio had regularly funding problems. In the first years the expenses were paid by the Tax and Customs Administration. With a growing number of users, the costs continued to rise and thus users were asked to donate, but the platform was never self-financed. In March 2012 the initiators of Pleio therefore transformed the platform into a foundation to secure a solid managerial, administrative and financial basis. In addition, the use of Pleio became fee-based and users have to pay an annual contribution since then. While the registration for individual users is free of charge, organisations have to pay a specific amount based on how many functions of the platform they want to use (WP4_NDL).

All cases provide various information to public officials to support them in decision-making and policy design. The provision and processing of information through ICT-related solutions can support public officials in their decision-making by filtering out, summarising and interpreting relevant data. Employees have to deal with less irrelevant information and thus focus more on identifying problems and opportunities. In addition, ICT solutions often enable public officials to retrieve information in real time. This provides direct access to the necessary information and thus promotes evidence-based decision-making (Huber, 1990). For example, in the case of NAGiS, the tool is a useful feature to assist decision-making processes related to climate change policy, including layering, querying, geo-referencing and most importantly visualisation. Public officials involved in territorial development can assess the different effects of climate change related to their locality. The system can be used to identify the most important challenges and vulnerabilities and visualise them in a way that is easy to understand (WP4_HUN).

All cases also contribute to increase the awareness for specific topics, like environmental protection (eNAP, NAGiS), budgeting (Chorus), the needs of public officials and citizens (Pleio) or the use of social media (DIGIT). The comparative analysis has shown that increased awareness can be achieved by improving the processing of information for public officials. This increased awareness can lead to employees including more relevant information in their decision-making than previously and thus facilitates evidence-based decision-making.
Table 3: Overview of the means and their link to decision-making

<table>
<thead>
<tr>
<th></th>
<th>eNAP</th>
<th>Chorus</th>
<th>NAGiS</th>
<th>Pleio</th>
<th>DIGIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web-based</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Software-based</td>
<td>✗</td>
<td>✓</td>
<td>(✓)</td>
<td>✗</td>
<td>-</td>
</tr>
<tr>
<td>Different applications</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Financing by the state</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Providing information</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Increasing awareness</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improving internal communication</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Improving external communication</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
</tbody>
</table>

As mentioned in chapter 2, all cases aim to improve communication within or across public sector organisations. However, upon closer examination, we found that in one case (eNAP) the means of the tool are not linked to improve the communication in or across public bureaucracies or with external stakeholders. ICT solutions can promote collaboration within the administration by facilitating communication between different users regardless of time and geographical location. In addition, they can enable communication between a large group of people. Improved communication allows information to be exchanged more quickly and precisely and thus promotes evidence-based decision-making. In addition, the increased exchange may provide information to public officials that they would not have otherwise (Huber, 1990).

For example, in its function as a platform, Pleio contributes in particular to improving communication within and between public sector organisations. Various applications such as communications websites or social intranet seek to encourage a dialogue among the public officials, across different public organisations, as well as with external stakeholders. In addition to Pleio, the technical means of Chorus also contribute to an increased communication with external actors. For example, Chorus Pro provides an online portal and a related phone application to facilitate companies to send invoices to the state and public institutions (WP4_FRA). DIGIT offers a common working space for the heads of communication of the different ministries to exchange views on social media issues and to develop a joint strategy across ministries. Therefore, the head of DIGIT visited all communication departments in the various ministries in order to collect existing strategies and get an overview of the respective communication departments’ experiences with what has worked, or not, and what these actors’ viewpoints are with respect to future developments (WP4_NOR).
4.2 Conditions

The conditions described here refer to the rationale for setting-up of the ICT-related initiatives and the actors involved in the process. The development of the initiatives over time, the context factor party politics, as well as the level of formal institutionalisation are also shortly described (for a summary, see table 4).

Three of the cases, eNAP in Germany, Chorus in France and NAGiS in Hungary were developed and implemented in a top-down process as part of a larger reform programme.

**eNAP** was developed by the Federal Chancellery and the Ministry of the Interior, Building and Community and was introduced in the spring of 2018. The tool was introduced as a part of the larger reform project eLegislation which seeks to digitise the federal legislative process. The eNAP tool is one of the first prototypes that was finalised and made available to the federal ministerial bureaucracy. Two research institutes, the Institute for Regulatory Impact Assessment and Evaluation (InGFA) and Frauenhofer FOKUS as well as two consultancy companies supported the creation and implementation of the ICT tool. The actual design and implementation phase lasted a little less than one year, until the tool was finally introduced in March 2018. In the development phase, ministry officials across portfolios were invited to take part in user workshops for testing the prototype and commenting on possible improvements of the tool (WP4_GER).

Similar to eNAP, **Chorus** was implemented by the French government as part of a larger reform programme. However, its development started much earlier, in the early 2000s, when the French government decided to provide the central state administrations with a shared financial information system. The basis for this was the Constitutional Bylaw on Budget Acts (LOLF) that aimed at modernising the French public services by following the principles of new public management (NPM). In 2005 the government established the Agency for State Financial Information Technology (AIFE) for the purpose of developing Chorus. Despite its name, the agency is a particular type of the French administrative apparatus, namely a service with “a national competence” (SCN). Therefore, it is not part of any ministry, but under the supervision of a minister’s cabinet, currently the minister of Public Accounts. Chorus was launched by the government in 2007 in order to fulfil the LOLF. The AIFE is in charge of the administration of the project development and management, while the official project owner is the ministry of Public Accounts. However, not all issues related to Chorus are addressed directly by the AIFE. Many tasks are outsourced to IT and business consulting firms through calls for tenders. The use of Chorus is compulsory for all French ministries. They are obliged to merge their own financial information systems and application into Chorus (WP4_FRA).

Similar to eNAP and Chorus, **NAGiS** was also introduced top-down. Following requirements from the EU’s Adaptation Strategy and the United Nations Framework Convention on Climate Change (UNFCCC) requirements, NAGiS was initiated through the revision of a climate change
law in 2012. The law allowed the government to set up an ICT tool to assist the *National Climate Change Strategy* (NCCS). A governmental think tank, the *National Adaptation Centre* (NAC) was set up to coordinate the revision of the strategy, and to develop means to carry it out. The legal background of the revision was the implementation of the *EU Emissions Trading System* (EU ETS) in 2012, which amended the *Climate Change Act* on the implementation of UNFCCC. Drawing upon the competencies the government gained through the Act, a decree was adopted in March 2014 setting out the conditions of NAGiS. Its predecessor was a project called VAHAVA, which formed the theoretical basis of NAGiS. The development of NAGiS was led by the *National Adaptation Centre* with a consortium of different key stakeholders. In 2016 the tool was first introduced and at the end of 2016 a second updated version was published, which has since been used to assist local governments in decision-making processes related to local climate policy development as well as to further develop already existing databases of NAGiS (WP4_HUN).

