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Digital Transformation in the public sector: Success factors and barriers

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SCHOOL OF SCIENCE & TECHNOLOGY

A thesis submitted for the degree of

Master of Science (MSc) in E-Business and Digital Marketing

JANUARY 2022

THESSALONIKI – GREECE



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Abstract

Digital era has brought new challenges and opportunities for public organizations. Digital technologies are transforming the public sector by affecting the organizational and the cultural aspects of organizations. Despite many scholars have investigated the phenomenon of digital transformation, less attention has been given to the public sector and the factors that hinder or facilitate digital transformation. Therefore, this dissertation investigates what are the success factors and the barriers in the digital transformation of the public sector. The literature review method was used to gather the data. The factors that were mentioned more than 4 times in the identified literature were gathered in a table and they were further investigated through the case study analysis to validate or not the factors. The chosen case studies were the digital transformation of Denmark and Latvia. In total 11 factors were found; the interoperability/silos, the communication, the citizens willingness to adopt the services, the culture, the leadership skills, the trainings, the skillful personnel, the managerial support, the strategy, the funding, and the resistance to change. The results indicate that all of them can be barriers or success factors of the digital transformation, depending on how they will be used throughout the journey. The case studies analysis showed the importance of the general background of countries that since Latvia and Denmark have very different bases. Therefore, it was assumed that different factors will affect the digital transformation of the countries' digital transformation. Nine out of eleven identified factors were recognized in both case studies. However, it was not possible to measure the managerial support, and the leadership skills, due to the lack of the available data. Moreover, in both countries more factors were identified than the nine most identified factors. This research suggests that the public sector should have as a starting point the eleven most identified factors, but governments should also consider the different backgrounds of their countries.

Zachari Maria-Eleni

21/01/2022

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To my mother and to my beloved grandmother
who are always there whenever I need them.

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Acronyms and Abbreviations

DESI: Digital Economy and Society

Index

EE: European Union

eID: Electronic Identity

ICT: Information and Communication

Technologies

IT: Information Technology

IVIS: Integrated State Information Sys-

tem

MoE: Ministry of Education

MoT: Ministry of Transport

NIFO: National Interoperability

Framework Observatory

OECD: Organization for Economic
Cooperation and Development

PDF: Portable Document Format

UN: United Nations

USA: United States of America

VARAM: Ministry of Environmental

Protection and Regional Development

(Latvia)

VRAA: State Regional Development

Agency (Latvia)

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1 Introduction

In this chapter we present the background of the phenomenon called digital transformation. Firstly, we give a brief overview of the recent history of digital transformation regarding the link to e-government, to digitization and digitalization. Then we investigate what is digital transformation in the public sector and why this transformation is necessary and in the last part of the chapter, we present the structure of the dissertation.

1.1 OVERVIEW OF DIGITAL TRANSFORMATION

Our world is becoming more and more digital, and many digital solutions are part of our everyday lives. Digital technologies affect every part of our society such as businesses, governments, municipalities and community councils, science, art, mass communication, financial institutions, telecommunications organizations, and educational institutions. By adopting these technologies, the changes are inevitable. In most of the organizations the changes are both internal and external. Governments and the public sector could not be untouched through this evolution.

Many scholars and organizations have expressed the use of digital technologies by the governments by conducting studies on digital transformation in the public sector. Digital transformation is considered to be a new topic in the international research literature and undoubtedly the greater challenge of the modern age, since it demands organizational transformation and not just the adoption of ICTs.

One could say that the adaptability of the public sector to the digital environment would not be an easy process because traditionally the public sector is characterized by a fixed perception that consists of high bureaucracy, legacy tradition, slow pace in executing activities and difficulty to embrace changes [1]–[4]. This is partly correct because during the last decades governments adopted digital solutions that allow the public sector to be up to date but the overall digital transformation has proved to be a complicated process. [2] found in the literature that the changes during last years in the public sector are very slow and with no radical approach and [5] argues that the digital transformation in

governments will make everything run in a different manner but has to be successful to guarantee the continuity and the effectiveness of the public sector [2].

Despite the fact that digital transformation is an increasingly popular topic it lacks a clear definition[6] and at the same time, the term is often confused with other notions. Digitization and digitalization often are used as synonyms of digital transformation [4], [6]. In addition, digital transformation is often confused with e-government and sometimes the terms are used interchangeably. This has led to a confusion regarding the success factors and the barriers of digital transformation because in many cases authors do not specify if they discuss e-government or digital transformation in the public sector or if they use the terms interchangeably. Moreover, new terms have arisen in an effort of academia to define digital transformation in the public sector. In a recent study, academics called the digital transformation of the public sector “transformational government” and they regard it as the second step of e-government which is directly linked to digital transformation[7] while frequently we meet the term “digital government transformation”[7]–[11]. Scholars try to invent new terms in order to name the new trends and to explain the current situation.

1.1.1 E-government and Digital Transformation

E-government was introduced by the former Vice President of the USA, Al Gore, who envisioned the connection of citizens to agencies of government to deliver services in an automated way [12]. Additionally, his plan included the reduction of costs, better performance, and fast delivery service [12]. According to the UN, e-government used to be “the use of digital technologies for enhancing the efficiency of government agencies” and e-government goal was the creation of digital services [13]. E-government implementation can give higher levels of accountability and transparency and greater citizens participation [12]. In 2002, [14] identified eight different levels of the e-government in order to narrow and define the term’s scope. These levels define to whom the e-government initiative addresses. These levels are: G2C = Government to Citizen, C2G = Citizen to Government, G2G= Government to Government, G2E Government to Employee, G2B = Government to Business, B2G = Business to Government, G2N= Government to Non-profit organization and N2G= Non-profit to Government. However, [15] considers only three of them as main levels, the G2G, the G2C and the G2B. In the literature we identified the following segmentation of e-government: e-government 1.0, 2.0, 3.0 and 4.0 [11]. There is a clear connection to the Web 1.0, 2.0, 3.0 and 4.0 and

they follow a chronological order. Moreover, the journey from e-government 1.0 to e-government 4.0 can be thought of as the path towards digitalization and digital transformation [2]. We must also highlight that the literature shows that governments around the world have not followed this implementation. In many cases governments are still trying to implement initiatives and plans from the e-government 1.0 or 2.0 [2]. The term e-government was found for the first time in the literature between 1995 and 2000. It is also known as Government 1.0 and it is a reflection of the World Wide Web [2], [16]. Some years later, e-government 2.0 was introduced by Web 2.0 [16]. This term is also known as “open government”, and some believe that refers to the concept of e-governance [2]. The e-government 2.0 changed the governments that were able to provide open data, mobile services, platforms as an infrastructure [2], [16]. According to [16], e-government 3.0 and e-government 4.0 are closely related to the digital government. The e-government 3.0 and it is related to new technologies, like blockchain, and artificial intelligence, that allow the governments to be called “smart”. It is closely related to Semantic Web technology [16]. As everything becomes smart in our everyday life, governments follow the lead and try to become “intelligent”. Moreover, the public services were available 24/4 and from any location. In many countries the citizens may easily find the needed information and the services are accessible by visiting the government’s website [2]. This increases the democracy levels since everyone can participate anytime and from any place [17]. As we mentioned earlier the journey from e-government 1.0 to e-government 4.0 can be considered as a journey towards digitalization. This is explained by [3] who strongly believes that digitalization is the one that allows citizens to interact with the public sector’s digital channels while OECD [18] refers to the 24/7 availability of online services as e-government. In addition to this [7] set the limitations of digitalization. More specifically they argue that digitalization is a process that the public sector has experienced the previous years and is only about the changes of the existing processes.

The last concept of e- government is the e- government 4.0, also called transformed government, and it addresses the demands and expectations of citizens and the stakeholders [16]. The key ICT area is the advanced analytics and the cognitive systems [16]. Generally, in most of the identified literature the authors refer to the e-government without specifying 1.0, 2.0, 3.0, or 4.0 but this categorization helped us to make the connections among the terms: digitization, digitalization, and digital transformation. The UN [13] supports that eventually the limits of e-government have been widened to

include the new needs and changes. In recent years citizens can find online open data and digital technologies are used to enable innovative solutions in governance under the term “e-government”. In 2015, OECD created a path towards digital transformation in which the second stage is e-government in order to achieve the digital government. In this report we meet three stages: from digitization through e-government to digital government. According to the report the main challenge is to integrate digital technologies into the digital government. In digitization the focus is to the improvement of cross government activities and to the enhancement of productivity. In the second step, digital technologies are used to build better governments for citizens with the aim to add public value. In the last stage there is efficiency and productivity as in the previous stage but it is added the transparency, the governance, the openness, the engagement, and the trust towards the government [18].

In the next subchapter we will refer to some studies that elaborate on the factors that result in a successful e-government implementation. It is essential for these factors to be mentioned because the barriers and the success factors of e-government are often the same as digital transformation in the public sector. This fact clearly proves that there is a confusion in the academic literature and why the investigation of the success factors and barriers of digital transformation is crucial.

