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BACHELOR THESIS

Evaluating "e-Estonia": digital administrative capacity building in the Estonian health sector.

A case study based on the implementation of the Estonian Health Information System from 2008 to 2018.

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0. Abstract

The following thesis aims to shed light on the governance mechanism of digital administrative capacity building in the Estonian health sector. As such, the implementation of the Estonia Health Information System from 2008 to 2018 is explored. The overall research question is “What is the key governance mechanism of implementing digital administrative capacity in the Estonian health sector using the example of the implementation of the Estonian National health information system from 2008 to 2018?”. In order to analyse this research question sufficiently, a descriptive, explorative approach is chosen. Firstly, primary literature is used in order to pre-define theoretical expectations. Thereafter, policy documents are analysed in order to test theoretically pre-defined dimensions affecting the governance mechanism of digital administrative capacity in the context of the Estonian health sector. Thus, semi-structured, qualitative key expert interviews are conducted in order to provide an in-depth focus on the dimensions of the Estonian digital administrative capacity building as well as to explore additional factors. Until recently, there is limited reliable evidence available in English or German investigating the governance mechanism of digital administrative capacity in the particular context of the Estonian health sector. This thesis proves its relevance by adding empirical additions to the actual digital health care system development.

List of abbreviations

CEE	Central Eastern Country
EHIS	Estonian Health Information System
EHIF	Estonian Health Insurance Fund
EU	European Union
GDP	Gross Domestic Product
NATO	North Atlantic Treaty Organisation
NPM	New Public Management
NWS	New Weberian State
OECD	Organisation for Economic Co-Operation and Development

1. Introduction

Within the group of Central Eastern Europe (CEE) countries, Estonia has not only been a remarkable example using their enthusiasm for singing[1] (Waren, 2012) but also being one of the forerunners for the implementation of digital governance approaches in the private as well as public sector (Kalvet, 2012). The country, which gained independence in 1991, has undergone rapid transformation and democratisation and joined the Union within the framework of the EU East enlargement in 2004. Already since the mid-1990s and thus before joining the EU, Estonia has developed first policies for the promotion of its digital infrastructure (Kalvet & Aaviksoo, 2008). Hereby, parallel developments can be identified. Not only has the country gone through comprehensive democratisation as well as Europeanisation process but has simultaneously paved the path for its rise towards an “e-Power”. The process of building digital administrative capacities within the public sector is conceptualised in various terms such as “eGovernment” (Gil-Garcia & Pardo, 2005; Kalvet, 2012; Kitsing, 2011). The term is moreover divided into several sub-terms expressing more specifically the area of interest (eParticipation, eService, eLearning, eHealth). The on-going academic debate mirrors the diversity in the field of eGovernment. Regarding the Estonian characteristic as a transition country, a considerable amount of literature has been published dealing with the Europeanisation respectively transformation of the public sector in CEE countries (Bouckaert, Nakrošis, & Nemec, 2011; Schimmelfennig & Sedelmeier, 2002).

Moreover, academic focus is laid upon the implications of public sector reforms in Estonia in terms of eGovernment (Kalvet & Aaviksoo, 2008). In the role as an outstanding example for eGovernment practices, Estonia is used as the subject of case studies. In 2018, Lember, Kattel and Tõnurist have analysed Estonian technological capacities in the public sector (Lember, Kattel, & Tõnurist, 2018). Further research has dealt with the explanation of the success of the Estonian establishment of eSolutions such as seen by Kalvet (2012) dealing with the factor of innovation, Gil-Garcia and Pardo (2005) concerning practical tools sharpening this success or Kitsing (2011) focusing on the actor constellations mainly developing the “evolution of e-government” (Kitsing 2011).

[1] Between 1988 and 1991, the Estonian independence movement of the USSR was largely determined by the so-called "Singing Revolution". Activists came together at music festivals to sing patriotic songs (Waren 2012)

This thesis will lay special emphasis on the governance mechanism of digital administrative capacity building within the Estonian health system (eHealth). Thereby, it will be focused on the Estonian National Health Information System (EHIS) which has been established in 2008. Health policy is one of the most demanding areas on the agenda of today's policymakers as it presents high values in terms of societal relevance. Thus, the implementation of the EHIS can be seen as a result of various policies, involving initiatives and legally binding documents such as the Estonian Health Project 2015, the National Health Plan (2008), the Estonian Information Society Strategy 2013, the Estonian eHealth Strategic Development Plan (2009), the Health Services Organisation Act, as well as the Personal Data Protection Act (Doupi, Renko, Giest, Heywood, & Dumortier, 2010). The EHIS results from the Estonian Health Project 2015 that is based on the establishment of four core projects which were ultimately merged to form the EHIS. These eProjects are namely (1) the electronic health record, (2) digital registrations, (3) digital imaging as well as (4) digital prescription (Kruus, Aaviksoo, Hallik, & Uus, 2013).

It is remarkable that Estonia is the best practice example of digitising its private and public sector in Europe. This is not only due to its history as a transition country and its extensive reforms in both the private and public sector, but also due to its small size and limited capacities. Although, there is English and German academic literature dealing with the Estonian health system in transition (Habicht et al., 2018; Tiik, 2012) this research has generally neglected the mechanism of digital administrative capacity building in the Estonian health sector. Nevertheless, it is important to outline that there might be analyses available in Estonian that could serve the chosen research context.

As a consequence, the main issue occuring within this context is the evaluation of building digital administrative capacity and the actual implementation of the EHIS. As already mentioned, the policy-making in terms of eGovernment has begun before Estonia’s accession to the European Union. The latest Strategic Development Plan 2020 was established in 2015. The target of this thesis is therefore to extract the governance mechanism given within the process of digital administrative capacity building within the Estonian health sector.

1.1 Context

Estonia is a Central Eastern European country that borders both Russia and Latvia. It has 1.3 million inhabitants of which approximately 70% live in cities (Habicht, 2018). As already mentioned, Estonia has undergone rapid public reforms during its democratisation and transformation processes beginning in the early 1990s. Since then, “the main policy objectives for Estonia have been the integration with international organisations and unions (…)” (Habicht, 2018: 1). This policy agenda has thus followed the accession to the European Union (EU) and the North Atlantic Treaty Organisation (NATO) in 2004 as well as to the Organisation for Economic Co-operation and Development (OECD) in 2010 (Habicht, 2018).

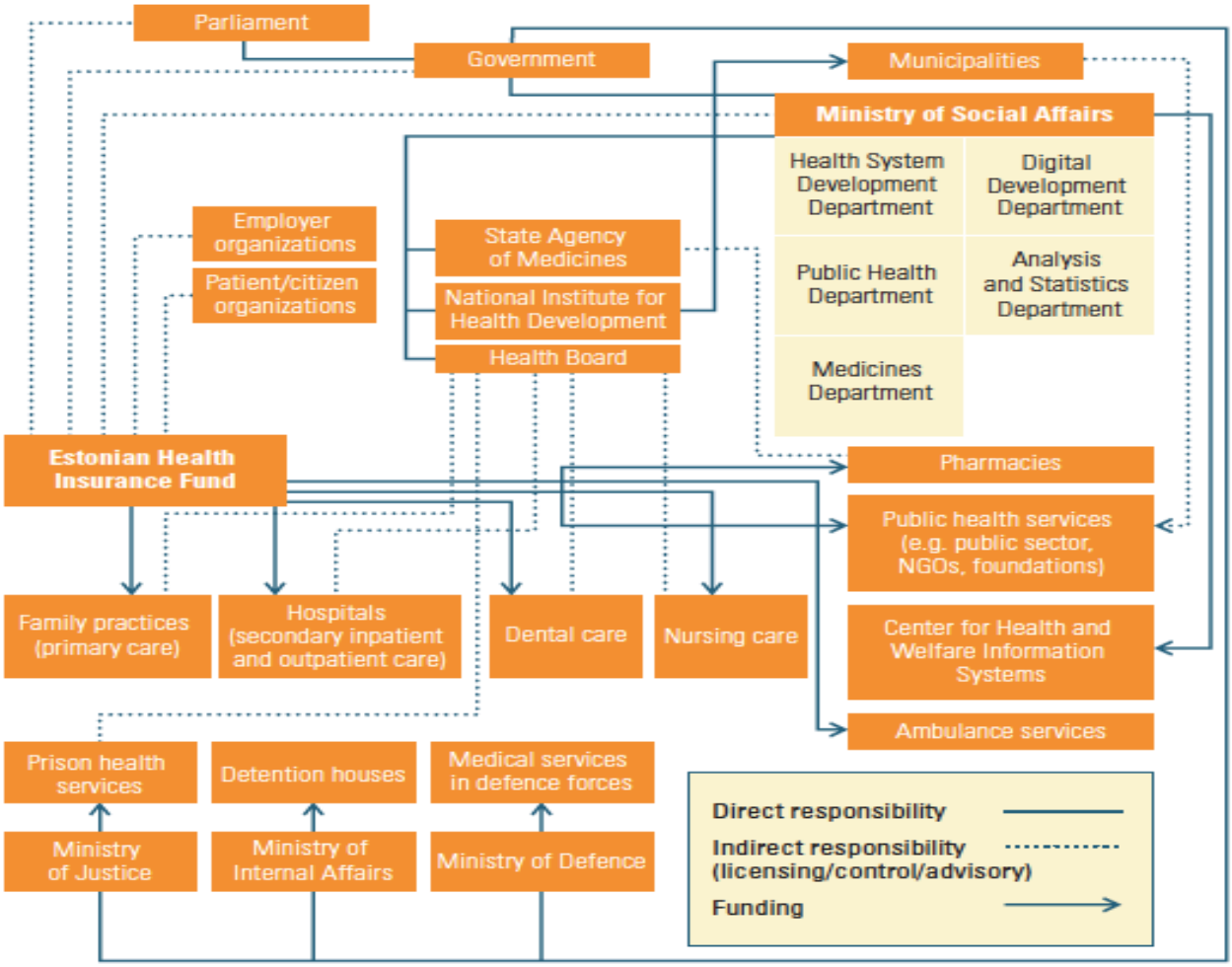
With regard to the economic context, the democratisation process has embarked several implications for the Estonian economy. One can outline a positive development in terms of economic development. Between 1993 to 2018, the gross domestic product (GDP) indicates growth from 5572$ per capita to 35 796$ per capita (Organization for Economic Co-operation and Development, 2019). The trade in goods and services in this timeframe has moreover increased from 66% of the GDP to 75.2% of the GDP (OECD, 2019).

In terms of the political context, Estonia has established parliamentary democracy after gaining independence in 1991 (Habicht, 2018). Due to this, the legislative supervisory power lays with a unicameral parliament with 101 members. Those are elected for a legislative period of four years. The executive power is held by the Government of the Republic of Estonia pursuing the legislative established within the Estonian constitution (Habicht, 2019). The head of state of Estonia is the President, who is elected for five years by an electoral body consisting of members of parliament as well as representatives of individual municipalities (Habicht, 2019).

As this research lays focus on eHealth, it is necessary to describe the context in which health policies are developed and established. The Estonian health system is based on “compulsory, solidarity-based insurance and almost universal access to health services provided by entities that operate under private law” (Habicht, 2018: 16). Besides the Parliament and the Government, the main health institutions are the Ministry of Social Affairs as well as the Estonian Health Insurance Fund (EHIF). The Ministry of Social Affairs is based on five departments. Those are namely the (1) Health System Development Department, (2) Digital Development Department, (3) Public Health Department, (4) Analysis and Statistics

Department as well as the (5) Medicines Department (Habicht, 2018). Furthermore, there is a direct responsibility of the Ministry of Social Affairs and the State Agencies, the National Institute for Health Development as well as the Health Board (Habicht, 2018). With respect to financial matters, the EHIF appears as a key institution. It is the main funding source for the public as well as semi-public organisations within the health system such as primary care, secondary inpatient and outpatient care, dental and nursing care as well as the Public Health Services and the Center for Health and Welfare Information Systems (Habicht, 2018). With regard to this, a centralized organisational structure of the Estonian health care system can be pointed out.