In contrast, *Pleio* and *DIGIT* were set up through bottom-up processes, initiated by public officials. In the end of 2009, the first ideas for the platform *Pleio* were drafted by public officials from the *Dutch Tax and Customs Administration* and the *Ministry of Economic Affairs* to enhance a very basic platform called BDplaza. The platform was a first attempt to connect the tax officials. After one year of development, Pleio went online in October 2010 and was officially launched to the public in January 2011. The public officials who initiated the development of Pleio had all strong ties to the central administration level in the Netherlands. One of the initiators of Pleio was also a responsible person at the “Ambtenaar 2.0” foundation, a programme dealing with government reforms and innovation. This means that even if Pleio was not officially part of a larger reform programme, it was clearly linked to one. During the first year, different public partnerships were arranged for developing the platform further, as e.g. the *National Archive* took care of the data archives, the *National Audit Department* monitored and improved the security, and the *Expertise Centre of Learning Government* provided the learning and testing environment for Pleio. After recurring problems with the financing of the platform, Pleio was transformed into a foundation in March 2012, in order to provide the platform with a solid managerial, administrative, and financial basis. However, Pleio was never officially recognised as a government tool. One reason for this may have been that the platform was regarded as a competitor for the government-based “Rijksportaal”, the intranet for the Dutch central public administration (WP4_NDL).
Table 4: Overview of set-up conditions

<table>
<thead>
<tr>
<th></th>
<th>eNAP</th>
<th>Chorus</th>
<th>NAGiS</th>
<th>Pleio</th>
<th>DIGIT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Set up approach</strong></td>
<td>Top-down</td>
<td>Top-down</td>
<td>Top-down</td>
<td>Bottom-up</td>
<td>Bottom-up</td>
</tr>
<tr>
<td><strong>Larger reform programme</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>
| **Initial actors** | • Chancellery  
• Ministry of the Interior, Building and Community | • AIFE  
• Ministry of Public Accounts | • NAC  
• Officials from  
• Tax and Customs Administratio  
• Ministry of Economic Affairs | • Heads of the communicati  
• on departments in the ministries | |
| **Support by external actors** | ✔         | ✔         | ✔         | ×         | ×         |
| **Linked to party competition** | ×         | ×         | ×         | ×         | ×         |

Similar to Pleio, DIGIT was set up in a bottom-up approach. The basis for the development of the inter-ministerial working group was the increased awareness of the potential of social media to be used actively by governments to engage with citizens. In 2008 a working group composed of communication advisors in the Norwegian ministries was founded under the patronage of the Ministry of Trade and Industry. Its purpose was to evaluate whether and how social media should be used more frequently by public officials. The working group found that social media usage in Norwegian ministries was hardly known. Therefore, they suggested to organise monthly meetings in order to be able to keep pace with the accelerating developments taking place in social media as well as to make sure that these developments would be adapted to and harnessed by all ministries. For this purpose, DIGIT was founded. The heads of the communication departments in the ministries decided to establish DIGIT as a working group under the aegis of the communication unit at the Prime Minister’s Office, which would prepare the ground for an increased and more coordinated use of social media in the ministerial bureaucracy. Initially, DIGIT was created for one year. Subsequently, the mandate was extended by the heads of communication departments in the ministries (WP4_NOR). Per August 2018, DIGIT had become a “permanent resource-group” (WP4_NOR, p. 3).

No process of establishing the ICT initiatives under scrutiny was linked to party competition e.g. as a pledge in an electoral campaign. However, this does not mean that the cases have no relevance for the political agenda. Chorus (through the AIFE), for instance, has a relatively far-reaching impact on the budgetary situation of individual administrations and the French State as a whole. Despite this potentially conflictual subject, Chorus has actively been supported by all governments regardless of their partisan composition (WP4_FRA).
4.3 Users and actors

This section presents the target (user) groups and the actors’ expectations towards the use of the ICT-related initiatives. All five cases have in common that the main target group of users are public employees in the respective central government apparatus. **Chorus** and **DIGIT** address the ministerial bureaucracy only, while **eNAP, NAGiS** and **Pleio** can also be used by semi-state and non-governmental organisations. In addition, **Pleio** also explicitly addresses citizens to use the platform.

The main target group of **eNAP** are ministry officials preparing and formulating laws and regulations. Thereby, the tool is particularly relevant for ministries that by definition are involved in a great amount of legislation, such as the **Federal Ministry of Justice and Consumer Protection or the Federal Ministry of Labour and Social Affairs**, whereas ministries like the **Federal Ministry of Defence** are concerned with eNAP and the SIA to a much lesser extent. Furthermore, the tool can explicitly be used by all societal actors (WP4_GER).

**Chorus** is an ICT tool explicitly created for the French public administration. Since January 2011 it is obligatory for all central and subnational state administrations to use the tool for financial management and planning. Of all tools, Chorus is the only mandatory one. Chorus was implemented in six waves, with most users starting in the last three waves between 2010 and 2011. Even if every ministry had to adopt the financial information system (FIS), the **Ministry of the Armed Forces** and the **Ministry of the Interior** can be considered as key players and users, the **Ministry of the Interior** being one of the most important mediators in public sector reforms, and in charge of many subnational state administrations, and the **Ministry of the Armed Forces** as it traditionally has been cautious regarding public accounting, and is in charge of the largest share of investment spending (WP4_FRA).

Just like eNAP, **NAGiS** supports public officials in policy formulation by providing important information. The metadata of the NAGiS portal is available for everyone without specific authorisation. For all other functions, authentication and registration are necessary. However, registration is only possible for a selected audience. This includes 24 different organisational groups. Interestingly, these include some institutions where it is very unlikely that they will use the tool, while other important groups of users e.g. certain NGOs or actors from the private sector are excluded from further use. The reason given by one interviewee for this was that the number of potential users should be kept low in order to prevent overload of servers and facilitate control over user access (WP4_HUN).