Success factors and Barriers of E-government

In 2002, the Working Group on E government in the Developing World decided on the ten questions that leaders should be able to answer before embarking on the e-government initiatives. This report is a roadmap and proves that since 2002 e-government was a transformational process and technology was a means to facilitate the stakeholders and the organizations. The roadmap addressed the top managers who, before funding the initiative, must be ready to change the way of thinking and the ways of communication between employees and administrators. The authors agree that all the initiatives must have a vision to address the benefit of citizens, but they highlight that the final goals of every initiative might be different in every country and project. This view is also supported by [1] who argues that countries experience e-government with various methods and adds that in many cases the projects are partly or total failure. Moreover, the Working Group sees clearly that the private sector is a main stakeholder and has a significant role during the execution, monitoring, and the assessment of e-government plans. However, regarding the evaluation, citizens will have an active role

too and they are described as the experts [15]. In 2005 [19] conducted a review of the existing literature and they listed 5 categories of why the e-government informational technology initiatives tend to fail. These categories are “information and data”, “information technology”, “organizational and managerial”, “laws and regulations”, and “institutional and environmental” categories. In “information and data”, we meet challenges regarding the quality and the dynamic information needs. In the information technology category, the challenges are the usability, the security, the complexity and in many cases the incompatibility and the technical knowledge. The challenges of “organizational and managerial” are related to the size of the project, to the users and organizational diversity and to the behavior of the managers. Moreover, a challenge is the reluctance to change, the disagreements, the difficulty to align the organizational goals to the project and the fact that the existing goals must not be controversial. The legal and regulatory category is about the laws, the relationships in the government and some authors argue the one-year budget. Lastly, the institutional and environmental challenges are related to privacy and security matters.

One year later, [1] list the critical factors from different initiatives that can lead to a successful implementation or to a failure of the e-government initiative. The categories are the governing factors, the technical factors, and the organizational factors. Every category has its own subcategories. The governing factors are the vision, the strategy, the top management support, the leadership, the focus on citizens and the financial resources. The technical factors are related to the information technology infrastructure and standards, the national physical technologies, the collaboration among the departments, the security, and the citizen relationship management. Moreover, the innovation and technology must be better than the previous situation that the organization experienced. As far as the organizational factors are concerned, they include problems related to policies and laws, the quality-of-service delivery, and a reward system for the employees. Furthermore, the same category includes how the initiative is executed, the trainings, unwillingness to change, the structure and culture within the organizations, the skilled workforce, the change management, the re-engineering of business processes and the awareness regarding the new initiatives.

1.1.2 Digitization and Digitalization

As we previously mentioned, the notion of digital transformation very often is confused with the notion of digitization and digitalization [4], [6]. Digitization is viewed by [20],

as a complete change in humanity's way of living and working and as an opportunity to improve social and economic growth by making citizens' lives better. Moreover, digitization is also known as digital enablement [21]. According to [4], [6], [22] the difference between digitization and digitalization is that the first concept refers to the conversion of digital information to digital form, such as converting a photograph into a digital document, Gartner's IT Glossary agrees that the idea of digitization refers to the process of converting from analog into machine-readable format and digital form, such as PDF file [23]. This is why [6], [24] state that digital transformation is more than the elimination of paper procedures. [24] states that the most recent wave of digitization resulted in the creation and launch of websites for businesses, municipalities where citizens could acquire the needed information by downloading brochures as PDF [4], [24] or conducting simple transactions. Therefore, digitization dematerialized the information. A success case of the transition to paperless format took place in Bulgaria. In 2017 and 2018 the country gradually made 24 certificates to be issued electronically and in 2018 the government completed the transition to a fully paperless way of working. The advantages of this change are the greater level of efficiency of the administration and the higher level of savings of paper, money and time [17]. Based on the abovementioned ideas, digitization can be described as the process that converts analog information into digital information. This process could be perceived as a non-added much value to citizens and employees since the documents or the photos may be in a digital format but still humans are needed to read the documents and collect the information. However, as it was mentioned in the case of Bulgaria, the extra value is linked to nature preservation and the reduction of raw materials use.

[4], [6], [22] support that digitalization is the possible changes in processes and not just digitizing the current processes. As noted by [3], digitalization and the deployment of new types of technology are fundamental determinants for the transformation of the public sector and the change is inevitable. According to [22], organizations must incorporate digitalization into their business models to meet the increasing consumer expectations and keep up with technology advancements. [4] gives some useful examples for the three terms; digitization allows the citizens to download online a form, digitalization gives the opportunity to users to complete online the forms and lastly digital transformation enables the full digital service delivery. Thus, we deem that digitization is a required step for digitalization to be achieved. Salesforce [25] describes digitalization as the leverage of information digitization to make easier and efficient the way of working.

Digitalization gives the opportunity to utilize the data that previously was kept in papers and archives by giving easier and rapid access to the information. What is important to be noted is that, according to Salesforce, digitalization does not imply a shift or a radical change in business but “just to do the old things faster”. At this point, the idea of digital transformation was generated because humanity has adopted new innovative technologies and digitalization is not enough anymore. The new digital technologies demand new ways of working, a total reshaping of the existing processes and at the same time digital transformation includes a holistic reconsideration of how everything operates. In a nutshell, the term digital transformation refers to a concept that is still relatively fresh to the broad audience, while the words digitization and digitalization first appeared years ago and are now part of the idea of digital transformation [2]. Even if many confuse the digitalization and digitization and think they are similar, there are some significant distinctions between them.

1.2 What is Digital Transformation?

Throughout our research we found that many suggest that the term digital transformation refers only to the effects of SMAC (social, mobile, analytics, cloud) [22] or SMACIT (social, mobile, analytics, cloud, and Internet of Things) technology in every industry and sector [26], [27]. Governments choose what technologies are going to use and examine how to execute their digital plans. Authors called the procedure of selecting the digital technologies “strategic choice of digital technologies” [28]. The strategic choice at this level entails the assumption that the same technology will be chosen at a strategic level too [28]. The term digital transformation is used by [24], to describe the delivery of technology-based solutions to existing or new issues and not just digitalizing or digitizing the current practices. However, the author encompasses to the definition the goal-driven organizational, procedural, and technological transformation that all sectors must undergo to flourish in the digital era.

Therefore, even if some authors consider digital transformation as a technology-based phenomenon, there are many other scholars supporting that digital transformation is more than that. Digital transformation has a deep meaning and radical change on how organizations operate. Many authors suggest that digital transformation is not about technologies but about strategy. In the report “Digital Transformation Is Not About Technology”, [29] mentioned that the leaders have to focus on the change on the way of

thinking of their teams, they have to change the organizational culture and the processes and then they can opt for what digital solutions are needed. These scholars emphasize the organizational change and the redesigning of business processes during the transformation journey.

According to the definition provided by i-SCOOP, digital transformation is “the cultural, organizational, and operational change of an organization, industry, or ecosystem through a smart integration of digital technologies, processes, and competencies across all levels and functions in a staged and strategic way” [30].

Salesforce highlights that digital transformation is the process of leveraging digital technology to create new or alter the existing business processes, culture, and consumer experiences to cope with the fast changes[25].

Similarly, [31] describe digital transformation as the rapid changes in organizational activities, processes, and capacities that have been triggered by digital technologies. The same authors [31] suggest that digital transformation requires turning the possible barriers into success factors. In the same vein, [22] state that digital transformation involves and implies significant modifications to business processes. A good illustration of digital transformation is completing forms online and updating and analyzing data in real time [4].

The definition of [7] includes the idea of a fundamental change that the above-mentioned authors point out as well, the structure and the organization of an organization and the key role of digital technologies.

Although differences of opinion still exist, there appears to be some agreement that digital transformation refers to fundamental organizational and operational changes and to radical change in processes.

1.2.1 What is Digital Transformation in the Public Sector?

[8] argues that the digital transformation is the higher point of e-government because it compels governments to change radically. The goal of digital transformation in the public sector is to add value to the citizens and to optimize the provided customer services. The transformation improves “both vertically, in terms of what is provided to the customers, and horizontally, to determine the interactions between government sectors.”[8]

[7] supports that digital transformation in the public sector mainly is the changes that need to be done because of the adoption of digital technologies in the public administrations and the public bodies.

A recent study [4] on the public sector based on expert interviews in multiple European countries indicates that the digital transformation in government level is connected to cultural, institutional, and organizational changes. In addition, [4] believes that digital transformation has no end and “it is a continuous process that needs frequent adjustments of its processes, services and products”.