Fig. 1 Organisational structure of the Estonian health care system



Source: Habicht, 2018

1.2 Social and Scientific Relevance

The selected topic of interest, the digital administrative capacity building in the Estonian health sector analysing the EHIS have multi-layered scientific and social relevance.

The research is socially relevant since the health sector is an important policy field for Estonian citizens as health illustrates a human right. As established in the National Reform Programme ESTONIA 2020 (European Commission, 2018) the overall public aim concerning the health sector is the improvement of quality, accessibility, and effectiveness of health care services (European Commission, 2018). The implementation of the EHIS entails consequences in terms of efficiency, equity and access to health services. With regard to the Estonian socio-demographic standards, this appears of particular importance as one can outline a negative population age structure ratio (Habicht et al., 2018). In recent years, there is a decline in the population whereas the morbidity ratio between women and men is remarkable (European Commission, 2018). Whereas the average age of women is 80,52 the average age for men is 70,62 (Commission, 2018). The aging population introduces certain implications for the performance of the Estonian health care system. Not only issues concerning social security are triggered but also the access and efficiency of the health system in order to capture rising demands towards the health system. The quality of health, as well as the efficiency of the health system performance, have to be driven forward. Digital solutions could be the key in order to tackle these ambitious tasks.

With regard to equity concerning the access to health care, the establishment of the EHIS could contribute to a twofold framework. On the one hand, patients have easier access to health services and digitisation represents a dismantling of barriers. On the other hand, data conducted via the system can lead to the development of policies that strive to reduce the issues of inequality. Efficiency is moreover increased in personnel and therefore financial manners such as seen by using ePrescriptions as no physical appearance is needed in order to help patients. Moreover, the quality of health services could be improved as the availability of relevant health data might reduce errors in the treatment of patients. In addition to that, the digitalisation of medical and records reduce paper consumption and thus have a positive effect on the environment and costs (Tiik, 2012).

In terms of scientific relevance, Estonia can be first described as an influential case and outlier in digital administrative capacity building under CEE countries. This is due to its entrepreneurial character of introducing digital solutions to its public and private sector. The analysis of the governance mechanism of digital administrative capacity building in the particular context of the Estonian EHIS represents an unstudied area that has to be scientifically investigated in order to further promote current developments within the cluster. Although there is a limited amount of English and German literature available dealing with the mechanism of administrative capacity building, there is a remarkable gap in research dealing with the building of *digital* administrative capacity. The topic is moreover relevant for policymakers as this thesis aims to present an evaluation of the status quo of implementation.

1.3 Structure

This thesis is structured as follows: This section introduces the reader to the research context and problem selected. Firstly, the context of research is given underlining the unique characteristics of Estonia implementing eGovernment mechanisms (section1.1). This context is a fundament in order to outline the societal and scientific relevance of the thesis (section 1.2). After outlining the structure, the research question and corresponding sub-questions are presented.

The second chapter then will evolve around the theoretical framework. The theory is not only used in order to show theoretical expectations (section 2.4) but also to illustrate theories and previously gained knowledge. Therefore, the components included within the research question and corresponding sub-questions are theoretically underlined. As such, this chapter starts with the context of public sector reforms (section 2.1) and then focus on administrative capacity building (section 2.2) including digital administrative capacity building.

The third chapter introduces the methodological choices used in order to conduct the given research. To do so, the selected research design is explained and defended (section 3.1). Moreover, the case selection (section 3.2), as well as the data collection methods (section 3.3), are illustrated. At least the operationalisation of concepts further used in terms of coding is established (section 3.4).

The fourth chapter deals with the actual analysis of collected and conducted data. The structure hereby follows the predetermined dimensions established in the theoretical framework. As such, section 4.1 deals with strategy, then support (section 4.2), resources (section 4.3), as well as implementation (section 4.4), follow. As this thesis performs a triangulation build on the data of comprehensive document analysis and three key expert interviews, each section starts with the presentation of the results gained concerning the policy documents. Thereafter, findings gained during the key expert interviews are presented.

After the analysis, the fifth chapter concludes the empirical findings. Thereby, an evaluation of the results is presented (section 5.1). Finally, an outlook dealing with the limitations of this research and lessons for further research is given (section 5.2).

1.4 Research Question

This thesis follows a descriptive, exploratory approach and aims to extract the public administrative mechanisms given in the context of digital administrative capacity building in the Estonian health care system. Thereby it uses the example of the implementation of the Estonian Health Information System from 2008 to 2018. The overall research question will therefore be:

What is the key governance mechanism of implementing digital administrative capacity in the Estonian health care system using the example of the implementation of the Estonian National health information system between 2008 and 2018?

The timeframe of 2008 to 2018 was selected as a period for analysis as the National Health Information System was established in 2008.

In order to further specify the scope of this question, this thesis aims to cover the component of digital administrative capacity-building and actual policy implementation. As such two sub-questions are

(1) *To what extent are digital administrative capacities built in terms of the implementation of the Estonian National Health Information System?*

(2) *What are the predominant factors affecting the administrative digital capacity building respectively the implementation of the Estonian National Health Information system in the Estonian health sector?*

2. Theory

This thesis intends to outline a descriptive, explorative approach. Therefore, a theoretical foundation in order to sufficiently address the research aim at hand is needed. As such, the concept included within the overall research question and corresponding sub-questions will be theoretically underlined. It is necessary to put emphasis on *public sector reforms* as they build the context in which the mechanism to be investigated takes place as well as the actual *building of (digital) administrative capacity*. Those fields cover the main issues arisen in the research context. Building (digital) administrative capacity is a complex and multi-faceted progress. Measurements to investigate the state-of-play of implementation, as well as the key mechanism of digital administrative capacity, are asked to be theoretically constructed and conceptualised. Those measurements are particularly needed as they might give evidence about relevant factors affecting the building of digital administrative capacity positively or negatively, respectively. After discussing relevant literature and theoretical concepts, the results gained are used in order to formulate theoretical expectations in terms of building a theoretical framework.

2.1 Public Sector Reforms

When analyzing public sector reforms, the context in which those are established is of particular importance. With respect to the selected scope of this thesis, literature refers to reforms of the public sector in CEE countries. This attempt is needed as the phase of public sector reforms in CEE countries is connected to the developments of Europeanisation and democratisation (Bouckaert et al., 2011).

2.1.1 Definition and Development

Pollitt and Bouckaert (2004) define public sector reforms as “deliberate changes to the structures and processes of public sector organisations with the objective of getting them (in some sense) to perform better” (Pollitt & Bouckaert, 2004: 16). The working definition selected for this thesis can be found by Junjan (2012) in Nemec and De Vries (2012). Here, “Public Administrative reform is described as any restructuring of the administrative part of the public sector in order to solve organisational and/or social problems associated with this structure and intended to promote a professional, merit-based and neutral civil service” (Junjan, 2012: 21). This definition is used as it covers a broader scope compared to the definition provided by Pollitt and Bouckaert (2004).

Public sector reforms in Estonia can be illustrated in a four-phase model. The first phase is situated in the timeframe of the first half of the 1990s to 1999 (Randma-Liiv & Drechsler, 2017; Tõnnisson, 2008). Within this period the overall aim was the establishment of institutions and an independent state (Tõnnisson, 2008). Moreover, the division of state and local authorities as well as “the creation of a modern legal and administrative framework for the civil service by the replacement of the Soviet patronage by merit principles” (Tõnnisson, 2008: 97) were path-breaking. There are three key characteristics of the first phase of public sector reforms (Staronova, 2006). Those are (1) the re-establishment of legitimacy and accountability systems of public authorities and the civil service, (2) the re-introduction of institutional pluralism that includes public agencies and civil society groups and (3) the increase of efficiency of the administrative state (Staronova, 2006).

Secondly, within the timeframe from 1999 to the EU accession in 2004, those first mechanisms were further developed. With respect to public sector reforms, a special focus was laid on features such as the quality and accessibility of public services, the accountability, and control of public sector (institutions), as well as the cost-efficiency of the public system (Tõnnisson, 2008). In addition to that, EU monitoring and support by Western European Countries, SIGMA and the OECD played a crucial role (Randma-Liiv & Drechsler, 2017).

The third phase starts with Estonia’s accession to the EU in 2004 (Sarapuu, 2012). From this point onwards, pre-accession reforms slowed down and “structural changes in this time can be expected to arise from a complex interplay between political strategies, historical-cultural convictions, and environmental pressures, with none of them having specific CEE-related character anymore” (Sarapuu, 2012: 810). This slow-down is based on the demise of previous given exogenous pressure such as seen by the EU, SIGMA as well as the OECD (Randma-Liiv & Drechsler, 2017). The fourth phase can then be illustrated as the stage in which innovation and technological devices enter the public sphere. Information and Communication Technology (ICT) solutions are introduced to the public sector of CEE countries in terms of efficiency and further public-sector developments (Randma-Liiv & Drechsler, 2017).

In addition to these four phases of public sector reforms, some of the reforms reasons and driving forces can be outlined given the context of analysing a CEE country. A prevalent factor was the exogenous pressure articulated by the Europeanisation process and the requirements to fulfil the standards of the *Acquis Communautaire* (Bouckaert et. al., 2011). This process was

further supported by assistance programs such as *PHARE*[2] in terms of technical assistance (Staronova, 2006). Moreover, international organisations such as the OECD and Western public administrative consultants supported and monitored the reform process in CEE countries (Randma-Liiv & Drechsler, 2017).

Additionally, Estonian public-sector reforms were determined by the process of policy transfers. As such, the Estonian public-sector is mainly influenced by German public management practices with regard to the legal framework as well as the UK and Nordic countries' practices regarding individual management tools (Bouckaert et. al., 2011). Nonetheless, Bouckaert et. al (2011) analyse the transition from these policy-transfer processes to policy-learning as those strategies and decisions are mainly based on domestic decisions (Bouckaert et. al., 2011).

2.1.2 Typology

With regard to the public-sector reform stages as outlined before, different public administrative approaches have been followed and implemented. In the current academic debate, the Estonian public sector is frequently classified as "the most radical and NPM-based" case (Bouckaert 2011: 18). New Public Management (NPM), as defined by Drechsler (2005) "is the transfer of business principles and management techniques from the private into the public sector, symbiotic with and based on a neo-liberal understanding of State and economy" (Drechsler, 2005: 95). As the academic sphere largely agrees with this classification (Bouckaert et al., 2011; Dan & Pollitt, 2015; Nemec & de Vries, 2012; Pollitt & Bouckaert, 2017; Staronova, 2006; Tõnnisson, 2008), it remains unclear to what extent new public administrative approaches will significantly determine current changes within the public sector for the selected case of Estonia. In terms of the main target of this thesis, the investigation of the governance mechanism of digital administrative capacity building, it is nonetheless necessary to analyse the context of public sector reforms in which this capacity-building is situated.

Following an NPM-approach, policy strategies fulfilled the desire to implement management mechanisms within the context of public administration. Thus, the central policy-target was not only the creation of a basic democratic system but to simultaneously make public institutions

[2] Phare was an instrument for pre-accession assistance for the CEE countries. It was replaced by the Instrument for Pre-Accession Assistance (European Commission, 2019)

more efficient (Bouckaert et. al., 2011). This approach not only followed the *Zeitgeist* of public sector reforms in the 1990s but also a strongly neo-liberal ideology (Randma-Liiv & Drechsler 2017). In correspondence to this, further visible features of NPM-approaches within the Estonian public sector was the establishment of flexible and decentralised structure within the public administrative system, pay-for-performance features, contracting- out and legislation as well as strategies that minimised the role of the nation-state (Randma-Liiv & Drechsler, 2017)

Given the unique context of a transitional country, there is a scholarly consensus that the NPM-approach was not the best choice given (Nemec & de Vries, 2012; Randma, 2001; Randma-Liiv & Drechsler, 2017; Tõnnisson, 2008). In terms of rational considerations, NPM and its features do not address the most relevant issues occurring in the CEE context sufficiently (Nemec & de Vries, 2012). NPM is unsuitable in order to establish sufficient public-sector reforms in CEE countries, as it minimises the role of the state that has to play a key feature in order to sufficiently implement public sector reforms in CEE countries (Drechsler, 2005). This role is particularly important regarding threats such as corruption and nepotism (Randma-Liiv & Drechsler, 2017).