**Pleio** can be considered as the ICT-tool with the largest target group. In addition to policy makers and public officials at the central, regional and local level, semi-public organisations and NGOs as well as citizens are explicitly addressed. Since the introduction of Pleio, however, there have been some changes, so that the use of certain functions was limited to certain professional
groups e.g. tax professionals. Public organisations participating in Pleio pay a certain monetary contribution to Pleio (WP4_NDL).

**DIGIT** is a cross-ministerial working group and its services are available for all ministries. The participation in the working group is coordinated by the communication departments. The working group itself is composed of officials in the ministries working on issues related to digital communication. The group meets monthly and communicates via a closed Facebook-group, which is open for all public officials related to the field of communication. DIGIT consists of a core of six communication advisors from the ministries, including a coordinator. Except for the coordinator, the other members spend relatively few working hours on the working group. DIGIT possesses no direct formal authority and therefore it can be considered as an organisational intermediary, which provides critical input at early stages in preparing initiatives relating to the use of social media (WP4_NOR).

In all cases, the targeted users differ. While Chorus and DIGIT can only be used by public officials, the other initiatives are completely or partially freely available (WP4_FRA; WP4_NOR). eNAP is the only solution that makes all functions freely accessible to everyone (WP4_GER). As mentioned before, Pleio and NAGiS are partly accessible, however, the use of some applications is limited to certain groups or organisations (WP4_NDL; WP4_HUN).

Large differences can also be observed for the numbers of users. While Pleio with over 400,000 users and Chorus with 53,705 users have very high user numbers, eNAP and NAGiS are currently still used by much fewer users. For Chorus, the high number of users is due to the mandatory use. In addition, Chorus was the first tool to be introduced and has been in use since 2007. Similarly, Pleio was introduced already in 2009 and appeals to the largest number of users. Moreover, it is not solely used for policy formulation, but as a platform for information exchange between different actors, which may also contribute to the high number of users. The platform recorded a particularly strong increase in user numbers in 2015 as a result of the introduction of two new platforms for teachers that encourage the use of ICT in education. With the registration of 43 professional communities and 180,000 new users (mostly teachers) the user numbers almost quadrupled. There are no exact user statistics for eNAP and NAGiS (WP4_GER; WP4_HUN). However, interview partners stated that the tools have not yet been used comprehensively. For NAGiS this is especially the case for the local level. Up to now, 17 out of 253 local governments have used the tool (WP4_HUN). Regarding eNAP, both the introduction of the tool and the government formation in 2018 were very recent at the time of the interviews. Therefore, the tool was neither used very often nor fully integrated into the legislative work of the ministries yet (WP4_GER). The overview of the users in the five cases is summarised in table 4.
Table 5: Overview of the users

<table>
<thead>
<tr>
<th></th>
<th>eNAP</th>
<th>Chorus</th>
<th>NAGiS</th>
<th>Pleio</th>
<th>DIGIT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target group:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Administration</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>NGOs etc.</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Citizens</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Free access</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Mandatory use</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>-</td>
</tr>
<tr>
<td><strong>Number of users</strong></td>
<td>• No data available</td>
<td>• 53,705 public officials</td>
<td>• No data available (17 out of 253 local governments)</td>
<td>• &gt; 400,000 users from more than 400 public organisations</td>
<td>• Not applicable</td>
</tr>
</tbody>
</table>

In all cases the interviewed experts stated that the initiatives lead to a more informed policy design or more coherent government communication. For example, in the case of Pleio, feedback from the various Pleio websites was expected to lead to more evidence-based policy-making (WP4_NDL). Furthermore, all initiatives except eNAP are expected to promote collaboration within the administration or with external stakeholders or citizens. Moreover, eNAP is the only initiative where practitioners assumed it may reduce uncertainty among public officials, by providing them with guidelines and information regarding the sustainability impact assessment. However, in some cases interviewees also expected that the initiative require the public sector workforce to gain new skills and knowledge. For example, in order to learn how to use SAP software, AIFE offers training sessions for Chorus (WP4_FRA). Previously, some users had criticised in particular the usability of the software. Also, in the case of NAGiS, some stakeholders call for more resources for training public officials in the use of the tool (WP4_HUN).

5 Effects on decision-making

In the analysis of the effects on decision-making and collaboration, the five ICT-related initiatives were examined by using three different analytical categories: scope, formality and intensity (Boston and Gill, 2011; Christensen and Lægreid, 2015). The scope of collaboration concerns the phase of the policy process in which the means of the initiatives are applied. This includes the timing of the application and the types of actors involved, as well as their relations between each other. When analysing the scope, we are interested in how the initiatives affect the quality and the duration of collaboration, as well as to which degree all relevant actors are included in the process. The formality of collaboration refers to the rules leading the collaboration practices, and can vary between very informal collaboration to highly formalised collaboration. The formality aspect is analysed by identifying the effects on changes in formal...
structures and procedures, as well as the effect on the intensity of formal and informal exchange between the relevant actors for decision-making. The intensity of collaboration concerns if and to what extent the initiatives are enabling or limiting the likelihood of collaboration.

5.1 Scope

All initiatives except DIGIT increase the scope of the decision-making process. This mainly happens at the individual level by providing and processing information for officials to facilitate decision-making and enabling a more informed policy design (eNAP, Chorus, NAGiS). In Pleio, information is not provided directly, but the platform acts as a collection hub for feedback and suggestions from internal and external actors, which are later incorporated into the policy-making process (WP4_NDL). DIGIT affects the manner in which the communication departments work but has no direct link to “policy-making departments” (WP4_NOR, p. 10). What all initiatives including DIGIT have in common, however, is that they increase public officials’ awareness for certain topics, which can have a direct or indirect impact on the policy formulation process. Only for Pleio we observed changes in the duration of the policy-making process. The introduction of an online system for open and closed groups on both the intranet and the extranet has reduced the duration of the decision-making process (WP4_NOR).