For SAP [5] the transformation in the public sector will come only by a complete 100% reimagining of the whole orientation of governments. The authors of the report developed three pillars of reimagining the government. Reshaping the business models with focus on the citizens by delivering valuable products, reimagining the processes related to data and to decision making and developing smart cities. Salesforce agrees with SAP [5] regarding the remaining and supports that this reimagining of business is called digital transformation. SAP [5] argues that through digitalization governments can make organizational changes in the operations by bringing together all the levels of the value chain. The third component is the reimagining of the workforce. This will be accomplished by introducing agile methods of working, by changing the culture to develop engagement, by building training programs, by providing a transparent environment and access to data, by giving incentives to employees, by taking advantage of predictive analytics in the decision making, and by using chatbots. All these changes will completely transform how the public sector operates and the working life of the public sector workforce.

DigiGov scientists and researchers [11] define digital government transformation as “the introduction of radical changes, alongside more incremental ones, in government operations, internal and external processes, and structures, to achieve greater openness and collaboration within and beyond governmental boundaries, enabled by the introduction of a combination of existing ICTs and/or new data-driven technologies and applications, as well as by a radical reframing of both organizational and cognitive practices; it may encompass different forms of public sector innovation across different phases of the service provision and policy cycle to achieve key context-specific public values and related objectives such as, among others, increasing efficiency, effectiveness, accounta-

bility, and transparency, to deliver citizen-centric services and design policies that increase inclusion and trust in government.”

All the definitions highlight the fundamental organizational change of the public sector, the complete reimagining of processes and radical change in the way the public sector operates.

1.3 The Necessity for Digital Transformation in the Public Sector

In the previous subchapters we tried to set the boundaries of the notions and to define what is the digital transformation in the public sector in order to explain in this part the reason why the digital transformation in the public sector is necessary. Digital transformation is not a simple technological upgrade or modernization. In most of the cases the digital shift is a matter of survival and the only way to stay up with the rapid changes while remaining competitive and successful.

One of the reasons why governments are obliged to transform is because nowadays the private sector has leveraged all the available digital technologies and offers high-level digital solutions. This phenomenon has raised the citizens’ expectations regarding the available government services [19], [32], [33]. For this reason, governments around the globe try to become more effective and to deliver more user-oriented services by investing in personalized services that add value to citizens. [33]

Moreover, digital transformation enables better decision-making processes. Nowadays, policymaking is not strictly the responsibility of governments. Digital technologies allow a greater participation grace to crowdsourcing and co-creation. Governments count on algorithms to have better insights and analytics to make decisions. [11]

Additionally, the European Union [2], [34] focuses on the deployment of innovative digital technologies in public administrations to enhance citizens’ trust, to eliminate social exclusion from online services and the job market and aspire to an interoperable digital environment among the countries. Governments try to enhance citizens’ trust as this value is deeply broken because of multiple failures such as the financial crisis, the high levels of corruption in many countries and the leaks of classified citizens’ data [8]. The European Union sets the framework, the strategies, the guidelines, and the action plans in order to foster digital transformation in order to boost citizens’ trust by invest-

ing in transparency, better quality of services, better communication channels and greater accessibility [8].

Another important reason why digital transformation in the public sector is vital is the unexpected situation of Covid-19. Governments around the world were compelled to act immediately by taking a wide range of measures against the spread of the virus in order to protect the citizens. Many countries were unprepared in terms of infrastructure, connectivity, and interoperability for such a disaster situation. The international organizations took initiatives to tackle the pandemic, Europe-as-a whole formed strategies but also the European Members took measures separately to contain the virus [34]. The public sector had to transform to ensure the continuity of public services during the lockdowns. Digital technologies helped national and European public administrations to rise to challenge the pandemic. For instance, the more digitalized countries with established digital solutions, such as eIDs, were more resilient and responded immediately to guarantee the access to the online services. The Program manager of the European Commission ,Georges Lobo, argues that during Covid-19 pandemic the public administrations had to overcome three main barriers to deliver e-services [34]. These are the following: the resistance to change, the lack of an already established eID system and the general change in the way of thinking and acting which is closely related to the culture.

On the other hand, countries with no advanced digital background had to develop promptly their digital services and solutions for all the sectors of the economy, such as telemedicine for medicine and remote education platforms and regulations for education [35]. In addition to this, the United Nations report mentions telemedicine as a way to replace the regular visit to the doctor, the thermal cameras at the airports and at public places to detect people who may be infected [36]. Therefore, it can be seen that many of the changes and innovations such as telemedicine are not a temporary solution, and they will continue to exist when the pandemic is over.

Moreover, many digital tools and trends were used by the European Commission to control the pandemic including medical research. Artificial Intelligence was the main one not only for monitoring the pandemic spread but also for reducing the human contact with the infected citizens in hospitals by using robots [37]. Europe used the satellites in the context of the EU Space Program as a communication tool among countries and to monitor the health of European citizens [37]. In most of the cases Covid-19 pan-

demic exposed the inadequate level digitalization in public administrations and made it clear to governments that these essential elements of digital transformation are missing and at the same time acted as an accelerator to the digital transformation journey as many new solutions were developed [34], [35].

1.4 Structure of Dissertation

The overall structure of the dissertation takes the form of six chapters, including this introductory chapter. Chapter 2 is concerned with the methodology used for this study. The next chapter presents the literature review concerning the success factors and the barriers of digital transformation in the public sector. The fourth section presents the results of the literature review, focusing on the selected case studies. The discussion chapter gives a comparison of the two case studies in relation to the identified success factors and barriers. Finally, the conclusion and the future work give a brief summary and a possible extension of the study.

2 Methodology

In this chapter we present the scope of the dissertation, the methodology we have followed, and we explain how we will ascertain whether our findings are consistent with the real digital transformation of the public sector cases or not.

2.1 Scope of dissertation

With the adoption of digital technologies, the increase in the number of people around the world who are connected to the Internet and use online services, there has been a corresponding need for a radical change in the public sector. In the view of this situation, the present dissertation examines the phenomenon of digital transformation. The scope of this study is restricted to the public sector and the factors that can affect the digital transformation journey. The research questions are two:

RQ1: What are the success factors of digital transformation in the public sector?

RQ2: What are the barriers of digital transformation in the public sector?

Since our topic demands extensive research, in the next sub-section we focus on providing details about the searching process, the chosen digital databases and the way of reviewing the literature. Moreover, based on the results of the literature review we analyze the digital transformation of two countries, to examine if their efforts and attempts to transform their public sector, corroborate our findings. The two selected countries are Denmark and Latvia.

2.2 Literature Review

In this dissertation we use the literature review method, and we try to answer the research questions addressed in the scope. The literature review is a method of summarizing material from other studies that are relevant to the specific topic and the posed research questions. It entails building a well-structured research strategy and orientation that focuses on a certain issue and responds to it. Therefore, we tried to have a clear

plan and specific orientation. A milestone in the literature review is the research questions to be formulated with precision since the beginning of the study to allow us to explore in depth the factors that affect digital transformation in the public sector and to finally answer the posed questions. Before deciding on the digital libraries, we planned what information was needed. We worked on the inclusion criteria regarding the selection of the relevant research articles and grey literature. We included only the resources that satisfy the following criteria:

1. Focusing on digital transformation.
2. Analyzing digital transformation in different countries.
3. Including success or failure factors of digital transformation initiatives.
4. Noting the benefits of digital transformation in the public sector.
5. Noting the challenges, the risks, or the barriers of the digital transformation of the public sector.
6. Discussing the dimensions of public transformation in the public sector.
7. Providing new data and information for digital transformation in the public sector.
8. Link e government to digital government transformation.
9. Do not use interchangeably the success factors and barriers of e-government and digital government transformation.

The next step was to define the limits of the searching process. Therefore, we excluded the articles that:

1. Their text was not in English.
2. We had to request for the full text.
3. Did not focus or discuss the initiatives or adoption of digital transformation in the public sector.
4. Articles that were not relevant to the main topic.
5. Analyzed the digital transformation only from the technical view.

Next, we continued with the selection of the databases. Our research consists of an electronic search, conducted on three databases: *Science Direct*, *Scopus* and *IEEE*. We

chose these digital libraries because of their high influence in the academic world and their reputation for their high-quality articles.

The articles were initially examined based on the title and the abstract. If the title or the abstract was irrelevant to the search terms, the article was excluded from the list. To facilitate the process, all the articles were merged in a common excel file and then the duplicates were removed.

Moreover, we compiled a list of keywords and key phrases to form the queries and search in these databases.

Table 1: Keywords for the literature review

Success Factors	Barriers	Public Sector
Effect	Challenge	Public administration
Impact	Obstacle	Countr*
Success		
Influence		

We used the Boolean operators “AND” and “OR”, to narrow and widen our search [38]. In this way, the author tried to connect the topic of digital transformation, the success factors, and the barriers with the public sector term by narrowing and widening the search.

The first query was generic, and it was about the digital transformation in the public sector: (“digital transformation” OR “egovernment”) AND (“public sector” OR “public administration”). This search was done in August 2021 and the query was used for all the databases.

The next searches were regarding the barriers and the success factors of the digital transformation in the public sector was done in October 2021 and the queries were the following: “digital transformation” AND (effects OR impact OR success OR influence) AND (“public sector” OR “public administration” OR countr*) and (“digital transformation” AND (barrier OR challenge OR obstacle) AND (“public sector” OR “public administration”).