The unsuitability of NPM-approaches of public sector reforms in CEE countries can be further found respecting the political sphere. As CEE countries lack a stable democracy due to their transformation history, public administrative responses to political changes appear weak. It is remarkable that “the frequency of changes and the lack of professionalism limit significantly the changes for effective reforms and represent almost non-existent long-term policies” (Nemec & de Vries, 2012: 13). With reference to the question formulated here, it is particularly important to recognise that “for CEE, the existence of a double revolution – in technology and the rise of a global innovation-based economy on the one hand, and in the political transition sphere locally on the other – is precisely what makes NPM even worse." (Drechsler 2005: 101). In correspondence to this Bastow, Dunleavy, Margetts, and Tinkler (2006) expect a negative impact on NPM on ICT implementation as the fragmentation of government and the indirect effects of NPM on supporting the IT industry for example due to contracting out, inhibits IT performance (Bastow et. al, 2006).

Besides these contradictory results, Dan and Pollitt (2015) conclude that “NPM *can* work”. In a comprehensive literature review, it is analysed that the critique against the choice of NPM-mechanisms in CEE countries can be balanced. In certain organisational settings, NPM

mechanisms can stipulate advantageous and fruitful improvements (Dan & Pollitt, 2015). With regard to Estonia, especially the mechanisms of decentralisation of the human resource management in the central government is positively outlined as it “created an impetus for positive change, facilitated other major public-sector change and afforded the flexibility to implement reform at the organisational level” (Dan & Pollitt, 2015: 1312). In addition to that, given the pre-requisite of a fundamental basic public administrative structure, NPM can offer tools that have positive effects on public sector reforms such as outlined before. Nevertheless, Drechsler (2005) makes one important exception underlining that small states could be able to create their own, appropriate strategy of public sector reforms. This will be further elaborated respecting the fourth stage of public sector reforms in Estonia.

Referring to the counterbalance of NPM advantages and disadvantages, Drechsler (2015) argues for the preserving and support of a strong state and a Neo-Weberian public administrative structure in order to sufficiently implement public sector reforms in CEE countries. The theoretical approach of the Neo-Weberian state (NWS) thereby merges what is analysed positively within a Weberian public administration and NPM. NWS is therefore based on a classical Weberian administration that includes features such as hierarchy, division of labour as well as exclusive employment (Randma-Liiv & Drechsler, 2017). Nevertheless, NPM-tools (e.g decentralisation) are included (Randma-Liiv & Drechsler, 2017). A demise of the NPM approach towards the NWS is analysed by several scholars (Bouckaert et al., 2011; Nemec & de Vries, 2012). According to Randma-Liiv and Drechsler (2017) the NWS approach therefore mainly influenced public sector reforms after the EU accession (Randma-Liiv & Drechsler, 2017).

Recently, as mentioned above, a technological shift towards Information and Communication Technology (ICT) solutions within the public administrative sphere takes place (Bastow et al., 2006; Randma-Liiv & Drechsler, 2017). Besides different approaches on how to support this technological shift administratively such as eGovernance and Public-Sector Innovation (PSI), there is no broad scholarly consensus on how to categorise this fourth stage of public sector reforms. This is also due to the fact, that this phase is currently in progress. However, theoretical foundations regarding small states and innovation can be found in their public sector.

The introduction of innovation and corresponding policies in small states have recently raised scholarly interest (Kattel, Randma-Liiv, & Kalvet, 2011; Randma, 2001). The size of states

plays an increasingly important role in the establishment of ICT mechanisms and innovative policies. Kattel et al. (2011) have outlined several implications for small states in terms of innovative success. Firstly, as having a small market and limitations for economies of scale, the corresponding dependence on exports often threatens small states to overspecialisation (Kattel et al., 2011). Secondly, as a crucial lack of financial as well as personnel resources occurs, public policy strategies are determined by “prioritisation, selectivity as well as adaptability” (Kattel et al., 2011: 3). The lack of personnel capacity also includes deficits in terms of hiring highly qualified public civil servants (Randma, 2001). Moreover, small states often present a higher degree of informal structures that support communication between government units. Randma (2001) further concludes that the small size of the country stipulates “a large discrepancy between norm and reality” (Randma, 2001: 49) which ultimately leads to a gap between policy expectations and realities. Additionally, and with special importance for the main target of this thesis, “the bureaucracy has operational autonomy in policy-making and a near monopoly of technical expertise” (Randma, 2001: 49).

2.2 Administrative Capacity Building

With regard to the transformation of Estonia including its public-sector reforms, the building of administrative capacity is a key feature. In order to theoretically conceptualise administrative capacity, a definition is first given. As the overall focus of this thesis deals with the mechanism of building digital administrative capacity respectively the implementation of the EHIS, *digital* administrative capacity building is further elaborated. To do so, a review of relevant theories dealing with governance mechanisms in the context of eGovernment is given. Those findings shall be ultimately merged with the conceptual framework of an administrative capacity building provided by El-Taliawi and Van der Wal (2019), Honadle (1981) as well as Rainey (2008).

2.2.1 Definition and Measurement

With the intention to create a measurable theoretical concept of administrative capacity, El-Taliawi and Van der Wal (2019) lay emphasis on the building of organisational administrative capacity. Here, they focus on Honadle’s (1981) identification and strongly elaborate that “capacity involves the ability to anticipate change; develop programs; attract, absorb and manage resources; evaluate activities and apply lessons to future activities” (El-Taliawi &Van der Wal, 2019: 4). With this definition in mind, different indicators for measuring

administrative capacity are critically evaluated. Here, it is particularly important to create a measurement mechanism that fits the case setting in which the given research case is situated. Regarding this, the previous elaborated typology of public sector reforms and subsequently the architecture of the Estonian public sphere are of importance. El-Taliawi and Van der Wal (2019) thus stress out lessons for establishing indices of measuring administrative capacity. With respect to this thesis, the most important lessons found are the respect for *dynamics in the administrative capacity development*, previous *context evaluation*, the *intervention with other administrative capacity dimensions* such as policy and state capacity as well as the *interplay with support systems* and *capacity gaps* (El-Taliawi & Van der Wal, 2019).

There are several attempts available establishing administrative capacity measurements. Honadle (1981) has established a conceptual framework for administrative capacity. Thereby, the author focuses on basic indicators such as *administrative practices* including internal resource allocation, information management, and periodic evaluation, *institutions* as well as *organisational requirements of capacity* that include the interrelations with other organisations, problem-solving process and mechanism for institutional learning (Honadle, 1981). Factors affecting organisational change and capacity building have been raised interest among scholars. In view of this, Rainey (2009) identifies eight success factors for organisational change and administrative capacity building. Those are (1) ensuring the necessity, (2) development of a strategy, (3) building of internal support for change and overcome resistance, (4) ensuring top-management support and commitment, (5) building of external support, (6) providing of resources, (7) institutionalization of change as well as (8) pursuing of comprehensive change (Rainey 2009). These success factors can be ultimately merged into a conceptual framework that consists of four dimensions namely, strategy, support, resources as well as implementation.

2.2.2 Digital Administrative Capacity Building

The overall aim of this thesis is to extract the governance mechanism emerging within the process of digital administrative capacity building within the Estonian health sector. As such, it is necessary to theoretically pre-define it in order to test if the governance mechanism is given in the particular context of the Estonian health sector. With regard to this, it is important to emphasise that the mechanism to be investigated may not function in another setting or in a different policy context.

In this thesis, digital administrative capacity is used in the context of "eGovernment" that is widely spread in the academic sphere (Gil-Garcia & Pardo, 2005; Kalvet, 2012; Kitsing, 2011) and subsequently divided into several sub-systems such as eParticipation, eLearning or eHealth. In this thesis, digital administrative capacity is therefore defined respecting the definitions of eGovernment provided by Dwidvedi, Weerakkody, and Janssen (2011). As such, digital administrative capacity is "to build a digital state where public services and information can be offered to citizens electronically" (Dwidvedi et a., 2011: 11).

Nevertheless, analyses of *building* digital administrative capacity are relatively fragmented as this progress is clearly context-related. The following section will cover a short discourse of available eGovernment approaches such as technological capacity (Lember et. al. 2018), digital era governance (Bastow et. al. 2006) and innovation policies (Kalvet, 2012; Kitsing, 2011). Thereafter, success and failure factors of digital administrative capacity building shall be presented. This is done as those findings are used in order to theoretically merge them with the conceptual framework of administrative capacity building respecting the selected context of this thesis.

The establishment of digital administrative capacity building can be seen in a multi-layered perspective. Some scholars focus on digital technologies in the context of organisational changes of public administration (Lember et. al., 2018). Others, such as Bastow et al. (2016) establish the idea of digital era governance (Bastow et al., 2006). This theoretical concept deals with the theory of modern bureaucracy and the role of IT solutions in the public sphere. Organisational change is thereby interrelated to technological developments within public administration. As such, it theoretically predicts the development of digital administrative capacity from supplement to a component of the public sector (Bastow et al., 2006).

In addition to these discourses, there is evidence about the success and failure factors of digital administrative capacity building. Ziemba (2016) identifies eight critical success factors of eGovernment. Those are (1) public outlay on hardware, networks, and telecommunication, (2) financial situation of government units, (3) ICT competences of government employees, (4) integration of front-office and back-office information systems, (5) information security in government units, (6) state standardisation of solutions for e-government, (7) top-management support as well as (8) electronic communication between government units (Ziemba. 2016). Moreover, single factors determining the building of digital administrative capacity have been

investigated as strategy (Kitsing, 2011) or innovation (Kalvet, 2012). Kitsing (2011) stresses a gap between indicators of the successful introduction of e-government implementation and their actual performance. Thereby, the author emphasises that there are major discrepancies in the Estonian public actor environment in terms of implementation and use of e-government devices. Kalvet (2012), on the other hand, points out the importance of public procurement in order to introduce innovation to the public sector and concludes that "private sector competencies and the contribution of 'ethical hackers' have been important to the emergence and development of Estonian e-government, as both are crucial for managing risks related to technology failures in public procurement for innovation" (Kalvet, 2012: 153).

In terms of creating digital administrative capacity in the context of establishing a health information system, there is a framework provided by the WHO (2000). This outlines a systematic approach for health information systems and illustrates the dimensions of health systems management functions that correspond with governance mechanisms. Here, it becomes clear that the establishment of such capacities is a comprehensive challenge in which "failures tend to be more common than successes" (Lippeveld et. al., 2000:25). The main role of the management of health systems is thereby described as the coordination and support of the service delivery levels (Lippeveld et. al., 2000). Those include indicators such as the *establishment of health policies and legislation*, *inter-sectoral coordination, strategic planning* and *programming, budgeting* and *financial resource allocation, organisation of the system, including referral mechanism, personnel development, including continuing education,* as well as, *resource management* (Lippeveld et. al., 2000: 22).

Furthermore, there is academic evidence about the challenges and barriers to e-government initiatives. Gil-Garcia and Pardo (2005) have performed a comprehensive literature review dealing with those factors. Here, the authors establish five categories of challenges that refer to different dimensions of digital administrative capacity building. In terms of (1) information and data, challenges might occur in terms of data quality and accuracy (Gil-Garcia & Pardo, 2005). With regard to (2) information technology, the complexity of new technologies, as well as a lack of technical skills of personnel, are main issues. Thirdly, in view of (3) organisational and managerial challenges, the main problem is the possible "resistance to change, internal conflict and turf issues" (Gil-Garcia & Pardo, 2005: 192). Respecting the context of (4) legal and regulatory challenges, restrictive laws and regulations are likely to hinder the development of

digital administrative capacity. Lastly, in terms of (5) institutional and environmental challenges, especially privacy and security issues may arise (Gil-Garcia & Pardo, 2005).