For the eNAP tool, its effects on decision-making are mainly on the micro level. That is, the tool primarily provides information on the contents of the sustainability strategy to public officials while conducting the SIA. In the past, officials were often unsure on how to carry out the SIA, especially if they were not involved in preparing legislative drafts on a regular basis. According to the interviewees, eNAP can contribute to reduce uncertainty among officials and facilitate the assessment. In addition, the tool may increase the officials’ awareness on the government’s sustainability strategy and strengthen the role of sustainability matters in the policy formulation process. Because policy formulation in ministries mostly takes place in highly specialised units, officials are often not aware that some goals of the strategy might concern their policy work. On the meso level, the tool may contribute to increasing the accountability of those in charge of the proposal since it has to be justified why a certain SDG is relevant or not. It may also contribute to strengthen the transparency of the SIA process by forcing ministerial portfolios to state which dimensions of the sustainability strategy were taken into account. The tool’s effect on the efficiency of the decision-making process cannot be fully estimated yet. While for those familiar with the sustainability strategy and the SIA, the new tool is expected to speed up their assessments, others may first need to invest some time. But as pointed out by one of the interviewees, the main benefit of eNAP should not be regarded in speeding up the process but improving the content of policies (WP4_GER).

According to the interviewees, Chorus is able to improve the decision-making process in the French public administration in different ways. One main aim of the tool is to consolidate the
central state’s accounts. Therefore, Chorus has different functional areas that align the French state with best practices from the private sector. These also offer decision-makers the opportunity to know the financial situation of a ministry, a given policy program or the central state as a whole in real time. This is directly linked to the program-oriented budgets, the performance management system and the ‘real cost’ approach to policy implemented by the LOLF. Moreover, Chorus standardised the data used for decision-making. This has a significant impact on budget discussions, as insufficient quality of data had been a recurring criticism in the past. Because of Chorus, a consensus was reached on the data and its quality is no longer controversial. The tool makes it easier for all ministries to negotiate and design national budgets. In this respect, Chorus acts as a mediator by providing its data to each decision-making authority (WP4_FRA).

NAGiS is a GIS tool that also enables to carry out assessments and provides input to public officials e.g. for the development of climate change policy strategies. The case study on NAGiS has shown that the tool influences policy design at the national, regional, and local level in Hungary. For example, most of the county governments developed their climate change strategy using means of NAGiS. At the local level the functionalities of NAGiS were extended and a “Municipal Adaptation Barometer” and a “Decision Support Tool” were conducted which municipalities can use together with local stakeholders. The tool has the potential to support the development of different policies as well as impact assessments by providing sufficient information. Even though NAGiS is used for several policy-making processes, the developed policies are not necessarily implemented, due to the relatively low salience of environmental policy in Hungary. Hence, NAGiS informs decision-makers and decision-making in terms of the availability of solutions, but not necessarily increase the quality of the entire policy process. However, interviewees mentioned that the tool is able to contribute to an increased awareness of the possibilities of ICT. Effects on the duration of the decision-making are considered to be very low (WP4_HUN).

The case study on Pleio has shown that the scope of the platform varies significantly between its different applications. While the RVO (Netherlands Enterprise Agency) intranet and extranet hardly shows any effects on policy-making, applications like tax community forums or the community platform for teachers show a larger scope. Through the communication forums, information from outside is carried into the public sector. For example, in the tax community forum, tax professionals can give feedback on the quality, scope and span of public communication. This gives the public bureaucracy the opportunity to recognise what kind of policies do or do not work and what parts of the legislation are effective or not. Therefore, Pleio can also have an impact on policy-making and regulatory processes. The content of the forums is part of the discussions on political and ministerial level and therefore the forums are not directly involved in fiscal policy-making itself, but indirectly by influencing the policy-making actors. The same applies to the communication platform for teachers. The results are integrated in the decision-making process since they became part of the meeting agendas and
the Ministry of Education, Culture and Science (OCW) reports. Thus, the forum can contribute to more evidence-based policy-making (WP4_NDL).

According to the interviewees, the most concrete effect of DIGIT was that it served as a catalyst to bringing the professional use of social media into the focus of public bureaucracy. One of DIGIT’s first tasks was to get an overview of the strategies of social media work in the ministries, but the working group also gathered information on who is working on social media in the ministries. Not all ministries at the time had defined concrete tasks related to social media, and those working on these issues generally lacked an infrastructure to inspire and support them. DIGIT was and is a "linking pin" (WP4_NOR, p. 8) function and therefore an important factor in raising awareness and stimulating the increased use of social media for official government communication. DIGIT activates communication departments and therefore has no direct connections to the policy-making departments in the ministries. However, the impact on the functioning of the communication departments is significant. Since social media has become more and more well known, the working group has mainly been concerned with giving advice to ongoing social media work in the ministries (WP4_NOR).

5.2 Formality

We analyse the formality of collaboration by identifying the initiatives’ effects on formal structures, responsibilities, and procedures as well as on the intensity of formal and informal exchange. The comparison of the cases shows that the ICT initiatives had few effects on formal structures and procedures. A significant effect was observed only in the case of Chorus. This may be related to the fact that it is the only initiative whose use is mandatory for public bureaucracies and most companies. In this case, it resulted in the harmonisation of structures and the creation of uniform standards.

eNAP has not affected formal structures and procedures of the SIA so far – neither between the ministerial departments nor between ministries and the Parliamentary Advisory Council for Sustainable Development, who formally reviews the SIA as conducted by the ministry in charge for the regulatory or legislative draft. It is embedded into the existing SIA structure and process, without inducing changes in the distribution of tasks or the allocation of resources within the government. As there are no binding guidelines concerning the RIA or the scope that the assessment should take, officials are free to choose whether or not to use the tool. Moreover, the SIA is usually carried out rather late in the policy formulating process, which may contribute to the fact that the use of eNAP to substantially change the content of legislative drafts is unlikely. Accordingly, the case study has shown that eNAP itself does seem to be sufficient to achieve sustainable policies and has to be complemented by additional measures, e.g. applied at an earlier stage within the political process (WP4_GER).

Chorus is the only initiative that had an effect on formal structures and procedures. Our analyses have shown that, since the use of the tool is mandatory, Chorus has created a uniform
financial and budgetary standard in all ministries. Due to the relative rigidity of the Chorus software, there are few flexibilities for the ministries to keep their own standards. Interviewees describe this rigidity as conducive to inter-ministerial collaboration based on standardised financial and budgetary tools and practices (WP4_FRA).