These searches gave us 1.624 results, 45 of those were duplicated. From the 1.579 articles we excluded 1.420 because of their irrelevant title and 89 because of the abstract. We read 70 articles and of them we used 25. After reviewing and selecting the articles, we used the backward citation searching method to further enrich our understanding concerning digital transformation. Backward searching is the examination and identification of the works and articles cited in an article. This kind of search looks back in time and it is also known as “chain searching” [39]. This dissertation applies the backward search method on most of the articles. Our search gave us 23 results and the final selection included 7 articles. Moreover, we used 25 web sources, and we visited them manually.

Lastly, we conducted a grey literature search. We followed the same limitations, but in this case, we visited manually the websites of the following institutions and organizations to find related to the topic material: Deloitte, Gartner, OECD, European Union, UN, World Bank, Pacific Council on International Policy, SAP, PwC. We found 45 documents relevant to the digital transformation, 12 were excluded from the title and the rest 33 documents were scanned to ensure that they contain relevant information to the digital transformation in the public sector. The author included in this dissertation 18 of them.

2.3 Case Studies

We use the case study research approach to better understand what the real conditions of digital transformation in the public sector are. We examine to what extent the selected countries satisfy the requirements of the digital transformation and if they do not; what are the factors that have helped during their digital transformation. Moreover, by investigating the two countries we have insights on how governments cope with the barriers that they might face during the implementation of the initiatives.

3 Literature Review: Success Factors and Barriers of Digital Transformation

In this chapter we answer the two research questions that we have posed in a previous chapter. We begin by presenting the success factors that influence the transformation and next we continue with the obstacles that may impede the digital transformation journey. In the last sub-chapter, we point out why we selected to include Denmark and Latvia as case-studies.

3.1 Q1: What are the success factors of digital transformation in the public sector?

First of all, in 2019, [2] divided the factors that drive to transformation and the factors that affect digital transformation. The drivers were categorized into three groups: political and social drivers, economic drivers, and technological drivers. What we noticed is that the factors that drive digital transformation are the same as the factors that led to e-government and public agencies. Therefore, the governments still aspire to reduce the costs and increase the saving and still strive for higher levels of efficiency by applying digital technologies. Regarding the success factors and the barriers, the authors [2] found 6 categories that depending on how they will be used can lead to a successful implementation of digital transformation or to a failure. The categories are technological, organizational, legal, ethical, sociocultural, and financial factors. These factors have sub elements that can affect the digital transformation without being necessary the other categories. In the first category we meet the adequate information technology infrastructure, the lack of silos and especially among IT systems and a more technical challenge, the access to data. The organizational factors include factors related to strategy, matters regarding the exchange of information, management issues like the resistance to change and the skillful workforce of the public sector. The legal factors are related to privacy threats, the legal framework and cybersecurity. In addition, the transparent way of using

data aims to build trust between the government and the citizens, the hostile environment on people and the respect towards citizens are the ethical factors. The continuous usage of services by citizens, the cultural hindrances, and the persistence to the old ways of acting and working are the social and cultural factors. Lastly, the authors mention the financial factors are related to the funding and the financial sources.

[2] contributes to the argument that digital transformation is more than technology by stating that other types of changes such as the changes in the regulations and laws are equally important for the digital transformation.

[40] developed seven success elements of digital transformation. Each factor has its own sub factors that define how these factors should be implemented. These factors are: determining the digital trigger, having a digital culture, developing a digital vision, defining what drives digital, establishing digital organization, deciding upon what areas will be transformed, and defining the effects. The authors argue that the most important elements from these factors are the following three: defining the digital drivers, developing a culture towards digital and defining the impacts. The creation of a digital culture is about a common understanding of what is digital transformation, is also about the existence of strong organizational leadership and practicing good governance. Defining digital drivers is related to the decision about what digital technologies will be used, analyzing if other resources are necessary, what are the needed knowledge for these technologies, and having strong digital leadership skills. Regarding the last factor, the “determining the impacts”, has to do with what are the impacts that the organization and the citizen/customer think they are going to face and how the effects are going to be measured.

In [41], Jonathan published a paper on the three factors that help to the successful digital transformation. He begins with the organizational and managerial elements which are the change management, the culture of the organization, the leadership trait, the trainings and the good alignment between IT and business. The second factor is the information technology which consists of the protection of information, the information technology architecture, the lack of silos and the data access. The last category is the environmental factors and the financial resources, the willingness of citizens to participate, the laws framework, the political environment, and the excellence and trustworthiness of the telecommunication systems.

[42] found as most common factors that can guarantee success the adequate funding and the timeframe of the projects. Moreover, the same authors found the communication, the user-friendly environment, and the managerial support as important factors of digital transformation. More than one time, they identified the citizens' participation, the IT infrastructure, the measurement of the performance of the initiatives, the professional project management, the clear implementation project, and the political support. Moreover, they identified as success factors the managerial accountability, the importance to recruit and retain skillful personnel, the use of well-known technologies, clear implementation plans, gradual implementation of the initiative, and the involvement of the employees.

[43] analyze the technological organizational and environmental factors. These broad terms include subfactors. The technology category includes the IT infrastructure and the workforce with adequate knowledge. The organizational factors include the managerial and financial support, the culture, and the digital strategy. Lastly, the regulatory framework, the willingness of citizens to adopt the online services and the Internet use make the environmental category up.

[44] argues that the public sector needs a successful change management to guarantee the success of digital transformation. They identified 10 factors relevant to the change management that are important for the change of the public sector. First of all, the existence of a strong vision across the organizations and the sense of urgency. For the first time we found that the resistance to change must be an expected condition and managers are advised to respond effectively in order to develop a supportive culture. Moreover, communication is needed to convey the message of vision, mission, and objectives and to connect people and agencies. Moreover, change management consists of the formulation of education programs and the commitment of people to the organizational goals. Also, strong leadership skills, employees' ownership, the culture and the values and the citizens satisfaction are key factors in the organizational change.

[45] support that the success of digital transformation depends on the strategic alignment in the public sector. The IT goals must align the strategic goals and all the departments have to support these goals by setting out specific prerequisites.

[46] emphasize the importance of the political environment as a factor that can lead to a successful outcome.

	[2]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
IT infrastructure	X			X	X			
Information technology architecture			X					
Trustworthiness of the telecommunication systems			X					
Interoperability/lack of silos	X		X		X			
Access to data	X		X					
Strategy	X			X	X		X	
Communication	X			X		X		
Skillful workforce	X				X			
Privacy threats/ cybersecurity	X		X					
Trust to government	X							
Citizens' willingness to adopt services/ Participation	X		X	X	X	X		
Funding	X		X	X	X			
Culture		X	X		X	X		
Vision		X				X		
Accept change as natural phenomenon						X		
Common understanding of what digital transformation is		X						
Leadership		X	X	X		X		
Change management			X			X		
Trainings	X		X			X		
Alignment between IT and business			X				X	

Legal and regulatory framework	X		X		X			
Political environment			X					X
Setting out prerequisites of digital transformation							X	
Timeframe of projects				X				
User-friendly environment				X				
Managerial support				X	X			
Internet use					X			
Managerial accountability				X				
Recruitment and retention of employees				X				
Involvement of employees				X				
Sense of urgency						X		
Acceptance of resistance						X		
Employees ownership						X		
Clear measurement performance				X				
Political support				X				
Use well-known technologies				X				
Clear implementation plans				X				
Gradual implementation				X				

3.2 RQ2: What are the barriers of digital transformation in the public sector?

[3] refers to the problems pursuing digital transformation and supports that the main problem is the lack of user-centricity in the approach of digital transformation. The au-

thor's direct quotation to present the problem is "the challenge is to integrate user-centric services across the silos". The same author [3] elaborate more on barriers including the conflicting incentives, the vertical structures, the employee job security rules. For these barriers the author believes there are no easy and right or wrong solutions.

As we previously mentioned, [43] analyses both the success factors and the obstacles of digital transformation. Regarding the barriers, the author identified the inadequate technology infrastructure, secondly the employees with advanced IT skills and the lack of political and managerial support. In addition, the researchers found that the complexity in the organizations' structure and the regulatory framework can impede the digital transformation [43].

[20] investigated the digital transformation in Saudi Arabia and mentions that the e-government and m-government project of 2005 failed due to the resistance to change. The author pointed out that if a country does not fully adopt digitization, it is impossible to implement digital transformation projects. So, for [20] an important barrier is the low digitization level of a country. Furthermore, [20] links the failure to the lack of consideration both the human and the non-human factors. Typically, developers do not take into account the human and the technical factors instead they mostly concentrate on the technical needs resulting in misspend of money. Moreover, [20] proves that reliability significantly influences the adoption of digital technologies, and he observed a correlation between trust and individual's willingness to adopt new technologies. This correlation might explain why some online services fail and are never adopted and used by the users. We can note that according to [2] the low adoption of the public online services in the e-government stage hinders the progress of the e-government and the research indicates that this is caused because of the low trust of citizens towards the e-government applications. In addition, [20] shows that the lack of awareness is a key factor in the adoption of new digital technologies and the low security level impedes the adoption of digital technologies in Saudi Arabia. Both factors can negatively affect the whole economy of any given country.