2.3 Theoretical Framework

The previous outlined theoretical concepts and academic research have theoretically underlined the concept of digital administrative capacity building in the context of Estonian public sector reforms. Public sector reforms in Estonia can be categorised in a four-phase-model. Whereas in the first phase general public institutions were re-established, the second phase has dealt with the improvement of quality and accessibility of public sector mechanisms. The third phase then started with the accession of Estonia to the EU in 2004 and has had major implications on public sector reforms, as they started to slow down. Thereafter, the introduction of ICT solutions to the public sector paved the path towards the fourth stage of public sector reforms in CEE countries such as Estonia. Thus, it appeared crucial to outline reform reasons and driving forces. The main driving force was thereby analysed as the Europeanisation and the pre-accession process of the country. With regard to the concept of administrative capacity, Estonia was categorised as mostly NPM-based. This approach illustrates both advantages and disadvantages in terms of building administrative capacity. Whereas some scholars have described the NPM approach as unsuitable for the given case, others outline the workability. Since the EU-accession, the Estonian public sector can, however, be typologized as Neo-Weberian as it combines classical Weberian public administrative structures with NPM features.

As the overall aim of this thesis deals with the extraction of the governance mechanisms of digital administrative capacity building, the further emphasis was spent on this cluster. It becomes clear that recently there is a broad scope of literature in terms of investigating the mechanism of digital administrative capacity. Nevertheless, this mechanism is clearly context-related. Therefore, the conceptual framework established here aims to investigate the governance mechanism of building digital administrative capacity in the context of the Estonian health care system. As such, it is likely that the mechanism may function differently in a different setting and policy context, respectively. The here established conceptual framework is based on four dimensions namely strategy, support, resources as well as implementation. According to these dimensions, El-Taliawi and Van der Wal (2019) have in correspondence to Honadle (1981) adapted a Capacity-Building framework that is based on five steps including the *anticipation of change, development of programs, the attraction, absorption and*

management of resources, the evaluation of activities as well as the application of lessons to future activities (El-Taliawi & Van der Wal, 2019). The framework is further developed in terms of the level of articulation for digital administrative capacity using the determinants of establishing a health information system as provided by Lippeveld, Sauerborn, and Bodart (2000) as well as other approaches such as seen by Gil-Garcia and Pardo (2005). Additionally, findings concerning single factors such as seen by Kitsing (2011) and Lember et al. (2018) are included.

On the basis of these theoretical findings, theoretical expectations can be formulated. These expectations shall be used in order to create a theoretical framework for the research at hand. With regard to the public-sector reforms and their developments, one can state that the increasing use of digital and technological devices in the Estonian public sector has implications for the country’s development. With regard to the typology of the Estonian public sector as outlined before, the first theoretical expectation is

(1) The given typology of NWS in Estonia is in favour of digital administrative capacity building.

The implications referring to size ultimately lead to the second theoretical expectation:

(2) The building of digital administrative capacity is context-related. With regard to this, the size of Estonia is a driving factor in terms of digital administrative capacity in the Estonian health sector.

With regard to barriers that are likely to occur in the context of eGovernment, the third theoretical assumption is:

(3) Digital administrative capacity building is likely to be challenged through issues concerning data quality, the complexity of new technologies, organisational resistance to change, restrictive laws as well as privacy and security issues.

3. Methodology

The following section introduces the reader to the methods used in order to perform this analysis. This is important in terms of conducting transparent and accountable research as well as it supports the testing and comparability of the research at hand (Yin, 1994). To do so, the research design will firstly be presented (section 3.1). Thereafter, the case selection is illustrated laying special emphasis on selecting an influential case with a small size (section 3.2). Thirdly, data collection methods used are introduced (section 3.3). Thus, the operationalisation and coding correspondingly to the previous established theoretical framework are explained (section 3.4).

3.1 Research Design

This thesis is based on a single case study following a descriptive, explorative approach. The main target is to extract the mechanism of digital administrative capacity building in the Estonian health sector. Thus, the mechanism is investigated using the case study of the implementation of the Estonian National Health Information system between 2008 and 2018. According to Yin (1994), five components of a research design are of special importance. Those are (1) a study question, (2) a study proposition, (3) unit(s) of analysis, (4) linking the data to the study’s proposition as well as (5) criteria for interpreting the findings (Yin, 1994). Those components are the foundation for the following section. In addition to that, possible threats and limitations to the selected research design are outlined.

3.1.1 Study question

The overall research question has a descriptive, exploratory character and aims to cover the main target of the thesis at hand. The research question, therefore, relates to the governance mechanism of building digital administrative capacity. It is stated as: “What are the key governance mechanism of implementing digital administrative capacity in the Estonian health care system using the example of the implementation of the Estonian National health information system between 2008 and 2018?” (RQ). The corresponding sub-questions are thus established in order to further investigate the whole scope of the research aim. Thereby, they mirror the descriptive, exploratory character of the research. The first sub-question “To what extent is the Estonian National Health information system implemented?“ (SQ1) is of descriptive nature aiming to focus on the process of digital administrative capacity building. The second sub-question then deals with the explorative part of the thesis questioning “What

are the factors affecting the administrative digital capacity building respectively the implementation of the Estonian National Health Information system in the Estonian health sector?” (SQ 2).

3.1.2 Study proposition

As indicated above, this research deals with the investigation of digital administrative capacity building. This study’s proposition is therefore to extract the governance mechanism of digital administrative capacity building. The concepts to be theorized is the building of digital administrative capacity in the context of public sector reforms. The theoretical framework has in correspondence to this stated some theoretical expectations that are based on previous findings. Due to the explorative character of the research at hand, the theoretical framework cannot, however, be seen as a static concept but as a guideline through the explorative analysis (Maxwell, 1998). Therefore, the following analysis respecting its explorative approach will put special emphasis on additional factor determining the building of digital administrative capacity.

3.1.3 Unit of analysis

In accordance to Yin (1994) the unit of analysis describes what is being analysed. In view of the research of this thesis, the unit of analysis is the mechanism of digital administrative capacity in the context of the implementation of the EHIS. This is due to the fact that the EHIS presents the explicit case in a certain context of being implemented in a CEE country. It is suitable to be analysed as it is an influential case in terms of the opportunity to investigate the mechanism of digital administrative capacity building. According to Seawright and Gerring (2008), influential cases are typically not representative and connected to certain contexts which will be further elaborated in section 3.2.

3.1.4 Linking data to a proposition

This thesis follows a descriptive, explorative approach as it aims to outline the mechanism of digital administrative capacity in the Estonian health sector. On a first step, academic literature is used in order to develop a theoretical foundation including theoretical expectations as well as to conceptualise and operationalise variables to be measured. As mentioned above, the theoretical framework is flexible due to the explorative character of this thesis. Thereafter, qualitative secondary literature is analysed in order to analyse and test the mechanism of digital

administrative capacity in the context of the Estonian health sector. Thus, monitoring and assessment reports such as the European semester country reports, Health system reviews provided by the World Health Organization (2018), but also national strategic development plans are analysed. This method of linking data or information from one case to theoretical propositions are characterised as “pattern-matching” (Yin, 1994: 25). Those findings are further investigated performing a triangulation via key expert interviews. This method is used not only to make the results gained within the document analysis more valid but also to illustrate possible discrepancies between the status quo of implementation on paper and in reality. Thereby, selected experts are directly involved within the policy development and assessment as well as the implementation process. The interviews conducted follow a qualitative and semi-structured approach.

3.1.5 Threats to validity

In view of the qualitative approach this thesis is following, it is necessary to outline possible threats and limitations of the research presented here. In addition to that, ethical considerations related to the performance of qualitative key expert interviews are presented. The following section therefore sheds light on these possible limitations.

With regard to the analysis of qualitative secondary data, Ritchie and Lewis (2003) categorise this method as valuable source as it is possible to further develop empirical findings, however, there are possible threats (Ritchie & Lewis, 2003). In accordance to them, those threats have arisen in terms of divergences between objectives of the study elaborated in the secondary literature. Due to this misleading results, a non-comprehensive sampling as well as limitations of data quality (Ritchie & Lewis, 2003) can occur. In addition to that, the quality of data can vary in qualitative document analysis as well as depending on the question posed, data can be created unsystematically (Flick 2014).

With regard to research designs including qualitative interviews, Flick (2014) has outlined possible threats as well as limitations. With respect to the applied research design in this thesis, three limits of qualitative research articulated by Flick (2014) have to be considered. These are the limits of theoretical sampling, the limits of interviewing, and the limits of qualitative document analysis (Flick 2014). Within the framework of theoretical sampling, the selection of available theories must be taken into account in the context of the given gap in the literature. Furthermore, according to Flick (2014), the comparability of interviews can suffer, since

qualitative interviews can run "relatively unpredictably" (Flick 2014: 221). This unpredictability further outlines the need for flexibility. Ritchie and Lewis (2003) stress out that “this highlights the need for qualitative researchers to be flexible and adaptable in their approach, to a have a commitment to understanding the perspective of the participant, to make research studies accessible to different groups, to be non-judgemental, and to treat participants with respect” (Ritchie & Lewis, 2003: 64).

In terms of ethical considerations, conducting qualitative interviews requires the aspects of informed consent, anonymity, and confidentiality as well as the protection of the participants and the research (Ritchie & Lewis, 2003). In view of this research, these aspects are respected as the interviewees will be asked for their consent and their personal data will be protected. Additionally, the research procedure applied in this bachelor thesis has been approved by the ethical committee of the University of Twente in Enschede.[3]

Those limitations or threats have to be critically reflected and can be potentially found within the introduced research design. However, the advantage of the thesis at hand is that it will contribute to the understudied area of administrative capacity-building in a particular context and therefore offers an addition to the given literature. Although the National Health Information System was critically assessed such as seen in the eHealth Strategic Development plan 2020 (2015), the particular mechanism of digital administrative capacity building based on the implementation of the EHIS has not yet been investigated.

3.2 Case Selection

The selected case study has four predominant characteristics: Estonia is a transition country, it is small in comparison to other CEE countries, Estonia is a member of the European Union as well as an outlier in terms of digital administrative capacity building in its public sector. Regarding the typology provided by Seawright and Gerring (2008), it can be described as an influential case in terms of case selection. This is due to the fact that in the group of CEE countries or transition countries, Estonia is the country that, in terms of digital capacities, has developed its public sector to the highest extent among the others. Additionally, Estonia is an influential case in terms of its population of approximately only 1.3 million (Kalvet 2012) which is, in comparison to the majority of CEE countries, small. The size is likely to have

[3] The ethical committee of BMS faculty approved this thesis proposal on the 28th March 2019.

implications in terms of the ease and speed of the implementation of the EHIS as outlined in the theoretical section. Moreover, Estonia indicates high trust in terms of technological innovation (Lember et al., 2018). A country with a smaller population than many major cities in Central Europe might establish a digital administrative structure more efficiently due to factors such as prioritisation and informal structures (Randma, 2001).

Using a best practice example or an outlier is related with a high potential of scientific threats, such as the lack of available theoretical foundation (Seawright 2008). However, the aim of this thesis is to outline the mechanism of building digital administrative capacity in the context of the Estonian health care system. The health sector as a policy area of interest and, correspondingly, the focus on digital capacity building in the health sector was chosen as the policy field of digital health is a cluster that is mainly determined on the country level. In the context of this study, this appears important since the scope of this thesis would be overreached dealing with a more comprehensive, multi-level point of view. Nonetheless, the embeddedness of the case study into a multi-level perspective will be shortly outlined. Moreover, and regarding the literature review provided, there is a significant gap in English and German literature dealing with digital administrative capacity building in the Estonian health sector. As mentioned above, the Estonian Strategic Development Plan 2020 is in need of empirical evaluation to which this thesis aims to contribute to.