The introduction of NAGis did not change formal structures or procedures, with the exception of opening up data sharing practices and changing collaborative practices (WP4_HUN). Pleio has not had any impact on the formal structures, but our analysis has shown that changes can be observed in the informal procedures. An important aim of the platform is to facilitate and encourage informal interaction and knowledge sharing e.g. between tax professionals or teachers. It is also intended to strengthen informal contact between these groups and the public bureaucracy (WP4_NDL). Since DIGIT possesses no direct formal authority on its own, there are no effects on changes in formal structures or procedures (WP4_NOR).

5.3 Intensity of the collaboration

All the solutions in the case study were applied in areas with little or no collaboration between the relevant actors beforehand, i.e. low collaboration intensity. In all cases, except for eNAP, interviewees mentioned that the initiative help to increase the intensity of collaboration (it should here be noted again that intensifying collaboration is not an aim of eNAP). Chorus and NAGis have only minor effects on the intensity of collaboration (WP4_FRA; WP4_HUN), while Pleio and DIGIT have much stronger effects (WP4_NDL; WP4_NOR). In the case of Pleio, collaboration with external actors in particular has improved. The external actors are now more involved in the processes and give feedback, which is partly integrated into the policy-making process (WP4_NOR). In the sense of an inter-ministerial working group, DIGIT was able to improve collaboration within the public sector.

eNAP has had no influence on the intensity of collaboration. The interviewees did however not expect the inter-ministerial coordination or the negotiation process to change, as they already engage in a continuous dialogue with the relevant actors anyway. Moreover, the consultation with other ministries in order to conduct the SIA is normally rare (WP4_GER).

With regard to the intensity of formal and informal exchange, different effects of Chorus can be observed. While the Chorus communication means to discuss budgetary issues are rarely used by public officials, Chorus provides a common data basis for negotiations. As mentioned earlier, disagreements over data quality have made collaboration between the ministries difficult in the past (WP4_FRA).

The degree of stakeholder involvement of NAGis has, according to the interviewees a positive but limited impact. The effect might have been greater if there had been a possibility for users to also provide data. In contrast, the intensity of the professional exchange between the
decision-relevant actors increased, especially in the development of municipal climate change strategies. It should be noted that at the local level, a lot of strategy work is outsourced to private consultants, which is the main type of external actors involved. NAGiS is also likely to create new opportunities for new consultants because of their expertise in using the software (WP4_HUN).

The intensity of informal exchange between internal and external stakeholders has increased significantly since the introduction and wide-ranging use of Pleio. The external actors are not directly involved in the policy process, but their feedback and suggestions are integrated into the decision-making process. In addition, Pleio offers a platform on which different actors can intensively exchange information on specific topics and share knowledge with external partners such as other public agencies, the private sector and citizens (WP4_NDL).

According to the interviewees, DIGIT has been able to increase the intensity of formal exchange by establishing new channels for the official communication of ministries, including the creation of a link between officials interested in new media and previously working in isolation from each other. The working group serves as a "clearing house" (WP4_NOR, p. 8) for social media initiatives, including group members active in a closed Facebook group for communications workers of the central government. DIGIT members report that this group has become more active over time, which is an indicator that social media work has generally become more important in the ministries (WP4_NOR). Table 6 summarises the scope, formality and intensity of collaboration of the solutions.

Table 6: Scope, formality and intensity of the solutions

<table>
<thead>
<tr>
<th></th>
<th>eNAP</th>
<th>Chorus</th>
<th>NAGiS</th>
<th>Pleio</th>
<th>DIGIT</th>
</tr>
</thead>
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<tr>
<td><strong>Scope</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of decision-making</td>
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<td>➔</td>
<td>➔</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td>Speed of decision-making</td>
<td>?</td>
<td>?</td>
<td>➔</td>
<td>➔</td>
<td>?</td>
</tr>
<tr>
<td>Inclusion of relevant actors</td>
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<td>➔</td>
<td>➔</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td><strong>Formality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in formal structures and procedures</td>
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<td>➔</td>
<td>➔</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity of formal/informal exchange internally</td>
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<td>➔</td>
<td>➔</td>
<td>➔</td>
<td>➔</td>
</tr>
<tr>
<td>Intensity of formal/informal exchange with stakeholders</td>
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<td>➔</td>
<td>➔</td>
<td>➔</td>
<td>➔</td>
</tr>
</tbody>
</table>

Legend

➔ = no changes; ➔ = slightly increased; ➔➔ = strongly increased; ? = unknown
5.4 Lessons learned

**ICT-related initiatives facilitate decision-making primarily on the individual level of public employees by providing and processing information**

ICT tools offer the possibility to prepare data and information within the public sector in a novel and user-friendly way. This improves officials' capabilities to assess information and thus supports evidence-based policy-making. In addition, this may also lead to a reduction of uncertainty for officials in the decision-making process and policy formulation. Furthermore, the studied ICT initiatives support the collection of additional information such as feedback and assessments by other internal and external actors which thus enriches the policy-making process. By providing and processing information, ICT solutions can also increase public officials' awareness for certain topics. However, they do not necessarily accelerate the decision-making processes. A shortening of the process can be expected for officials with experience on other ICT initiatives. Otherwise, such initiatives may also slow down processes before the necessary familiarisation with it is completed.

**Changes in formal procedures and structures are more likely if the use of the solution is mandatory**

In our case studies, effects on formal procedures and structures occurred only for mandatory ICT-solutions. ICT initiatives that were introduced as part of a reform programme and with apparent rigidity showed consequences for various ministries that adhered structurally and procedurally. This led to uniform standards in the public sector and the harmonisation of processes. This shows that the regulatory framework can have a significant influence on the effects of ICT initiatives. If the use of a solution is voluntary it may depend mainly on the individual motivation of public officials and the extent they use it to display its full potential. As expected, novel solutions can be implemented more easily in a top-down approach in a country with Napoleonic tradition (France). Its centralised state structure facilitates the obligatory use of ICT-solutions for all administrative levels. In federal states with a strong autonomy of lower administrative levels (e.g. Germany), it is much more difficult to oblige all levels to use a solution.

**Leadership support is crucial for the success of an ICT initiative**

Across the cases, the support of the political leadership has been crucial for the success of the ICT initiative. If it is voluntary, its use must be promoted. Hence, political and government support is also of great importance for supporting its application but also for financing it. Initiatives that are initiated bottom-up are likely to be even more dependent on support than solutions that are implemented in a top-down process. However, implementation as part of a larger reform process is not always a characteristic of secure funding. If the salience of the topic the solution deals with decreases over time, this can also lead to problems with financing. Salience increase, though, may help to institutionalise ICT-related solutions.