[42] discusses the critical success factors and barriers that affected the implementation of digital government initiatives in Prague. They identified the following obstacles: the lack of training, the lack of highly knowledgeable employees and the lack of personnel. Moreover, the researchers found that managers try to develop very complex initiatives and they do not spend enough time on the planning phase. Lastly, they mentioned some

barriers that are found only to one district of Prague, and these are: lack of infrastructure, not enough managerial support, no support from the top managers, not enough training, and lack of communication.

[46] examined the cultural barriers of the public organizations in Sri Lanka the authors introduced twelve new barriers, in total found twenty-one and categorized them in five different themes. Firstly, they found the knowledge gaps that are related to the following factors: the unwillingness to share knowledge in an informal way, to the lack of skillful workforce and training, to the missing skills, to the lack of relevant knowledge and to the lack of innovations and agility. The second theme is called dependencies and includes the dependence on hierarchy, the influential role of the core trade union, the addiction to legacy systems and the lack of leadership. The next category is miscommunication. In this category we meet the lack of understanding of what the users need by the technical team, the misunderstanding among the internal teams. As barriers of the same category also are the middle managers who are not notified of the digital transformation initiatives and the lack of culture in the teams. The fourth category is the bureaucracy and the authors identified there the lack of support of the managers and personnel in any digital project, the unwillingness of the top managers to adopt the new technologies, the political influence, and the power distance. Lastly, “the accomplishments” is the last category and includes the resistance to change, the lack of support for the strategy and the benefits of the completion.

Moreover, [47] mentioned that the leadership skills and the organizational culture are important components of a successful implementation of digital transformation. However, the authors identified the factors that can impede these two success factors. The first one is the managerial reluctance that is a key barrier to leadership and aborts the implementation of digital transformation and the second one is the lack of skillful personnel in the public sector that causes problems to organizational culture and makes the transformation even harder.

[10] examined the drivers and the barriers of digital transformation in public organizations from the organizational point of view and categorized them into two groups, the structural and cultural barriers. The identified barriers are the following: the lack of managerial and political support, the lack of skills, the lack of personnel in the public sector. Moreover, they found that the organizational complexity and the difficulty of communication and among departments of the same agency are crucial structural barriers.

ers. The cultural barriers include the personnel that are afraid of innovations, the strong resistance to change and the old bureaucratic way of working [10]. It is important to mention that the authors tried to validate their literature findings through a survey in the Netherlands and they found that the digital transformation journey in this country was not affected by the identified obstacles [10].

Table 3: Barriers

	[2]	[3]	[10]	[20]	[42]	[43]	[46]	[47]
Resistance to change	X		X	X			X	
Bureaucracy			X					
Discriminations against people	X							
Culture	X						X	
Lack of infrastructure	X				X	X		
No access to data	X							
Silos	X	X					X	
Privacy threats	X			X				
Lack or complexity of legal/regulatory framework	X					X		
Lack of user centric approach	X	X		X				
Conflicting incentives		X			X			
Vertical structures		X					X	
Lack of digitization				X				
Lack of trainings					X		X	
Lack of skillful personnel			X		X	X	X	X
Lack of managerial support			X		X	X	X	X

Lack of political support			X		X	X		
Lack of communication			X		X		X	
No adoption of services by citizens				X				
Awareness of citizens				X				
Organizational complexity						X		
Lack of workforce			X					
Fear towards innovation			X				X	
Lack of agility and innovation							X	
Influence of trade union internally							X	
Lack of leadership							X	
Lack of awareness of middle managers regarding digital transformation							X	

3.3 Case Studies Selection

We decided to analyze the digital transformation in the public sector of two countries to test and validate the most identified factors in the academic literature. We opt for the countries based on the Digital Economy and Society Index (DESI) [48]. DESI is an index that measures annually the digital performance and progress of the EU Member States', and it is reviewed by the European Commission. According to DESI [49], for 2021 Denmark ranked first out of the twenty-seven European countries and this is the reason why we have decided to further examine the country's digital transformation journey. We decided the second case study to be a Baltic country since it is often in the literature the Nordic region to be studied in comparison with the Baltic region [50]. The second chosen country is Latvia because it is 17th out of the 27 European countries and ranks last in comparison to the other two Baltic countries[51]. Estonia is 7th[50] in the ranking and Lithuania ranks 14th among the 27 Member States of the EU. In our analy-

sis we comment on the DESI report findings, the strategies every country has followed and continue to follow, and we try to connect all this information to the identified and most identified success factors and barriers. Before we start the case-studies analysis, we present some basic information about the background of the two chosen countries to have better insights into their characteristics.

3.3.1 Denmark and Latvia

Latvia and Denmark are very different from each other. First of all, the population of Denmark is larger than Latvia’s and Latvia’s size is bigger than Denmark’s. Denmark is a small country but with a very high population level and urbanization rate. Latvia has a serious problem with the population growth rate as the difference compared to 2019 is huge. Also, Denmark seems to have a higher income rate in comparison to Latvia. Latvia has a medium level of urbanization and became a Member of the European Union in 2004. Lastly, one important difference between the two countries is their official language. In Denmark citizens speak Danish, though in Latvia people speak Latvian and Russian is widely spoken. Moreover, Denmark is first in the corruption perception index while Latvia ranks 42nd. Based on the data, we expect that Latvia may have faced more obstacles in the digital transformation journey in comparison to Denmark. In contrast, the high urbanization rate, the high GDP per capita and the first place of Denmark in the Rule of Law index and in the Corruption Index inclines us even more towards the perception that Denmark has a successful digital transformation journey.

Table 4: Characteristics of Denmark and Latvia

	Denmark	Latvia
Population	5.867million[52]	1.908 million[53]
Capital city	Copenhagen	Riga
Official languages	Danish[52]	Latvian, Russian[54]
Country’s size	43,094 km2[55]	64,574km2[53]
Form of Government	Constitutional monarchy[55]	Republic, parliamentary democracy[53]
Government	Social Democratic Party[52]	President (Mr) Egils Levits and multi-political parties’ system[53]
EU member	1973[52]	2004[53]
Population	0.36% [56]	-64% (2020)

growth rate		compared to 2019)[57]
Life expectancy at birth	81.2 years[56]	75 years (2019)[57]
Urbanization rate	87.99% [56]	68.325[57]
GDP	356.09 billion US dollars[56]	29.3 billion euro (2020)[53]
GDP per capita	59,861.61 US dollars[56]	15.431 euro (2020)[53]
Inflation rate	0.33% [56]	0.2 % (2020)[53]
Unemployment rate	5.66% [56]	8.1 % (2020)[53]
WJP Rule of Law Index (2021)	Rank-1[58]	Rank-24[58]
Corruption Perceptions Index (2020)	Rank-1 Score 88/100[59]	Rank -42 Score 57/100[59]

4 Analysis of Results

This chapter is divided into three parts. The first one presents the most identified factors in the literature review. The second part moves on to discuss in greater detail the identified factors in connection to the two case studies in order to find if the real conditions corroborate the findings.

4.1 The most Identified Factors

In total, we identified twelve studies that examine the success factors and/or the barriers of digital transformation in the public sector. We realized that almost all factors can be in favor of digital transformation but also can be against it, depending on how the elements are used. For instance, if there are adequate resources this could be in favor of the digital transformation while the lack of funding can cause a collapse of the initiative. The categorization in negative or positive factors derives from the authors' point of view and their research objectives.

To collect the most identified factors we set a limitation of the minimum of four studies. Therefore, we accepted the factors that are mentioned in more than four different studies either as success factors or as barriers. In total we found eleven factors the academics agree on. The most identified factors obtained from the literature review are presented in Table 5.

Table 5: The Most Identified Factors

	Articles view it as success factor	Articles view it as barrier	Total number of articles
Citizens' willingness to adopt the services	[2], [41]–[44]	[20]	6
Culture	[40], [41], [43], [44]	[2], [46]	6
Skillful personnel	[2], [43]	[10], [42], [43], [46], [47]	6
Silos/ interoperability	[3], [41], [43]	[2], [3], [47]	5

Communication	[2], [42], [44]	[10], [42], [46]	5
Leadership skills	[40]–[42], [44]	[46]	5
Trainings	[2], [41], [44]	[42], [46]	5
Managerial support	[42], [43]	[10], [42], [43], [46], [47]	5
Strategy	[2], [42], [43], [45]	[2], [42], [46]	5
Resistance to change	[44]	[2], [10], [20], [46]	5
Funding	[2], [41]–[43]	[2]	4

Interestingly, none of the most accepted factors is not mentioned only as a barrier or as a success factor. Below we analyze the most identified and accepted factors based on the academic literature.