3.3 Data collection methods

As mentioned above, two methods of data collection are used. Firstly, qualitative document analysis is used in order to outline the factors affecting the implementation of digital administrative capacity-building in the Estonian health sector. Moreover, strategies such as the Estonian Strategic Development Plan 2020, monitoring reports, policy reviews as well as Health System Reviews are selected outlining the mechanism of building digital administrative capacity in the Estonian Health sector using the case of the EHIS. Secondly, as there is a gap of available data, six qualitative key expert interviews were planned and ultimately three executed to generate in-depth views into the actual implementation process of the National Health Information system and influencing factors besides those established within the theoretical expectations. These interviews are crucial as the practical expertise of the selected key experts involved in the implementation and capacity-building process is gathered to add new insights to the theoretical assumptions.

With respect to categorisation as stated by Maxwell (1998), the qualitative key expert interviews conducted in terms of the second step will be coded using the program ATLAS/ti. In order to further support the validity of data conducted, these interviews are transcribed and coded on the basis of the following presented conceptualisation and operationalisation. Moreover, a triangulation is performed. Triangulation “involves the use of different methods and sources to check the integrity of, or extend, inferences drawn from the data” (Ritchie & Lewis, 2003: 43). This triangulation is given respecting the twofold research design that performs a document analysis and expert key interviews using the same measurements. The key experts selected are moreover included within the process of developing digital administrative capacity in Estonia. The names are anonymized. However, under special conditions names will be made available upon request.

3.4 Operationalisation and Coding

The overall research question includes one variable that needs to be conceptualised and operationalised. This is the digital administrative capacity building. In the following section, the theoretical concept, as well as corresponding dimensions, measurement, and levels of articulation for digital administrative capacity building are introduced. Thereafter, the coding of the data conducted will be shortly presented.

The building of (digital) administrative capacity can be conceptualised using the determinants introduced by Fernandez and Rainey (2006). This terminology describes “determinants of successful implementation of organisational change in the public sector” (Rainey & Fernandez 2006: 409). Here, the previously mentioned success factors of administrative capacity can be described as dimensions further specified with indicators. Those are as already mentioned (1) ensuring the necessity including the managerial articulation of need for change (2) development of a strategy (3) building of internal support for change and overcome resistance which includes open discussion to reduce resistance to change (4) ensuring top-management support and commitment including the support of political appointees and top-level civil servants to change (5) building of external support which includes the indicator of support and commitment to change among political overseers (6) providing of resources including adequate amount of financial, human and technological resources to implement change (7) institutionalization of change including the monitoring of the implementation of change as well as (8) pursuing of comprehensive change that includes the analysis and understanding of the interconnections

between organisational subsystems before pursuing subsystem congruence (Rainey & Fernandez 2006). In the context of this thesis, those dimensions are ultimately merged into *strategy, support, resources,* and *implementation.* In correspondence to this, the theoretical framework is further developed with regard to the Capacity-Building Cycle by (El-Taliawi & Van der Wal, 2019) based on the findings by Honadle (1981).

The dimension of *strategy* is measured by managerial articulation (Rainey, 2008) and anticipation of change (El-Taliawi & Van der Wal, 2019). Hereby, the level of articulation is stated as the promotion of eGovernment initiatives by leading politicians and interest groups. Moreover, strategy development and the development of programs are further measurements. Those are articulated by available strategic planning and programming (Lippeveld et. al. 2000) legislation course-setting that favours eGovernment, organisations of the information system that include referral mechanism (Lippeveld et al. 2000).

Support is further measured distinguishing between two measurements. Those are internal and external support. The level of articulation of internal support refers to inter-sectoral coordination as well as cooperation between different government units (Lippeveld et al. 2000; Ziemba 2016). External support, the second measurement, includes the support by external partners that can be characterized as IT firms, consultants, research institutions, international organisations and policy advisors (Bastow et al., 2006; Lippeveld et al., 2000).

Thirdly, the dimension of *resources* is divided into three measurements, namely financial, personnel and technical resources. Financial resources are articulated by the financial spending on technical devices, education, and training of personnel. The level of articulation of personnel resources refers to the level of highly educated and advanced personnel (Lippeveld et. al., 2000) as well as their training and regulation of personnel development (Lippeveld et. al., 2000; Ziemba, 2016). The measurement of technological resources then refers to the ability to construct a digital architecture including a certain degree of data quality.

The fourth dimension, *implementation*, is measured by institutionalization and monitoring. Institutionalization is articulated by the establishment of institutions, units, departments (Lippeveld et. al., 2000) as well as the actual use of the EHIS by relevant target groups. Monitoring, as the second measurement, refers to the available monitoring reports and papers available.

This operationalisation is used in terms of directed coding (Hsieh & Shannon, 2005). Here, categories and corresponding codes are developed deductively using the theoretical framework established. Thus, the coding scheme is based on the operationalisation as presented before including the dimensions and levels of articulation. To do so, available secondary data such as the policy documents as well as the transcriptions are coded using the programme ATLAS.ti. Additionally, the interview guides used during the key expert interviews are directed through the predetermined categories (Hsieh & Shannon, 2005). In the context of directed coding, there are two strategies of coding available. On the one hand, it is possible to highlight all passages in the data dealing with the unit of analysis (Hsieh & Shannon, 2005). Thereafter, the resulting analysis is nuanced coding these passages with the predetermined codes. This strategy is favourable for approaches that aim to “identify and categorise all instances of a particular phenomenon” (Hsieh & Shannon, 2005: 1281). On the other hand, the data is coded immediately with the predominant codes. This strategy allows to explore and define additional categories that are not included within the predetermined coding. In terms of the descriptive, explorative character of this thesis as well as in regard to SQ2 identifying additional factors, the second strategy is used. The data will, therefore, be coded immediately using the predetermined codes of the operationalisation. As mentioned before, those are strategy, support, resources, and implementation. Further, the measurements and levels of articulation are included. As such, there are eleven codes in total. The scale selected to measure the data is divided into four levels that indicate that (x) there is no data available, (-) there is no level of articulation, (0) a moderate level of articulation as well as a (+) high level of articulation available as operationalised in the operationalisation table (App. 1 & App. 13).

4. Analysis

In the following section, the governance mechanism of digital administrative capacity in the context of the Estonian health sector will be investigated and analysed. With respect to the overall research question of this thesis and the subsequent sub-questions, the theoretical framework including the theoretical expectations is used in terms of a red thread throughout the analysis. Firstly, in reference to SQ1, it will be investigated to what extent digital administrative capacities are built using the example of the EHIS following the theoretical concept of administrative capacity building. Here, the focus will be laid on strategies (section 4.1) that include the managerial anticipation for change, corresponding legislation, and policy strategies. Support (section 4.2) can be internally and externally articulated. Resources (section 4.3) covers financial, personnel and technical resources as well as actual implementation (section 4.4) that refers to the monitoring of activities that ultimately lead to the application of lessons for future activities. In view of SQ2 and in terms of exploration, light will be shed on additional factors that are likely to occur within the mechanism of digital administrative capacity building. Those are theoretically pre-assumed. As mentioned above, a triangulation is performed. Due to this, each section will firstly illustrate the results gained through the comprehensive document analysis. Thereafter, data conducted in terms of key expert interviews are analysed.

The analysis of digital administrative capacity building is performed using the example of the Estonian National Health Information System. The EHIS is a merger of four subprojects. Those are digital prescription, digital health records, digital imaging and digital registration (Doupi et al., 2010). The components are built as decentralised entities. However, they are connected through the so-called X-Road that is used as a data exchange platform (Doupi et al., 2010). As presented in section 1.1 of this thesis, the organisational structure of the Estonian health system is centralized. Nonetheless, decentralised components such as the actual structure of the EHIS as well as networks using the system can be analysed.

4.1 Strategy

As outlined before, the first dimension of digital administrative capacity building that will be investigated is strategy. In the following section, special emphasis is firstly laid on the managerial articulation as well as the anticipation of change provided by top-management leaders. Secondly, a possible strategy development concerning the eHealth development is presented.

4.1.1 Managerial articulation and anticipation of change

The top-down managerial articulation and the anticipation of change can be seen as pre-requisite of the development of new administrative capacity and organisational change. Within the policy documents far too little attention has been paid to this aspect. Although policy and strategy developments are generally presented, there is a lack of focus on the anticipation of change by leaders and top politicians, respectively. This lack can be illustrated with respect to App. 2 as there are only two documents dealing with managerial articulation. In the context of e-Participation, however, Pesti and Randma-Liiv (2018) emphasise that “the actual implementation of e-participation tools has not been a priority to politicians or top government officials which has led to dying out relevant initiatives” (Pesti & Randma-Liiv, 2018: 283).

The data gained in concern of the key expert interviews close this gap in data as presented in App. 3. Here, all of the respondents confirm a top-down approach in terms of anticipating the need for change and digital administrative capacity building. Although there was no outstanding political debate in the media (Respondent A, 2019; Respondent C, 2019), the anticipation for change was driven by relevant stakeholders such as specialty groups, associations (Respondent A, 2019), doctors as well as experts (Respondent B, 2019). Top politicians such as the president of Estonia are in favour of “eEstonia” (Respondent B, 2019). However, special emphasis must be put on the small size of Estonia. Due to this and the relatively limited amount of personnel resources which will be further elaborated in section 4.3 “Estonia is a complete top-down phenomenon by the political, technological elite” (Respondent C, 2019: 7:21) that overlaps to a certain extent to double roles.

4.1.2 Strategy development

In terms of strategy developments, light will be shed on two main components namely to what and when strategic planning and programming has taken place as well as what information technology policies and regulatory legislation have been established. Although there was no eHealth strategy until 2015 (Habicht et al., 2018), several policies and, consequently, legislative regulation that support the establishment of the EHIS have been developed since the mid-1990s. This development is mirrored within App. 2 as divergencies in terms of the level of articulation within the policy documents occur. The first cornerstone in developing an Estonian Health Information system can thereby be found in the “Principles of the Estonian Information Policy” that strived to pave the path towards a National Health Information system (Doupi et al., 2010)

including the characteristics of an action plan. This policy introduced main instruments in terms of digital administrative capacity building such as "modernisation of legislation, supporting the development of the private sector, development of interaction between the state and citizens, and awareness raising on problems concerning the information society" (Kalvet, 2007:10). This strategy was further updated in 2004 prioritizing the introduction of ICT solutions within the public and private sector (Kalvet, 2007). An additional strategic step was taken with the beginning of the health system improvement project (1995-2000) that was financed by the World Bank (Doupi et al., 2010). This included first attempts to introduce ICT solutions within the health sector in order to increase health system efficiency. The follow-up to this project can be found in the Estonian Health Project 2015 that was established in 2000 under the responsibility of the Ministry of Social Affairs (Doupi et al., 2010). Another major step was taken in 2005 as the Estonian eHealth Foundation was established under the stewardship of the Ministry of Social Affairs (Kruus et al., 2013). The eHealth Foundation was mainly involved in planning the EHIS, formally introduce it as well as ultimately implement it in 2009/2010.