**The means of an ICT initiative influence its effects on collaboration intensity**
Whether an ICT initiative influences collaboration is shaped by its means. While some solutions offer special communication platforms for collaboration within the public sector and external actors, other solutions aim exclusively at providing information. Various applications such as communications websites or social intranets may encourage the dialogue between and across public officials and as well as with external stakeholders. In addition, the availability of the initiative also plays a role. Some initiatives are intended for certain user groups exclusively, while others are freely accessible to everyone as part of a web-based solution. Free access may allow actors outside the administration e.g. NGOs or citizens to use the solution as well and possibly provide information that might be relevant to the administration.

6 Effects on the parent organisations
The following section analyses the effects of the initiatives on the organisations involved. It examines how formal responsibilities within and between organisations and the collaborative culture between the organisations have been affected by the introduction of the novel ICT initiative. Further analytical categories examine the effects on the politics-administration dichotomy i.e. the relationship between the political leadership and the line bureaucrats within the public sector organisations utilising the ICT-solution, as well as the effects on legitimacy and efficiency of the public sector organisations.

6.1 Direct and indirect effects on the organisation
Across the five cases, the organisational effects of the novel ICT initiatives differ. Chorus is the only case with significant changes in the lines of formal responsibility. The tool has contributed to an important reorganisation of subnational state authorities. Following the entry into force of the LOLF, the government has decided to group some administrative services into Shared Service Centres (CSPs). However, this reorganisation is not the direct result of Chorus, but has accompanied its development. CSPs are spin-offs of corporate services in order to separate operational tasks from corporate headquarters. These headquarters are concerned with management and corporate governance. The French government administration has adopted a model similar to this organisational structure. This structural reform of subnational state administrative services partly induced by Chorus allowed the state to benefit from economies of scale and to rationalise financial operational tasks related to expenditure chain and tax revenues. The reorganisation was accompanied by a necessary professionalisation of the staff. Chorus required employees with higher knowledge of (state) accounting issues. Therefore, new staff was hired and special training for the employees was offered (WP4_FRA).

Except for the case of eNAP, an improved collaborative culture between the organisations involved was observed, particularly in the cases of Pleio, NAGiS, and DIGIT.
The first platforms of **Pleio**, launched in 2013, were based on the ideas of open source, transcended business boundaries, dialogue with external stakeholders, and knowledge sharing. According to the interviewees, over time, Pleio has impacted on the internal culture of the organisation and on the behaviour of the public officials. While the formal hierarchies did not change, the platform had an influence on informal hierarchies. A new form of leadership based on more freedom and autonomy for the teams involved emerged. But also the behaviour of the officials changed through the use of the platform. The officials had to change their communication habits. Values such as connection and openness became increasingly important, as a new way of acting was essential for the success of Pleio. In addition, the **RVO** intra- and extranets led to a new form of meeting culture. Since many things could already be clarified in advance via the intranet, the duration and number of personal meetings decreased significantly. This contributes to a more flexible work culture and enables employees to participate in discussions from home or elsewhere (WP4_NDL).

**DIGIT** may also have changed the collaborative culture within the organisation, but by other means. The working group is a link between communication workers interested in social media topics and employees who have so far been isolated from this issue. Thus, it provides a new way of communication to bring these two groups together (WP4_NOR).

Just like DIGIT, one of **NAGIS**' strengths is that the project brings together a wide range of institutions. Thereby, the tool contributes to a more cohesive and collaborative atmosphere between the institutions in charge of the development. In addition, the tool has a positive influence on the attitudes of the actors towards data sharing, which in the past had regularly led to problems in collaboration (WP4_HUN).

None of the initiatives under scrutiny had considerable influence on the politics-administrative dichotomy within the respective public sector organisations, e.g. on the political control over the permanent bureaucracy. This is a very interesting finding, as the political leadership usually intervenes regularly in the policy design process. The fact that they do not use their influence in the cases examined might be related to the fact that the initiatives mainly target internal administrative processes and communication channels. Thus these initiatives are used almost exclusively for horizontal collaboration and are less relevant for vertical interactions between public officials and the political leadership.

**ICT**-related solutions in general can contribute to different kinds of legitimacy: input, throughput and output (see Info box 3).
Info box 3: Types of legitimacy

Legitimacy can be divided into three different types (Scharpf, 2003; Schmidt 2013):

- **Input legitimacy**: Input legitimacy focuses on people's perception of politics and governance and ensures that decisions are made in a way that involves those who are governed (government by the people).

- **Output legitimacy**: Output legitimation deals with the legitimacy of results. It focuses on the increase the legitimacy of an organisation by producing useful services or deliverables (government for the people).

- **Throughput legitimacy**: Throughput legitimacy focuses on how decisions are taken in the political process. Legitimacy can be established by involving citizens in the process, e.g. through direct democracy.

Except for NAGIS, our analysis has shown that all cases can be regarded to have increased input or output legitimacy. However, the initiatives mainly contribute to the output legitimacy of the organisations. For example, in the case of eNAP, Chorus and Pleio, this is done by contributing to an evidence-based policy design using the information provided by the tool and thus increasing the legitimacy of the output of the policy-making process (WP4_GER; WP4_FRA; WP4_NDL). In the case of Chorus, information is used and spread to improve and speed up the work of state administrations as well as to decrease delays of financial and budgetary information circulation (WP4_FRA). Pleio does not only contribute to the output legitimacy but also to the input legitimacy of the organisation. By giving external stakeholders and citizens the opportunity to participate, the platform brings outside information into the administrative sphere (WP4_NDL). In the case of DIGIT, the growing legitimacy of the organisation results primarily from the fact that the administration adapts to developments in society, in this case social media, and thus fulfils the expectations of citizens for a modern administration (WP4_NOR).