Willingness of people to use the services

Six articles agree on the importance of the willingness of citizens-users to adopt digital services. This factor is very crucial since it reflects the ultimate performance of the service and the satisfaction of citizens.[2]

Culture

Six studies agree on the importance of culture in the public sector. Culture was identified as a factor that can bring success to the digital transformation initiatives in 4 articles and in two as a factor that can cause serious problems. In general, culture is a broad term and is often characterized as an organizational factor [41], [42]. [46] define the term as the behavior, the characteristics and the values of employees and place culture in a higher position than strategy. Moreover, [41] believes that culture shapes the leadership and the way of thinking of employees but also affects the willingness to change, to learn and experiment with innovations.

Skillful personnel

In addition, six studies refer to the skills of the personnel. The reason why the skillful personnel is a crucial factor for the digital transformation journey is the fact that most of the authors mention that the lack of the skillful workforce in the countries can significantly impede the transformation. This is because the public administrations need personnel with more technical knowledge. The adoption of new technologies, the new software programs and the large amount of available data demand people who can manage all the digital tools. [2] mention that the delayed adoption of artificial intelligence

was due to the lack of personnel with adequate knowledge and the lack of leadership in the IT departments.

Silos

The lack of interoperability refers to the elimination of silos. This is a topic that concerns for many years the public administrations, the governments and in general the public sector. For example, [2] mentions that interoperability is connected to governance as it gives the opportunity to have reliable insights for better service delivery or to have more available information to support the policy making by integrating different databases that a single machine learning algorithm can analyze. In addition to the wider concept of interoperability and elimination of silos in Europe, the Program manager of the European Commission, Georges Lobo, emphasizes that many public administrations have already built their own applications and it is important these systems to be harmonized and be built by central services, otherwise many different systems and ways of interacting could upset the users [34].

Communication

Another important element of digital transformation is communication. Managers who can convey the digital transformation vision, mission and objectives to employees are more likely to eliminate the reluctance to change by creating incentives to change [44]. In addition to this, [46] state that very often top managers do not inform employees about their decisions regarding digital transformation. Moreover, [42] emphasize that managers and the stakeholders must communicate, especially when the projects are implemented with inadequate funding. Lastly, communication allows the flow of information regarding the needs of users [46]. If the IT department knows what the end users need, they can easily deliver the services or applications [46]. When the program manager European Commission, George Lobo, was asked about the biggest obstacles that governments in general face in their digital transformation journey, he answered that biggest problems are the need of continuous flow of information among public bodies, the accessibility of e-services, is the connectivity issues [34].

Leadership

The “leadership skills” factor is mentioned in five articles. Leadership trait is an important factor because it allows the managers to coordinate employees and their tasks. [42] categorizes leadership as an organizational factor. Similarly, [40] call it “organizational leadership traits” and believe that is crucial for developing a digital culture in the

organizations. [46] support that leadership skills can endorse a supportive environment to accept digital transformation initiatives.

Trainings

“Trainings” is considered to be the solution to the lack of digital skills. Training programs that must be provided by the government or the institutions to help participants to gain knowledge and develop their skills. Intergovernmental and European organizations, governments, and the top managers of public bodies have to develop programs in order to advance the digital literacy of the workforce worldwide[2].

Managerial Support

Managerial support is the extent to which managers support the employees, the changes and the strategies. [46] reports that often top managers have a “sense of superiority” instead of supporting the employees. In addition, the same authors support that the top managers several times do not easily adopt the digital technologies and emphasize that many initiatives have failed when top managers reject the strategies.

Strategy

Strategy is mentioned as a main element of digital transformation as one of the most common mistakes of organizations during digitalization was the omission of strategies [2]. The same authors [2] argue that the lack of strategy may indicate a misalignment between central and local governments. In the many articles, we met some elements that we have included under the factor “strategy”. According to our research these success factors compose the “strategy” because they define how a digital transformation initiative should be planned and measured. These factors are the following: setting out the prerequisites of the project in the public sector before the implementation [45], determining the digital trigger [40], defining what drives digital [40] and deciding upon what areas will be transformed [40]. Regarding the success and the failure of a project, [40] suggest that the possible and desired effects should be defined before the implementation. This statement is boosted by [42], who found as a crucial factor the performance measurement of the project.

In addition, [46] add one more interesting reason why strategy is important in the digital transformation. They support that the lack of strategy indicates serious knowledge gaps. Moreover, they define three elements that constitute a digital transformation strategy: the leverage of digital technologies, the changes in structure and the changes in how the value is created.

Resistance to change

The willingness or resistance to change includes the general tendency of civil servants to change, to use the new technologies and to work in a different way [2], [44].

Funding

Lastly, 4 studies agree on the importance of funding in the digital transformation journey. The allocation of resources is considered a high priority action for governments according to [43]. In the same vein, the results of [41] indicate that the lack of financial resources can cause the failure of digital transformation in the public sector and [2] mention that the lack of skillful workforce and the lack of infrastructure is connected to the lack of adequate financial resources.

In an effort to categorize the most identified factors, we notice that most of the factors are organizational and cultural. Funding belongs to the financial category and the interoperability to the technological. One could suggest that interoperability is also relevant to communication because having interoperable systems facilitate the exchange of information. However, this dissertation focuses on identifying the success factors and the barriers rather than categorizing them.

Overall, these results indicate that many scholars agree with each other about the critical elements of digital transformation and none of the elements cannot be seen only as a success factor or only as a barrier. In addition, it is almost certain that most of the factors are interlinked with each other. This happens because some authors categorize the factors into broad categories, while most of them organize sub-categories.

4.2 Case Studies Analysis

Below we will analyze the two case studies in order to examine if the countries face the same barriers and success factors in their digital transformation as the academic literature reports. However, we have to note that the evaluation of the changes that digital transformation has brought is mentioned by [11] as a difficult task.

4.2.1 Denmark

We initiate our analysis from the country's governance structure. We highlight the country's governance structure because it facilitates the organization of the country in terms of applying the digital government initiatives. Denmark has twenty ministries,

ninety-eight municipalities and five regions [60]. The municipalities are under the Local Government Denmark Association (KL) which acts in the common interest of municipalities, provides them consultancy services and monitors the local authorities [61]. Also, Denmark has formed the Agency of Digitisation that belongs in the Ministry of Finance [60].

As we previously mentioned we will comment on the DESI report to examine if there is any of the eleven most identified factors. The first area measured by DESI is the human capital and Denmark has the fourth place with a score 61.2 when the total European score is 41.7 [49]. The 70% of individuals have at least the basic digital skills when the 49% of population has above the basic skills. However, the European Commission highlights the fact that the Danish workforce needs to improve the digital skills and points out that three out of ten adults still lack the basic digital skills [49]. Danes recognize their weakness and the importance of having a digitally literate workforce in the public and private sector and they answer that their new strategy will solve these issues [49]. These actions indicate that Danes have the needed skills and when they do not, they try to fix their weaknesses by developing new strategies. Danes have realized the portance of strategies in digital transformation, exactly as the academic world has.

Moreover, the report [49] also mentions that due to Covid-19 pandemic the Danish Ministry of Higher Education and Research offered new projects to enhance the digital skills of teachers as they had to teach remotely through the online platforms. This proves the fact that Denmark provides trainings to civil servants and the fact that Covid-19 made necessary the digital skills.

The next measured factors are connectivity, and the integration of digital technology; Denmark is in the first and in the second position respectively. The ranking position of the country is excellent, however, in our literature review only a few articles mention the information technology infrastructure as a needed factor [49].

The last area measured by DESI is the digital public services of European countries. Denmark ranks second with 92% of internet users using the e-government services and this is the highest percentage among all European countries [49]. However, the country is in 10th place on the digital public services for citizens and scores only 84 to 100 [49]. In addition, Denmark is among the 20 countries that built or upgraded their public e-services due to Covid-19 pandemic [34]. Nevertheless, the high percentages clearly indicate the intention of Danish people to adopt the services offered by the government

and this endorses our finding regarding the success factor “the willingness of citizens to adopt the services”. It is also worth noting that Denmark is among the five countries that reported no disruption in the delivery of public services. The advanced digitalization of the Danish public administrations and the high level of interoperability allowed the country to respond immediately to Covid-19 needs and to ensure the utilization of online public services during the pandemic [34], [35]. For Denmark, the key digital solution was the widespread adoption of eID that was capable of holding the e-services together and ensuring their continuity [34], [35]. The IMF reports that Denmark had one of the most rapid vaccination progress in Europe [62]. The digital culture of Denmark and the established interoperable systems not only gives the lead on the digital public services but also makes the country resilient to unexpected situations.