Generally speaking, Estonia indicates a "favourable legislative environment towards ICT and the most important legislative acts have been approved without external pressure" (Kalvet, 2007: 11). With regard to App. 2, all of the documents analysed indicate a high or moderate degree of level of articulation in terms of legislation. Already in 1998, a first regulation was developed respecting the exclusive use of digital-only patient cards by 2001 (Kruus et al., 2013). Further regulations evolved around the legalization of digital signatures within the Digital Signature Act (2000). In 2001, the Public Information Act entered the stage developing standards on electronic access (Kalvet, 2007). With respect to the digital health records, the Health Services Organisation Act and corresponding Amendment Act have established an obligation to proceed medical data to the EHIS. This was done in 2008 (Doupi et al., 2010). Two years later, in 2010, further regulation was considered defining the obligation to use e-Prescription within the Medicinal Products Act. The most influential regulations concerning the building of digital administrative capacity are however the Digital Signatures Act, the Public Information Act, the Personal Data Protection Act, the Uniform Bases for Document Management Procedures as well as the Archives Act (Pappel & Vanker, 2015). However, the strategy development as presented illustrates a shift within the Estonian health system. Whereas the mid-1990s were characterized by comprehensive reforms, the establishment of eHealth policies and their corresponding follow-ups illustrates the prioritisation of incrementalism and improvement of health system efficiency (Habicht et al., 2018). With the approval of the

Estonian eHealth Strategic Development Plan in 2015, an action plan was established respecting previous policies. Within this roadmap, not only an eHealth vision 2025 is developed but focus was also laid on five focus areas including (1) high-quality health information and data infrastructure, (2) persons and personal medicine, (3) comprehensive case management and cooperation between organisations, (4) development of effectiveness of health services and capacity for analysis as well as (5) development of remote service (Government Office Estonia, 2015). Nevertheless, Pesti and Randma-Liiv (2018) conclude the Estonian strategic planning capacity with a value of 6.00 on a scale of 10 which indicates a moderate level of strategic planning capacity. As such, Estonia ranks 10 regarding the EU28 countries and indicates a relative deficit in strategic planning (Kruus et. al., 2013).

With respect to the key expert interviews conducted this unanticipated finding was confirmed. The respondents indicate the lack of comprehensive and coherent strategy development in terms of building the EHIS. This deficit was also presented respecting App. 3 that indicates a moderate to low level of strategic planning. General awareness about the eHealth strategy 2020 and its components (Respondent A, 2019; Respondent B, 2019) is nonetheless given. Respondent B (2019) points out that this strategy was more or less successful as nearly 80% of the goals established will be achieved within the mid-term period of ten years (Respondent, 2019). In terms of the building of the Estonian health information system, it is confirmed that major developments are based on incremental growth without planning and strategy (Respondent C, 2019). As such, progress is rather driven by the focus on functional developments (Respondent A, 2019) creating sole policies. Correspondingly, legislative regulations are described as a crucial factor respecting the development of the EHIS and digital administrative capacity in general (Respondent A, 2019; Respondent B, 2019). Thus, Respondent B (2019) points out that the ideal would be a parallel development of legislation during the implementation projects to offer relevant target groups a peal time in terms of regulations. This ideal has however not been achieved. Respondent C (2019) interestingly outlines that developments in the Estonian public sector are not legislation led but rather policy led. As such, the government rather follows a “try it then legitimize it”- approach (Respondent C, 2019: 9:41). Firstly, policies are introduced. Thereafter, corresponding legislation is created. In terms of coding, this development cannot be illustrated in App.3 as ex-post legislation has been implemented.

4.2 Support

Another crucial dimension towards the building of digital administrative capacity can be expressed as support. In the following, the sections will deal with the internal support such as inter-sectoral cooperation and co-operation between government units as well as external support covering support by external partners such as IT firms, international organisation, and research institutions.

4.2.1 Internal Support

Internal support is measured on two levels of articulation. Firstly, by inter-sectoral coordination and secondly by co-operation between different government units. Regarding App. 4 There is a high level of internal support indicated. In terms of building digital administrative capacity, strategies aim to cover the needs of both the private and public sector. Reasons, therefore, can be mainly found respecting the size of the country as outlined in section 2.1.2 of this thesis. As mentioned, small countries’ policymaking is determined by prioritisation and limited resources. Due to the decentralised and relatively fragmented structure of the Estonian public sector, network-based co-operation such as hospital networks as well as the inclusion and the support of local governments play a crucial role (Government Office Republic of Estonia, 2019). Especially the role of the Estonian Health Insurance Fund as one of the main agencies of the Ministry of Social Affairs is of special importance. This is not only due to its task to assess health innovation but also due to its current low support for innovative solutions (Kruus et. al., 2013). In addition to that, inter-sectoral relations with the clusters of agriculture, justice and economy occur as these fields are “actively involved in the health system activities due to the development and implementation of inter-sectoral public health strategies” (Doupi et al.; 2010: 10).

App. 5 confirms the results established in the policy documents. As internal support is a relatively “uncontroversial area” (Respondent C, 2019), internal support is given. Nevertheless, one respondent confirms an available mix of coordination instruments (Respondent A, 2019), whereas another emphasises that this coordination might be unsuccessful (Respondent C, 2019).

4.2.2 External Support

The articulation of external support in the context of digital administrative capacity building in the Estonian health system is coloured by the NWS typology of Estonia. Although the system is organised in a hierarchical and centralized manner, management tools such as contracting out and hiring external experts in order to build digital administrative capacity are available (Kruus et al., 2013). Nonetheless, under the stewardship of the Ministry of Social Affairs, an eHealth strategy council was established coordinating technical working groups that mainly consist of external experts (Government Office Estonia, 2015). Again it becomes obvious, that the size of the country and correspondingly the capacity gap leads network structures between the public and the private sphere. Therefore, the distinction between internal and external partner get blurred. This result is mirrored within App.4 as there is a high level of articulation reflected.

With regard to the working groups, a division of three types of external support groups can be drawn. The first working group accumulates the expertise of health care experts and expert groups. This expertise can be expressed in a threefold manner. Firstly, they give high-quality expert advice evolving around the development of processes and standards. Secondly, they actively participate in the improvement of digital administrative capacity services. Thirdly, they investigate opportunities for further developments (Government Office Estonia, 2015). The second typology of external support is expressed in the reference panel of the population. Hereby, external support is performed using active citizen participation in terms of building digital administrative capacity. This not only illustrates a bottom-up way of supporting the establishment of digital administrative capacity but puts the spotlight on the actual needs of the users of the EHIS (Government Office Estonia, 2015). Another external support group can be found focusing on health service providers. Those are particularly in charge to develop sub-health-information-systems that can be interfaced with the national eHealth services. Here, the decentralised structure is again expressed.

In addition to that, it is to question whether international organisations are involved as external supporters. Since there is no exogenous pressure of implementing digital administrative capacity in Estonia, corresponding policies and strategies are based on domestic developments. In addition to that, it is outlined that with regard to external support on the international level “the limited nature of the eHealth mandate at the level of the EU and the inevitable need for

prioritisation of resources within Estonia must be considered (…)” (Government Office Estonia, 2015: 55). Nonetheless, cross-border and European co-operation such as the Baltic eHealth co-operation with Finland have to be outlined (Doupi et al., 2010). In contradiction to this, it is to be outlined that in terms of health technology assessment international organisations such as EUnetHTA, NICE, FinOHTA as well as public policy think-tanks such as “Praxis Centre for Policy Research” are involved within the process (Doupi et al., 2010). Support is moreover accumulated regarding the academic sphere. Here, the Department of Public Health of the University of Tartu, as well as the University of Technology Tallinn, provide external, academic support (Doupi et. al., 2010).

Those findings are supported and further elaborated within the key expert interviews as indicated in App.5. Whereas on an initial stage doctors were the main external partners included within the process, lessons have been learned introduce patients and their interest groups to the capacity building process. Different stakeholder groups and associations are included in the institutional setting given within the development such as in the Health Board of the main financier, the EHIF (Respondent B, 2019). Besides the EU and World Bank as crucial external support factor in financial regards, private IT firms, companies and consultancies are the main groups of external support. This is due to the fact that internally, there is a lack of capacity in terms of software development (Respondent A, 2019; Respondent B, 2019). As such, public procurements are performed outsourcing the whole technical development of the EHIS to private partners. A surprising finding occurs in terms of the interview by Respondent C (2019). Here, it is illustrated that the lines between the private and public sector are blurred. Due to the size of the country, it is “a very Western European thing to conceive of the eStructure in which you can do a proper delineation between the public and private sector, that is not Estonian” (Respondent C, 2019: 13:09).

4.3 Resources

An additional and one of the most influential factors of digital administrative capacity building are resources. Without the accumulation of financial, personnel and technical resources, digital administrative capacity building can theoretically be developed but will, however, not be fruitful in reality. The following section, therefore, emphasises on three types of resources that mainly support or hinder the digital developments in the Estonian Health sector.

4.3.1 Financial resources

With respect to financial resources, the question not only evolves around *what* needs to be funded but rather emphasises *who* will coordinate and efficiently manage financial capacities available. In view of the building of the EHIS, the Estonian Health Insurance Fund is the key player coordinating funding sources in the Estonian health sector (Government Office Estonia, 2015). In addition to that, external partners such as the EU and the World Bank play a role regarding the financing of ICT solutions within the Estonian health sector. This illustrates the broad range of funding sources in the context of the Estonian health system (Government Office Estonia, 2015). Through the Estonian Development Act financially support of knowledge-based and high technology industries could be regulated (Doupi et al., 2010). As such, 240 000 Euro per year are invested in ICT technology development. Whereas the Ministry of Social Affairs has invested 2.0 Million Euro into the launch of the EHIS, international organisation play a crucial role in terms of building a financial fundament. Accordingly, 85% of the Estonia ICT budget is funded by the EU in cooperation with the World Bank. In detail, 2.8 million Euro are based on the EU structural fund following comprehensive cohesion strategies. 1.5 Million Euro have been spent on the state budget for eHealth. Further, 1.5 Million have been released by healthcare providers (Doupi et al., 2010). Importantly, “for successful application of the eHealth strategy, it is important to ensure flexible finance components at a sufficient level” (Government Office Estonia, 2015: 59) which can be correspondingly seen with the decentralised, multi-stakeholder setting of the EHIS. Such components are especially named as hardware investments and administration, acquisition and integration of licensed final products, financial engagement in service development and “investment in creation of stimuli through reasonable standardisation, support of the implementation” (Government Office Estonia, 2015:59). Those findings are underlined respecting App. 6.

4.3.2 Personnel resources

In the following section, personnel resources shall be captured focusing on the capacity of highly educated and advanced personnel as well as the availability to train and regulate personnel development. According to the National Health Plan Estonia (Sotsiaalministeerium Estonia, 2008) indicates a general lack of highly qualified personnel that is measured by quality Ph.D. graduations. Although the Estonian Public Service Act has introduced and regulated the recruitment based on merit, competitive examinations, regular appraisal and common grading

salary scales (Pesti & Randma-Liiv, 2018) personnel resources in the Estonian health sector are limited and present an issue concerning the establishment of the EHIS.

Within the key expert interviews, the lack of highly qualified personnel is again outlined as indicated in App.7 Although this lack does not lay within the technical expertise building the architecture of the information systems included in the EHIS as they are provided by external experts (Respondent A, 2019), the availability to assess and support the building of digital administrative capacity in the health sector is limited. This is explained by the need for an “incredibly highly qualification in two to three mutual exclusive fields” (Respondent C, 2019: 14:44) that can be named as information technologies as well as health policies. A general lack of highly qualified personnel is moreover given through the size of the country. Here, it must be outlined that especially the blurred distinction between the public and private sector leads to inter-sectoral transitions of personnel as well as public-private double roles (Respondent B, 2019).

4.3.3 Technical resources

Technical resources shall be measured focusing on technical architecture and components of the information system as well as focusing on the quality of data available. Although there is limited data available dealing with technical resources such as illustrated in App.6, a limited amount of data available is analysed. As the regulations established oblige the uploading and sharing of data, this lack might be explained by a deficit in the correct use of the EHIS. Moreover, uploading data voluntarily and establishing open data approaches have been complicated. In terms of having available data, this resource is hard to use as they have not been cleaned yet as well as there is no coherent uploading of data by the organisations. This can also be referred to as the lack of available regulations establishing standards for these technical processes. In addition to that, a lack of trust in eHealth applications and missing technical equipment and training of personnel makes it more difficult (Pesti & Randma-Liiv, 2018).