According to the interviewees, all cases increased organisational efficiency at least partly. Organisational efficiency can be understood as the generation of a desirable output (e.g. policy draft, decision) with the smallest possible use of resources (e.g. time, money, human resources). In all cases, except eNAP, it can be assumed that the provision of information improves the effectiveness of decision-making. Particularly clear effects can be seen in the case of Chorus. The tool helps to simplify the processes and to improve the circulation of information about financial and budgetary issues (WP4_FRA). In the case of Pleio, it can be seen that some applications e.g. the RVO intra- and extranet can lead to the saving of resources and working time in the public bureaucracy, for example by reducing the number of mails and meetings (WP4_NDL). In the case of eNAP, only limited conclusions can be drawn in this regard, as there are no statistics available yet evaluating how often the tool is actually used and whether it influences the design and content of policy-making. Table 7 summarises the effects on the organisation in the five case studies.
Table 7: Effects on the organisations

<table>
<thead>
<tr>
<th></th>
<th>eNAP</th>
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<th>Pleio</th>
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<tr>
<td>Changes in formal responsibility</td>
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<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Improved internal collaborative culture</td>
<td>×</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Effects on politics-administration</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Increased legitimacy</td>
<td>✔</td>
<td>✔</td>
<td>×</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Efficiency gains</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</table>

6.2 Lessons learned

**ICT initiatives rarely lead to changes in formal responsibilities**

The ICT initiatives studied did not change the formal set-up of the organisations, including procedures, structures and responsibilities. However, the use of most of the studied ICT initiatives was voluntary. Furthermore, ICT initiatives created by bottom-up dynamics are less likely to change formal structures than top-down processes that are supported by the political leadership as part of an overarching reform programme. Even though the ICT initiatives studied did not change the formal processes, they influenced the informal processes and hierarchies. This may be especially true for ICT initiatives meant to improve intra-governmental collaboration. Communication forums and working groups can create a platform for a new form of communication that breaks down formal hierarchies and offers officials the opportunity to collaborate with each other more informally, regardless of time and location. This can strengthen the collaborative culture within the public sector.

**ICT initiatives for internal policy formulation mainly contribute to output legitimacy**

ICT initiatives can contribute to different types of legitimacy: Input, throughput or output legitimacy. Solutions that are primarily specialised in internal policy formulation, such as the ones analysed in this report, contribute mainly to the output legitimacy of organisations. In other words, they increase the legitimacy of an organisation by producing useful services or deliverables. This may mean, e.g. that public officials make more effective decision-making by using the solutions, or that the output produced is more evidence-based. Since the solutions often specialise in internal administrative processes and therefore rarely involve citizens, this result does not seem surprising.
7 Conclusion

The comparative analysis of the five case studies shows that ICT-related initiatives can have different effects on processes of internal collaboration, decision-making and policy formulation. Decisive for these effects are the distinct set-up conditions, the behaviour of the involved actors, and the technical means.

Whether the initiative leads to innovative intra-governmental collaboration depends on how it is used. We find that most of the studied ICT initiatives address the micro-level by providing and processing information for the public officials. They prepare data in a user-friendly way and provide the officials with information that otherwise would be difficult to assess, such as the possible consequences of a legislative draft. If public officials use them this can contribute to more evidence-based policy-making and increases the public officials’ awareness for relevant concerns e.g. climate change.

The comparison of the cases shows that changes in formal procedures and structures through ICT solutions are rare. They were only observed in one case, in which the use of the solution was mandatory. If the use of the ICT solution is voluntary, the use will mainly depend on the individual motivation of the employees and a harmonisation and standardisation of processes is more difficult to enforce. Especially if the use is voluntary, government leaders can make a crucial contribution to ensuring that ICT solutions are successful. Promoting and incentivising the use of ICT initiatives and offering training opportunities is also important. Leadership support increases the likelihood for public officials using ICT tools. However, this would necessitate the availability of sufficient resources.

The means have a major influence on the effects of the solutions on the collaboration with other stakeholders and eventually policy design. The ICT initiatives differ greatly in their means and thus in how they shape collaboration. Some initiatives mainly promote evidence-based policy-making by providing and preparing information, while others improve communication within the administration and with external stakeholders.

Regarding the effects on the organisations, we observed that changes in formal responsibility due to ICT initiatives are rare. However, the initiatives do influence informal structures, especially if they aim to improve intra-governmental collaboration. In the case studies, for example, effects on meeting and collaborative culture were observed. None of the ICT initiatives had a visible influence on the interactions between the political leadership and the permanent bureaucracy. Yet the case selection may also have influenced this non-finding. It is reasonable to assume that other ICT tools may affect these interactions as they e.g. provide the political leadership level with information on how the bureaucracy conducts its tasks. In addition, the studied cases show potential for increasing administrative efficiency and legitimacy. In this respect, the initiatives mainly contribute to output legitimacy, i.e. they increase the legitimacy of the organisation by providing useful deliverables or services.
Based on the results of the academic expert survey (D 4.2) and the literature and report review (D2.1) of WP2 we expected that the administrative traditions may influence the effects of the ICT initiatives. Due to the exploratory character of this comparative study and the heterogeneity of the field of investigation, only limited statements can be made about the relevance of administrative traditions. For our cases, their effect is rather limited. According to the academic survey, one might expect the emergence and diffusion of ICT initiatives to follow similar dynamics as other administrative reforms. Consequently, more flexible administrative systems could be expected to adopt ICT solutions more easily and quickly than those with legalistic traditions. In addition, it could be assumed that bottom-up approaches would be more difficult to institutionalise in countries with legalistic traditions. In the cases examined, both indicators for and against the influence of administrative traditions were found. On the one hand, the Napoleonic tradition in France supported the mandatory and wide-ranging application of Chorus. On the other hand, contrary to expectations, the Dutch platform Pleio is a widely used and rapidly bottom-up implemented tool applied and used in a public sector following a Continental tradition. Upon closer examination it becomes apparent that the administrative traditions will likely influence the set-up conditions of ICT solutions but do not explain the utilisation and success of ICT solutions and their effects on collaboration. Therefore, the analysis of the investigated cases confirms our assumption that the influence of the traditions on the implementation of ICT initiatives may be lower compared to other administrative reforms, since digitalisation poses new and similar challenges for countries of all traditions.

If the influence of administrative traditions on ICT initiatives and their effects on decision-making is to be further investigated, more comparative research is needed, such as a comparison of the same or very similar ICT-tools used in different administrative traditions. In addition, current (and future) developments may enable researchers to trace and analyse the development and use of ICT initiatives and tools across government organisations, e.g. big data analytics and artificial intelligence applications – although these are not explicitly designed to improve collaboration and instead primarily focus on gathering, clustering, and interpreting information and evidence and providing suggestions for decision-making. Further, our case studies showed that the effects on decision-making and collaboration can change over time. Thus, panel studies or in-depth qualitative case studies over a longer period of time may help to differentiate between time-dependent and time-independent factors.