In addition, Denmark has realized the fact that the public sector must work together with the private and the government many years ago. The government collaborated with CEOs and skilled people from companies, business associations, ministries, trade unions and Danish Regions [63]. This collaboration named Digitalization partnership with the aim to deliver recommendations on the following: how Denmark can take advantage of digital technologies to provide fair treatment and same opportunities to all Danes, on how to make Denmark greener, on how to provide a better and more efficient public sector and supporting companies through digital transformation [49], [63]. Moreover, the Danish government had priority to support digital transformation by having a strategy on how to introduce new initiatives and partnerships.

Now we will look at the digital strategies that took place in Denmark. Since the strategy is a crucial factor according to the literature, we will examine if the strategies have cohesion and if the goals are accomplished. In parallel we will comment on what elements have helped the country to take the lead in the DESI report.

The country followed a gradual path towards e-government and digital transformation. The “gradual steps” factor is not among the most identified factors table, but it is mentioned by [42] as a digital transformation success factor.

Danes embarked on their digitization journey in the public sector in the 90’s but our analysis will focus on the strategies after 2000 [60]. In the composition of digital strategies, all the levels of government (central, regional and local) participate and cooperate [64]. The strategies are published every 4 years and the political and governmental units are very precise in the timeframe [60]. The forward planning, the leadership trait, the

cooperation, and the prioritization are key elements in the Danish way of thinking, and all can be found in the success factors' table and some of them in the most identified factors table.

In 2001, Denmark started the digital transformation journey by introducing the digital signature and the base infrastructure [64]. In 2004 Denmark launched the NemKonto to provide citizens with a single bank account in order to facilitate authorities in the payment procedure. Moreover, in the same strategy Denmark introduced the e-Invoicing service, a portal for public services addressed to businesses named Virk.dk and a portal for giving access to its citizens personal health data. Moreover, in this strategy the government ensures the secure emails among government bodies. In this strategy we clearly notice again the very well-structured guidelines of the strategy and the efforts to optimize infrastructure for better communication among the stakeholders.

Then Danes moved towards the common infrastructure and even more new initiatives were available after 2007 [64]. The common infrastructure denotes the lack of silos and the efforts for interoperability among the public bodies that is a success factor according to the literature. In this strategy we meet for the first time the Digital Post which was made mandatory for all citizens and companies in the strategy of 2011. The word 'mandatory' indicates that maybe in 2011 citizens might have been reluctant to change. But the Danish government regarded it as a natural condition as suggested by [44] and made it mandatory to give to citizens the opportunity to experience the benefits of the service and to cultivate a digital culture.

The NemID, eIndkomst, NemSMS and a portal for citizens the borger.dk were also launched [65]. We can note that [49] reports that in August 2021 the newest electronic ID was launched. According to the official webpage, Danes were informed via email about the newest MitID in October 2021 and the process of replacement of the old eID will last until 2022 [66]. The initiative was executed by the Digital Agency for Digitization in cooperation with the Danish banks [67]. These actions point out excellent communication among all the stakeholders.

The strategy of 2011-2015 made mandatory self-service and the online communication between citizens and Government and companies and government. This transition to the online way of communication was done in 4 waves during the 4 years of strategy. Every year new services were offered online and by adopting the online contact with the public bodies, Denmark aimed at reducing the use of paper by the end of 2015 and at saving money [65].

The estimated amount of savings by this transition was 900 mill Danish kroner per year [67]. Moreover, the last initiative of this strategy was to put in the center of attention the welfare services and to make available the public sector's basic data for everyone [65]. This strategy corroborates the following findings: the importance of well-planned strategic decisions, the importance of the available funding in order to build all the services, the importance of the elimination of silos, the leadership skills, and the importance of communication.

In addition to the abovementioned MitID, during the last strategy some more new services and applications were created in Denmark. In November 2020 Danes could download in a digital format their driving license and more than 500.000 people downloaded their driver's license during the first day and since June 2021 Danish people can have their health insurance card in an online form through a new application that was downloaded more than one million times in the first month of launching [49]. These high numbers regarding the downloading prove once more the high willingness of Danish people to adopt the new services and a digital oriented culture ready to accept the change.

At the end of 2015, Danes published their strategy for 2016-2020 with three main goals and each one had many initiatives [65]. The first goal was the quick and easy to use services with high quality solutions, the existence of legal and regulatory framework, the better communication, and providing better data about disabled people. Communication was found many times in the literature as a crucial factor that can lead to success or become hindrances to digital transformation journey. Regarding the data about the handicapped people, even if we found the factor only once throughout the literature review, we would like to mention that it can be linked to the barrier "Discriminations against people" in Table 3. The second goal of the strategy was providing the context for growth like the automation in the reporting process of companies. The last goal highlighted the importance of security and trust in government and generally in the public sector with initiatives being about the efficient sharing of information, and providing the essential digital skills to children and young adults [65]. In our research we also found cybersecurity and trust as factors that may affect the implementation of digital transformation; however, they are not among the accepted factors since they do not exceed the 4 studies limitation. In contrast, the initiative regarding trainings is a factor that many scholars agree on. Danes enrich their digital transformation strategy and every 4 years optimize their performance by building strategies that fix their weaknesses. Moreover, the same strategy developed a better framework to enhance the business commu-

nity by promoting digitization [65]. The report [65] proves that digitization saves money, and it is the first step towards digital transformation.

In addition to the last strategy, a new one, the Digital Growth Strategy [68], was published in January 2018 with thirty-eight initiatives to support Denmark's tech ecosystem and to help businesses fully leverage digital technologies. Some of those initiatives of this report were previously mentioned in the literature as needed factors to guarantee the successful result. These are: the more agile way of working and the creation of a platform that matches talents and businesses by leveraging the digital technologies and interoperability capabilities [68]. In addition, Danes tried to cope with cybersecurity and the legal issues by offering to companies the solution to report online the cyber threats [68]. According to [49] in 2018 the Danish Health Data Authority a separate unit was created to deal with cybersecurity in the healthcare sector. Even if throughout the literature review cybersecurity was not identified by more than 4 scholars, we see that the Danish government regard it as a crucial factor and include it in the goals of all the last strategies.

It is worth mentioning that cybersecurity is still an issue of high priority due to Covid-19. Covid-19 has brought the need of a trustworthy digital environment as gradually more and more processes are executed online. It is important to be noted that the European Member States believe that a crucial digital element against the virus is information transparency [35]. Undeniably, Denmark has created a path towards online public services. The country strongly supports the importance of transparency to generate citizens' trust that will actuate citizens to use e-services [35]. The last initiative of this strategy that is worth mentioning is the willingness of the government to enhance the digital thinking of primary school [68]. Even if the strategy refers only to children and elementary education, we can link this initiative to the following factors: the importance of not having an unqualified workforce in the future by providing trainings and the shape of new culture.

Furthermore, we would like to mention that regarding the 'funding' factor, that is mentioned many times in the literature, Danes support their strategies financially. For instance 134 million euros will go to the strategy from 2018 to 2025 and ten million per year [68].

Lastly, we would like to comment that during our study we have noticed that Covid-19 acted as an accelerator to the digital transformation journey of Denmark [49].

4.2.2 Latvia

According to DESI report [51] in Latvia nearly half of citizens (43%) have at least the basic digital skills, while only 24% of Latvians have above basic digital skills. The percentages are low, and the same report mentions that Latvia is aware of the insufficient digital skills of citizens and the new strategy for 2021-2027 focuses on the enhancement of digital literacy. DESI 2021 report supports our finding regarding the importance of the digital skills and highlights that the lack of digital skills hinders Latvia's digital transformation progress [51]. The report emphasizes the commitment of the Latvian government to provide the workforce with trainings to improve the digital skills of employed and unemployed people. In 2020 two projects were initiated; the first had a goal to support civil servants and municipal employees and the second to train the already digital specialists in the latest digital technologies [51]. Throughout our literature review, trainings proved to be an important factor for digital transformation in the public sector and we can see clearly that Latvia tries constantly to boost the overall level of digital literacy with courses and trainings. By endeavoring to level up the digital skills of the workforce, Latvia adds a factor that can guarantee success to its digital transformation. Moreover, the emphasis of Latvian government on digital skills does not end with the abovementioned initiatives. Latvia tries to enhance digital literacy from pre-school to secondary education by providing courses that familiarize children and students with digital technologies [51].

As far as the funding is concerned, DESI [51] report refers to the resources that will be given for supporting the digital transformation plans. Latvia will allocate 106 million euro to reskill and upskill its workforce and in the program are included young people, professionals, enterprises, individual learning, and public administration personnel. This investment corroborates many of the identified needed factors. First of all, it proves the importance of predefined funding and then the need for a well-planned strategy to support the change of the Latvian culture by enhancing the digital skills of the workforce. All these factors are mentioned more than 4 times and the fact that they are identified in the country's digital transformation journey makes them extremely important. The abovementioned investment also proves the efforts to eliminate social exclusion by not discriminating between people based on their groups, ages, and professions. The attempt to include different groups to the program applies to the identified barrier 'Discriminations against people' that was found in the literature, but it is not a generally accepted factor in the academia.