4.4 Implementation

The actual implementation of the EHIS will be investigated covering two measurements. Those are institutionalization and monitoring. Institutionalization thereby not only refers to the institutions that have been established in order to build the EHIS, but also the actual use of the four components included in the EHIS. In addition to that, monitoring covers not only the

monitoring of the EHIS itself but its corresponding policies and regulations that have been established since the early 2000.

4.4.1 Institutionalization

With regard to App.8, the policy documents analysed indicate a moderate to high degree of institutionalization. As already indicated in previous sections, the implementation of the EHIS was based on several steps beginning with the establishment of the eHealth foundation in 2005, that planned, formally promised and thus implemented the EHIS in 2009. The main impetus for the development of a roadmap for implementation was given by the eHealth Task Force Lead Market initiative that also stimulated the implementation of inter-sectoral health strategies (Doupi et al., 2010). There are divergent information regarding the full implementation of the EHIS and its components. Whereas, Kruus et al. (2013) stresses that already 2011 all four components of the EHIS have been developed and integrated together so that they are “fully operational to the extent that service providers make use of the system” (Kruus et al., 2013: 21) expected the fully implementation for 2013 based on occurring technical problems. Interestingly, Pesti and Randma-Liiv (2018) emphasise that in Estonia “the implementation of innovative ideas depends on a lot on single visionary persons who have the enthusiasm and motivation to implement their vision, not so much on government’s strategy addressing the government as a whole. This derives from the segmented nature of the Estonian central government” (Pesti & Randma-Liiv, 2018: 281). This finding corresponds to the results as presented in section 4.1 strategy. Due to the lack of actual strategic planning, the focus is laid on incremental steps and policies. The implementation is therefore based on functional developments rather than implementing a pre-determined strategic plan.

Nonetheless and with regard to the building of institutions in order to further stimulate the implementation of the EHIS, not only the eHealth Foundation plays an important role. The stewardship of the building of digital administrative capacity lays with the Ministry of Social Affairs. Here, besides the departments for public health, medicines and analysis and statistics one can especially outline the establishment of the departments for health system development and digital development (Habicht et al., 2018). In terms of digital administrative capacity building, those appear as departments with the aim to further promote the development of the EHIS. Further agencies of the Ministry of Social Affairs are also included within the implementation of the EHIS. Those can be named as State Agency of Medicines, the Health Board and National Institute for Health Development (Doupi et al., 2010). In addition to that,

public independent bodies such as the EHIF as the main financial source, the hospital network under private regulations, private primary care units, Non-Governmental or professional associations (Doupi et al., 2010) are involved.

External institutions are moreover accumulated within the Council of the Estonian eHealth Foundation that consists of eleven members appointed by those independent organisations. Additionally, state and local municipalities are included within the overall process of implementation having impact “on the regulation and planning process of hospital through participation in Supervisory Boards and patients are represented in the working groups and commissions of the Ministry of Social Affairs as well as holding positions on the EHIF Supervisory Board” (Kruus et al., 2013: 11). Kruus et al. (2013) further concluded that the fundament of governance in the Estonian health sector is laid in regulations and contractual relations “rather than in subordinated relationships” (Kruus et al. 2013: 11).

In view of the actual use of the EHIS, it is crucial to take a step back and focus on the four components that build the information system. Those are, again, digital health records, ePrescriptions, digital images, and digital consultation. In terms of ePrescriptions difficulties and challenges of actual use have been analysed. Those issues cover several reasons why this component indicates not the level of institutionalization what was previously aimed to achieve. Those reasons mainly refer to technical difficulties installing the system, financial issues due to healthcare budget cuts and nonetheless to the lack of acceptance (Doupi et al., 2010).

The implementation and included the institutionalization of the EHIS has been described as a success by all key experts (Respondent A, 2019; Respondent B, 2019; Respondent C, 2019). This is indicated in App. 9. Whereas in the beginning, the target group of doctors was the main focus of implementation, lessons have been learned and patient’s views have been included within the implementation process. The implementation and institutionalization respectively have been developed in a modular way. Due to this, a decentralised structure, developing several small projects and information systems simultaneously that are connected through the centralized “X-Road” is established. This structure illustrates strong points such as a higher level of security through decentralization as well as weak points as divergencies in terms of the actual use of components by relevant target groups (Respondent A, 2019; Respondent B, 2019). These divergencies are however based on the range of functionalities the different components of the EHIS have (Respondent A, 2019). What is surprising is that the institutionalization has

not led to a digital transformation as such. Respondent C (2019) rather described the implementation of the EHIS as a “digital upgrade” (Respondent C, 2019: 2:16) that has not fundamentally changed the organisational structure of public organisations within the Estonian health sector.

4.4.2 Monitoring

There is a lack of comprehensive data presenting the monitoring process of the implementation of the EHIS respecting App. 8. Nevertheless, it can be illustrated that even before the EHIS was established in 2008, on-going policies and regulations that aimed to support the building of digital administrative capacity have been frequently monitored. This monitoring was not only performed on the domestic level, due to the lack of highly qualified policy analysts, but evaluations of policies were also provided by external partners or by the European Union in terms of European Semester Reports or in European projects such as the European Large Scale Pilot (Doupi et al., 2010). As such, the eHealth Action Plan that has been established in 2004 required regular monitoring reports of the state of art in the deployment of eHealth provided by the European Commission. Correspondingly, national eHealth roadmaps were updated (Doupi et. al, 2010). Moreover, each policy and regulation implemented such as illustrated (see section 4.1.2) of this thesis can be seen in the context of regular monitoring and taking into account lessons for the future. Subsequently, “the need for evaluation of eHealth policies and projects has been stressed time and again by the ECT, not least in order to further promote the spread of eHealth in the process of healthcare delivery” (Doupi et al., 2010: 32). A domestic institution that further promotes the monitoring of eHealth policies and regulations is already established as the Estonian State Audit Office. However, although there are several evaluations concerning eGovernance available, a general plan for monitoring eHealth implementation is lacking (G.O Estonia, 2015).

Regarding the data conducted through the key expert interviews, contradictory results occur in terms of the degree of monitoring. Respondent A(2019) and Respondent B (2019) confirm the general and coherent monitoring of projects and policies implemented as mirrored within App. 9. Further, monitoring is institutionalized by departments such as the IT house that provides data evaluations (Respondent B, 2019). Nevertheless, Respondent C (2019) emphasises that there is a general lack of pressure to monitor on the domestic level. Monitoring is rather performed internationally.

4.5 Additional factors

Besides the dimensions previously presented, additional factors included within the mechanism of digital administrative capacity in the Estonian health sector have been explored in the context of the document analysis and key expert interviews (App. 10 & App. 11). Hereby, factors mentioned can be related to two categories. Those are institutional factors as well as societal factors.

Considering additional institutional factors, special emphasis must be laid on the *modular architecture* and decentralised way of building the EHIS. Here, the architecture of the whole system as such as well as interrelated information systems has to be frequently renewed and evaluated. Respecting the vital and changing environment, this appears as an eternal task. Secondly, the *functionality* of the system is a determining factor. A major weakness in terms of the actual use of the system by target groups is its complex application respectively its relative difficulty for users. Another special factor is the presentation of benefits as well as opportunities. Here, *public relations* are needed in order to stimulate further development as well as the use of the system. Thus, *transparency* and *security* of the system are two components that are crucial to be publicly expressed. In terms of the regulatory environment, a *flexible legal system* is an additional factor favourable for the implementation of digital administrative capacity in the context of the EHIS. In terms of the context of Estonia, *size* can lastly be described as one of the most influential factors. As outlined in the theory of this thesis, the small size of a country has certain implications for its ability to introduce innovation to its public sector. It becomes clear that especially the size of Estonia is a reason for network structures, double public-private roles of civil servants respectively personnel as well as the incremental approach to implement digital administrative capacity.

In terms of societal factors, all of the key experts expressed *trust* in the government and its units as well as in the system as such (Respondent A, 2019; Respondent B, 2019; Respondent C, 2019) as an important prerequisite. This factor is particularly connected to the dimension of implementation as it mainly impacts the actual use of the system. The building of digital administrative capacity is as successful as its actual use. In addition to trust, *acceptance* of digital administrative capacity introduced was outlined as a prerequisite of digital administrative capacity building (Respondent A, 2019; Resondent B, 2019; Respondent C, 2019).

5. Conclusion

The following section will discuss the empirical findings presented in this bachelor thesis. To do so, the results are firstly evaluated. Accordingly, the overall research question and the corresponding sub-questions shall be answered. Thereafter, the theoretical expectations established in the theoretical framework will be analysed. Lastly, a short outlook will be given focusing on possible limitations of this thesis as well as further research in this cluster.

5.1 Evaluation

The overall aim of this thesis was the extraction of the governance mechanism of digital administrative in the context of the Estonian health sector respectively the implementation of the EHIS. In order to analyse this governance mechanism a descriptive, explorative approach was chosen. A theoretical framework including theoretical expectations was therefore pre-determined. The dimensions outlined are however not rigid. Rather, the extraction of additional factors of the mechanism was of special interest.

With respect to strategies, it is analysed that several strategies and policy development papers concerning building digital administrative capacity building have been implemented since the mid-1990s. However, a coherent strategy dealing with the development of such capacity in the Estonian health sector has only been established in 2015. The strategy is nonetheless described as not comprehensive. Moreover, there is no strategy explicitly developing a strategy of building the EHIS. These findings, as well as the data conducted during the key expert interviews, have illustrated that digital administrative capacity building in Estonia is not strategy driven. Rather is the development based on functionalities, technological demands, and policies. Therefore, incremental steps are taken following a “try it”-approach.

With respect to managerial articulation, it has been stressed that the policy-led approach was supported by a clear top-down demand including elites out of the political, academic and technical sphere. Due to the size of the country, personnel within these spheres overlap creating a network. Correspondingly to the policy-led approach, there is no parallel development of legislation. However, regulations have been implemented in reaction to the mentioned incremental steps and policy testing. This progress leads to the conclusion that Estonia illustrates a flexible and favourable legislative environment that is based on policy-testing. This is a factor that has to be critically evaluated as it presents a vagile process.

Although the Estonian health system is of centralized character including decentralised components, the distinction between internal and external partners has been analysed as blurry. The main factor for this is the small size of the country and the occurring network structures. Nonetheless, the support process is top-down driven and mainly in the responsibility of the government respectively the government units such as the Ministry of Social Affairs and the EHIF. Therefore, and in terms of the lack of personnel capacity, intensive public procurement and contracting out involving external partners such as IT firms are done in terms of developing needed software and technical devices. With respect to financing the building of digital administrative capacity, funding is provided by external partners such as the EU and the World Bank. Furthermore, academic support is provided by the universities of Tartu and Tallinn. In addition to that support between government units and inter-sectoral cooperation is given. Only in terms of coordination, there is no clear coordination instance established.

With regard to resources, especially the lack of highly qualified personnel that is able to assess and support the process of digital administrative capacity is missing. A likely explanation for this is the multi-facet requirements to be qualified in the two different fields covering health system management as well as information systems. This lack is nonetheless not only given in the context of Estonia but a general barrier of implementing digital administrative capacity in different settings. Technical resources, on the other hand, are challenged through the quality of data within the EHIS. As the EHIS is a decentralised system consisting of several components connected through the so-called X-Road, there are divergencies in terms of quality of data that is introduced to the information system. Additionally, the architecture of the information system is modular and has to be frequently renewed. This process is moreover set into a vital and fast-changing environment. It is, therefore, a long-term task to be achieved.

Focusing on the actual implementation of digital administrative capacity respectively the EHIS, all of the four components, namely digital prescription, digital electronic health record, digital images, and digital appointments have been established during the period of interest, 2008 to 2018. In the data conducted in terms of the performed key expert interviews, the implementation is therefore described as more or less successful. In terms of institutionalization not only responsible government institutions and units such as the digital development department have been established. After first resentments in the first years of implementation, the actual use of the EHIS is described as satisfactorily by key experts.