Based on the current status of the results, there are certain conditions, e.g. the obligatory use of a tool or political support, which affect formal collaboration. At the same time, however, the informal effects of the ICT initiatives, such as changes in the collaborative culture of the organisations and in the behaviour of public officials, should not be underestimated, since these may institutionalise over time and thus potentially lead to formal changes as well.
References


Danielsen, Ole A. 2019. Social Media Coordination in Norwegian Government Ministries: A Case Study of the Working Group DIGIT.


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Appendix

Appendix I – List of the case studies

<table>
<thead>
<tr>
<th>Country</th>
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<th>Institutional affiliation</th>
<th>Title</th>
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<td>Camilla Wanckel</td>
<td>University of Potsdam</td>
<td>The electronic sustainability assessment tool ‘eNAP’: A Case Study</td>
<td>2019</td>
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<td>Samuel Dafacqz &amp; Claire Dupuy</td>
<td>CNRS/IEP Grenoble</td>
<td>Chorus: An integrated financial information system for policy design in France</td>
<td>2019</td>
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<td>Central European University Budapest</td>
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<tr>
<td>Netherlands</td>
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<td>TROPICO – WP 4 Case study: Pleio</td>
<td>2019</td>
<td>WP4_NDL</td>
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<td>Ole Danielsen</td>
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<td>Social Media Coordination in Norwegian Government Ministries: A Case Study of the Working Group DIGIT</td>
<td>2019</td>
<td>WP4_NOR</td>
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Appendix II – Case study protocol

**PART I: Method and data**

1. Please specify the time period covered in your analysis.

2. What data do you use for your case study?
   - Please specify the number of interviews (and positions of interviewees), ideally with date of interview
   - Please specify the additional sources (documents and else), including rough number and type (governmental reports, media coverage etc.)

3. How do you intend to store your data?

**PART II: Case description**

**Conditions (= Set-up and operation of the ICT-tool)**

4. Please provide a short descriptive analysis of the actors involved in setting-up the ICT-tool (including external actors, if applicable).
   - Which actors were involved in the decision to establish the ICT-tool?
   - What formal competencies and resources did these actors possess?
   - Did the actor constellation change over time, and if so, why?
   - How would you describe the decision-making process (centralised or else etc.)?
   - Was the ICT-tool inspired by other solutions in the public sector?
5. **Please provide a brief timeline** of the setting-up process of the ICT-tool (since when is it in place, was there a pilot phase first etc.)

6. **Was the initiation of this ICT-tool part of a larger reform program/initiative or else?** Please provide a brief description, if applicable.

7. **Is the initiation and/or operation of this ICT-tool linked to party competition** (e.g. as a pledge in an electoral campaign or else)? Please provide a brief description, if applicable.

8. **Please indicate the level of formal institutionalisation of the ICT tool**, i.e. whether it is maintained due to:
   - (a) legal framework,
   - (b) policy framework,
   - (c) political will,
   - (d) bottom-up initiative.

If (a) or (b): To what extent is the framework specifying usage and actors' responsibilities vis-à-vis the ICT tool in question? What else does the framework regulate regarding the ICT-tool?

9. **Was there a narrative** regarding initiating/using the ICT-tool and if so, which one? Who promoted this narrative?

**Actors (= Users of the tool)**

10. **Which ministries and/or central agencies are using the ICT-tool** for which types/cases of decision-making (= collaboration)? Did the number of actors change since the inception of the ICT-tool?

11. **What are these actors' expectations on the usage** of the ICT-tool? What are their preferences, i.e. what is about to change (improve? worsen?) compared to the previous ways of decision-making (without the ICT-tool in place)?

12. **Did the ICT tool require the public sector workforce to gain new skills and knowledge?**

**Means (= ICT-tool as a mean in governmental collaboration)**

13. **Please describe the technicalities** of the ICT-tool (proprietor, software, funding/budget, resources etc.)

14. **Relevant usage statistics**: Please provide information on the usage of the ICT-tool (if applicable, e.g. number of users, number of cases etc.)

15. **What are the major means** available in the ICT tool and how are they linked to decision-making (in a more technical sense)?

**PART III: Analysis of effects and consequences**

**Effects on decision-making**

16. **Which effects does the ICT tool have:**
   - **on changes in formal structures (resources etc.)?** Which actors?
   - **on changes in formal procedures (hierarchies etc.)?**

17. **What is the intensity of the collaboration (= decision-making) on which the ICT-tool is applied?** Does the usage of the ICT-tool change this intensity and if so, how and in which way (making it stronger/weaker)?
• strong collaboration (sharing responsibilities),
• medium collaboration (sharing work),
• weak collaboration (sharing resources),
• absent collaboration (sharing information only)

18. In which way does the **ICT-tool shape the decision-making** (compared to before/not using it)?
   (a) Quality of decision-making (availability of solutions)
   (b) Effort to conduct the decision-making (resources, human/financial)
   (c) Duration to conduct the decision-making (time)
   (d) Degree of inclusion of all relevant actors for the decision-making
   (e) Intensity of *formal/professional* exchange between relevant actors for decision-making
   (f) Intensity of *informal* exchange between relevant actors for the decision-making
   (g) Contact to external actors involved in the decision-making
   (h) Other (please specify)?

20. Has the ICT-tool changed the (previous) **behaviour of bureaucratic actors** in decision-making, and if so, how? This may refer to e.g.
   • Policy analytical capacity of bureaucratic officials
   • Information overload
   • Attitude towards compromises/consensus
   • Formal exchange between relevant actors
   • Informal exchange between relevant actors
   • Attitude towards digitalisation

**Effects on the organisation**

20. Did the usage of the ICT-tool have effects for the internal organisation, e.g. regarding
   • lines of formal responsibility
   • hierarchy

21. Did the usage of the ICT-tool have effects for the **politics-administration dichotomy**, i.e. for
   • the political control over the (permanent) bureaucracy
   • the relationships between the executive (ministry/agency) and the legislative (parliament)
   • the discussion of policy proposals with other external actors (NGOs, interest groups, media)?
   • the presentation of policy proposals to the public?

22. Have there been other **intended effects**? Which ones? E.g.
   • efficiency gains
   • increasing legitimacy (also: trust in government etc.?)

23. Have there been other **unintended effects**? Which ones?