In addition to these pre-determined dimensions, additional factors have been explored (App.10 & App. 11). Those can be categorised into two dimensions: institutional as well as societal factors. In terms of institutional factors, it has been analysed that especially the *architecture* and the *functionality of the system*, *the legal environment*, as well as *size* play an impacting role. Societal factors are thus related to *public relations* as *trust, transparency* and *acceptance* of the system have to be promoted. Moreover, initiatives in terms of making the system transparent and safe have been positively framed.

With regard to these overall conclusions, the research questions, as well as the theoretical expectations, can be answered. In terms of the overall research question “What is the key governance mechanism of digital administrative capacity in the Estonian health sector regarding the implementation of the Estonian Health Information System between 2008 to 2018?” this bachelor thesis has outlined the mechanism as multi-layered progress. The governance mechanism was developed in terms of an incremental, policy-driven approach anticipated by a top-down approach of a leadership network within a flexible legal environment. Within this environment, relevant target groups have moreover indicated a certain level of trust and acceptance in the digital administrative capacity respectively the EHIS. The system thereby characterizes capacity as a supplement of the Estonian health sector which was built modularly. The modular architecture, as well as project components of the system, are however still in progress.

In terms of the SQ1, the results as mentioned before show that the EHIS has been more or less successfully implemented. Although there are divergences regarding the actual institutionalization of each component, the EHIS was fully implemented in the selected time period of 2008 to 2018. With respect to SQ2 focusing on the exploration of additional factors, it becomes clear that in addition to the predefined dimensions strategy, support, resources, and implementation there are two categories of additional factors to be outlined. Those can be named as institutional factors as well as societal factors. The most influential institutional factor is size. Estonia’s size is not only a major reason in terms of the development of the top-down, elitist network structure but also in prioritizing eGovernment initiatives. Moreover, the network structure is a possible explanation for the policy-led approach and the ex-post legislative course setting.

The first theoretical expectation was that Estonias typology as Neo Weberian State supports digital administrative capacity building. As stated in section the Estonian health system indicates a centralized organisational structure. The Ministry of Social Affairs, as well as the EHIF, can be seen as the main public institutions leading the implementation of the EHIS. Nevertheless, components related to an NPM approach such as contracting out as well as decentralization within sub-systems are analysed. These characteristics are determinants of the typology of NWS. As these structures mainly influence the building and implementation of the EHIS, which has been analysed as successful, a tendency that NWS is in favour of digital administrative capacity building can be outlined. However, further investigations relating to the favourability of NWS on digital administrative building must be taken into consideration. Due to the limited scope of this thesis, this could be a starting point for further research.

The second theoretical expectation expected Estonia’s size to be a crucial factor in terms of digital administrative capacity building. This expectation can be clearly confirmed. As mentioned several times, the governance mechanism of building digital administrative capacity is context-related. The small size of Estonia is thereby a pre-requisite for several developments such as the flexible legal structure, the favourable network structures as well as the prioritisation of policies that have ultimately led to the incremental approach of building the EHIS.

Lastly, it was theoretically expected that the barriers for digital administrative capacity are “data quality, the complexity of new technologies, organisational resistance to change, restrictive laws as well as privacy and security issues”. As outlined in section 4.3.3 the quality of data is an important factor in terms of technical resources as well as the implementation of the system. This is due to occurring divergencies in the decentralised components of the system that are connected through the X-Road platform. Secondly, the complexity of new technologies is a barrier as outlined in section 4.5. This factor especially refers to the actual use as well as trust in the system. Organisational resistance to change has been firstly analysed in terms of the actual use of the EHIS as outlined in section 4.4.1. Nevertheless, these resentments have been erased in the selected period of time including the target groups of patients within the implementation process. Restrictive laws might be a barrier as in section 4.5 the success factor of a flexible, legal framework is confirmed. Lastly, privacy and security issues are not analysed and have to be further investigated. However, it has been outlined that the factors of privacy and security impact the actual use as well as the trust within the system.

5.2 Outlook

Selecting an influential case implies a limited degree of case representativeness. As outlined before, the governance mechanism of digital administrative capacity building is clearly context-related. The case of the EHIS and the Estonian health sector, therefore, presents a particular setting. This is especially underlined regarding the additional factors outlined such as the small country size. Nonetheless, in terms of validating the results, cross-case references and comparisons with cases indicating a similar context such as other CEE countries would be a sufficient starting point for further research.

Moreover, one could say that the conceptual framework of this thesis was a sufficient starting point investigating the mechanism of digitial administrative capacity in the Estonian health sector context. Nevertheless, in regard to the results that have been stressed, the chosen conceptual framework illustrates some divergencies with the Estonian reality. This is again due to the small size of the country and correspondingly to the factors such as the strong network including public and private elites as well as to the prioritisation and gap of capacity as outlined in the theory section (El-Taliawi & Van der Wal, 2019). It is therefore suggested to include other theoretical approaches such as seen by Dwidvedi et al. (2011) that further cover a broader cluster of the digital transformation of public administrative structures.

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7. Data Appendix

App. 1 Operationalisation

Dimensions	Measurement	Levels of articulation		Data collection
Strategy	Managerial articulation Anticipation of change	Promotion of eGovernment initiatives by leading politicians and interest groups (Lippeveld et al., 2000; Ziemba, 2016)	*To what extent do leading politicians or interest groups promote eGovernment initiatives?*	Document analysis Key expert interviews
	Strategy development Development of programs	Strategic planning and programming (Lippeveld et al., 2000) E-government legislation available Organisation of the information system, including referral mechanism (Lember et al., 2018; Lippeveld et al., 2000; Ziemba, 2016)	*What strategic plans and or development documents available?* *To what extents has e-government legislation been implemented?* *To what extent are policy documents that organize the information system systematically available?*	Document analysis
Support	Internal support	Inter-sectoral coordination (Lippeveld et al., 2000) Co-operation between different government units (Lippeveld et. al., 2000; Ziemba 2016)	*To what extent has inter-sectoral coordination taken place?* *To what exten is there co-operation between different government units?*	Key expert interviews
	External support	High level technical advice by external partners such as IT firms, consultants, research institutions, international organisation, policy advisors (Bastow et al., 2006; Lippeveld et al., 2000)	*To what extent are external partners such as private consulting firms, IT firms, international organisations involved?*	Document analysis Key expert interviews
Resources	Financial resources	Financial spending on technical devices, education, personnel etc. (Lippeveld et.al., 2000)	*To what extents is there an exclusive budget for the implementation of digital administrative capacity?*	Document analysis
	Personnel resources	Capacity of highly educated and advanced personnel (Lippeveld et. al., 2000) Training and regulation of personnel development	*Is there qualified/educated personnel available?* *To what extent is there training and regulation of*	Document analysis Key expert interviews

		(Lippeveld et. al., 2000; Ziemba, 2016)	*personnel development available?*	
	Technological resources		*To what extent are there technical resources available?*	Document analysis
Implementation	Institutionalization	Institutions/units/ departments established focusing on technological development (Lippeveld et. al., 2000) Actual use of the EHIS	*To what extent are there institutions/units established or organised that mainly focus on technological development?*	Document analysis Key expert interviews
	Monitoring	Monitoring papers and reports available	*To what extent re there monitoring reports available?*	Document analysis Key expert interviews

App.2. Coding Strategy Documents

Dimension	*Measure*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*	*D7*	*D8*	*D9*	*D10*	*D11*	*D12*
Year		2007	2008	2010	2010	2013	2015	2015	2016	2017	2018	2018	2018
Strategy	Managerial articulation	x	x	x	x	-	x	0	x	x	-	x	x
	Strategy development	+	+	+	+	-	+	0	+	x	-	-	+
	Legislation	+	x	+	+	+	x	x	x	x	0	x	0

App 3. Coding Strategy Interviews

Dimension	*Measure*	*IA*	*IB*	*IC*
Year		2019	2019	2019
Strategy	Managerial Articulation	+	+	+
	Strategy Development	0	0	-
	Legislation	+	+	+

App 4. Coding Support Documents

Dimension	*Measure*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*	*D7*	*D8*	*D9*	*D10*	*D11*	*D12*
Year		2007	2008	2010	2010	2013	2015	2015	2016	2017	2018	2018	2018
Support	Internal support	x	x	0	+	+	+	x	x	x	x	x	+
	External support	x	x	+	+	+	+	x	x	x	+	x	x

App 5. Coding Support Interviews

Dimension	*Measure*	*IA*	*IB*	*IC*
Year		2019	2019	2019
Support	Internal support	+	+	+
	External support	+	+	0

App 6. Coding Resources Documents

Dimension	*Measure*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*	*D7*	*D8*	*D9*	*D10*	*D11*	*D12*
Year		2007	2008	2010	2010	2013	2015	2015	2016	2017	2018	2018	2018
Resources	Financial resources	x	x	0	+	+	+	+	x	x	+	x	x
	Personnel resources	x	0	x	-	-	-	x	x	x	-	x	-
	Technical resources	x	x	+	x	x	+	+	x	x	-	x	x

App 7. Coding Resources Interviews

Dimension	*Measure*	*IA*	*IB*	*IC*
Year		2019	2019	2019
Resources	Financial resources	x	x	x
	Personnel resources	-	-	-
	Technical resources	+	x	x

App 8. Coding Implementation Documents

Dimension	*Measure*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*	*D7*	*D8*	*D9*	*D10*	*D11*	*D12*
Year		2007	2008	2010	2010	2013	2015	2015	2016	2017	2018	2018	2018
Implementation	Institutionalization	x	x	+	+	+	+	0	x	0	0	x	0
	Monitoring	x	x	-	+	x	-	x	x	x	x	x	x

App 9. Coding Implementation Interviews

Dimension	*Measure*	*IA*	*IB*	*IC*
Year		2019	2019	2019
Implementation	Institutionalization	+	+	+
	Monitoring	+	+	0

App 10. Extraction of Additional Factors Documents

Dimension	*Measure*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*	*D7*	*D8*	*D9*	*D10*	*D11*	*D12*
Year		2007	2008	2010	2010	2013	2015	2015	2016	2017	2018	2018	2018
Additional factors	Privacy	x	x	+	+	x	+	x	x	x	x	x	x
	Trust	x	x	x	+	x	x	x	x	x	x	x	x
	Security	x	x	+	+	x	+	x	x	x	x	x	x
	Functionality	x	x	x	x	x	+	x	x	x	x	x	x
	Transparency	x	x	x	x	x	+	x	x	x	x	x	x
	Public relations	x	x	+	x	x	x	x	x	x	x	x	x

App 11. Extraction of Additional Factors Interviews

Dimension	*Measure*	*IA*	*IB*	*IC*
Year		2019	2019	2019
Additional factors	Privacy	+	+	+
	Trust	x	+	+
	Security	+	+	+
	Functionality	+	+	+
	Transparency	x	+	+
	Public relations	x	x	+
	Size	+	x	+
	Modular architecture of the system	+	x	x
	Flexible legal environment	x	+	+

App.12 Decoding Documents

D#	*Year*	*Source*
1	2007	Kalvet (2007)
2	2008	Sotsiaalministeerium Estonia (2008)
3	2010	Saluse et al. (2010)
4	2010	Doupi et al. (2010)
5	2013	Kruus et al. (2013)
6	2015	Government Office Estonia (2015)
7	2015	The World Bank (2015)
8	2016	Government Office Estonia (2016)
9	2017	Government Office Estonia (2017)
10	2018	Pesti and Randma-Liiv (2018)
11	2018	Habicht et al. (2018)
12	2018	European Commission (2018)

App. 13 Decoding Indicator

Indicator	*Definition*
x	There is no data available.
-	No level of articulation.
0	Moderate level of articulation.
+	High level of articulation.