Additionally, we found that the Latvian government put emphasis on the elimination of discriminations, social exclusion. They introduced HUGO.lv; a translation service from English into Latvian and vice versa and from Latvian to Russian and vice versa that assists people when they use e-services and government portals [34], [51], [69], [70]. Recently the government advanced HUGO.lv by providing speech recognition and text-to-speech options [34]. By building HUGO.lv Latvians had two goals; firstly, to build a service that helps every individual in Latvia regardless of language, age, and origin and secondly; to implement the European interoperability principles, one of those is multilingualism in e-services. We need to highlight that in the DESI report [51] it is mentioned that Covid-19 pandemic has led individuals to use the digital assistants of the e-government websites more often. Therefore, in the case of Latvia, Covid-19 accelerated digital transformation and “brought closer” citizens with e-services.

By examining the next areas in the DESI report, we see that Latvia is in the 14th position regarding connectivity and in the 23rd position regarding the integration of digital technologies. Both positions are lower than the average EU’s position. Regarding the integration of digital technologies, we have to mention that the DESI report highlights that the country’s Recovery and Resilience Plan will invest 125 million euro to enhance the digitalization of companies. Furthermore, Latvia funded telemedicine services and a new Healthcare Digitalization Strategy for 2022-2027 is being set up by the Ministry of Health. These efforts and plans point out the continuous funding and a strong political will to ameliorate the insufficiencies. Moreover, Latvia by investing in digitalization processes proves that digitalization is a necessary step before digital transformation.

Latvia is in the 10th position on the digital public services. The country scores 79.6% in this category while the EU average is 68.1%, which is considered to be quite an achievement in comparison to the low levels of the above-mentioned categories. In Latvia 85% of the internet users are e-government users and the percentage exceeds once more the overall level of the EU, which is 64%. The country scores 87 for the digital public services for citizens, 82 for the prefilled forms and 80% for the maturity of open data. Moreover, it is important to be mentioned that Latvians are about to introduce artificial intelligence in public bodies in different forms [70]. The abovementioned high percentages prove the eagerness of people to use the services and the willingness of Latvians to adopt the changes, innovations, and digital technologies.

Regarding the communication infrastructure in 2018 the digital post (E-adrese) was made mandatory for enabling easier communication between the central and the local government bodies and since 2019 is available for both citizens and companies to facilitate the communication with more than 3,000 state and local authorities anytime, from anywhere [71]. Therefore, we may assume that at first Latvians, as Danes, were reluctant to adopt the available services and the government made it a mandatory condition to push public servants to use the new service.

Moreover, the DESI report mentions a factor that is not among the most identified factors table, but we think that accelerated the digital transformation journey of Latvia. The DESI report describes that during the previous years Latvia's electronic systems developers did not consider the users' needs and they recently realized the need of user centric public services. Covid-19 measures brought out the need of online services and made clear that there is a need for development and improvement of the user-centric solutions in both private and public sector [34]. For this reason, in Latvia, 2020 was the year during which many conversations and methods were used in order to be formed strategies and designs with focus on the users-citizens. Throughout the literature review we found two barriers related to the human centric approach that may hinder digital transformation in the public sector: the lack of consideration of both human and technical factors in the designing and building of platforms and e-services and in general the lack of user centric approach in e-government.

Now we will examine the digital strategies that have been developed after the accession of the country in the EU and we will focus on the strategies and services from 2006 up to 2020. It is also worth noting that the responsibility for the strategies is spread among many actors like the VARAM, the VRAA, the MoT and MoE. The lack of a single leadership mechanism hinders many activities and government actions and hampers the coordination of strategies and plans. In addition, the lack of a whole of government approach hinders the digital transformation of the country. However, in Latvia one could note that there is political will to support this digital transformation, but the governance model is not in favor of it.

In 2003 the law on the electronic documents was activated and defined the framework on the e IDs and e signatures. A law on personal identification documents came into force in January 2012 to define the eID card types and to provide clarifications on the secure e-signatures that are made available through and the e IDs [72]–[74]. In 2016 the

government made the eID possession mandatory for all citizens and by using them the citizens can access many services [72], [74] which is an important step against silos. Moreover, since 2017 citizens from Latvia can use their eIDs to use services in other EU Member States grace to the Digital Service Infrastructure [72]. The above-mentioned facts indicate that Latvians are eager to adopt the services, but the actual implementation takes long time.

In addition to the factor 'elimination of silos', Latvians made an effort to comply with the European interoperability framework NIFO. They created the IVIS (Integrated State Information System) which provides an integrated place where the national registries and information systems may exchange information and at the same time the national portal delivers services. However, Latvians are more concentrated on the technical aspects and do not put the necessary emphasis on the legal, organizational and semantic parts [72], [74]. This is contrasting to the general frame of digital transformation that emphasizes the organizational change rather than the technical.

Regarding the strategies, Latvia adopted three main programs from 2005 to 2013. The Latvian e-Government Development Program (2005 - 2009), the Guidelines for the development of Information Society (2006 - 2013) and the e-Government Development Plan (2011 - 2013) [75]. The Information Society Policy focused on the higher availability of ICT infrastructure, the upskilling of citizens, the improvement of e-services related to the culture, the enhancement of the economy by boosting innovations and e-commerce and on encouraging people to use ICT in science [75]. The last plan (2011-2013) focused on the enhancement of e government and on the alignment of the EU priorities to Latvia's actions. These actions include [75] the development of digital skills, the wide range of broadband access, e IDs, eInvoicing through ePakalpojumi.lv or through the municipality websites [72], eJustice and eHealth [75]. Although these strategies have dealt with digital literacy and suggested a change of culture by introducing innovations, the country still struggles for these factors and tries to eliminate the barrier. Therefore, the strategies probably were not effective enough or the government did not implement them properly, or the society was not ready to adopt the changes.

In 2014 the country developed the Information Society Development Guidelines for 2014 -2020. The main guidelines are related to the digital skills, to broadband access and to the modernization of public administrations with main consideration the participation of citizens and the partnership with the private sector. Moreover, the guidelines

of the strategy include the wider availability of e-services in more areas of public sector like education; the cross-border cooperation for Digital Single Market which requires interoperability among the EU platforms and the national services, the support of research community on digital technologies and lastly the development of an environment that will be based on trust and security [75]. In addition to the last guideline, in 2019, Latvia approved a cybersecurity strategy to fight cyber-attacks, and develop national cyber defense capabilities [69]. Nowadays, as we previously have mentioned, due to the current Covid-19 outbreak, cybersecurity is a top priority of all European countries.

In the view of all that has been mentioned so far, one may suppose that Latvia tries to progress but there are not concentrated efforts from a single actor to accelerate the progress but only strategies from different actors that try to fill the gaps and to fix the country's insufficiencies. The country developed and offered a portal for citizens, the eID cards, multiple e-services, and gave the ability to citizens to conduct online payments. Also, Latvia tries to deal with silos and to establish rules and regulations to facilitate the changes and to stand by citizens with low levels of digital skills. Lastly we cannot assign blame to the citizens because DESI report [51] highlights that the Latvian average in the digital public service adoption is higher in comparison to the average of the other factors.

5 Discussion-Conclusion

Governments have left behind their bureaucratic past and nowadays are concentrated on innovation [6]. Governments and the public sector adopt digital technologies as both seek for new methods to increase productivity, collaboration and to upgrade process efficiency [6]. The academia still tries to define what is digital transformation and what are the differences from e-government, digitization, and digitalization. The literature highlights the necessity for digital transformation in the public sector while there is a lack in academic research regarding the factors that may hamper or facilitate digital transformation journey in the public sector. Therefore, the aim of this dissertation was to find and analyze what factors may help or hinder digital transformation in the public sector and any effort to categorize them need to be interpreted with caution

Throughout the literature review we identified eleven factors in total, and then we used the case study method to validate if our findings are in accordance with the actual implementation of digital transformation. During our case studies analysis we found that nine out of the eleven most identified factors were mentioned in both case studies. The results of this dissertation indicate that academia has identified the main success factors and barriers of digital transformation in the public sector. Contrary to the expectations, we were unable to measure the leadership skills and the managerial support because the identified data and reports do not include information about the personal traits of the Danish and the Latvian managers and their professional relationships with their co-workers and employees. These results are consistent with those of other studies and suggest that that both factors are organizational.

In addition, as we expected, in the case studies we identified some more success factors and barriers that are also included in the literature review and affected the process of digital transformation, but they are not identified more than 4 times. The limitation we had set about the minimum mentioning in 4 studies proved that countries are living organisms and cannot implement digital transformation initiatives based only on the eleven most identified factors. We accept what [4] stated that digital transformation has no end and “it is a continuous process that needs frequent adjustments of its processes, services and products” We proved that digital transformation efforts are affected by their

background; therefore, every country's needs are different. However, it is suggested to all countries to take as a starting point the eleven most identified factors.

More specifically in Denmark we identified as success factors the advanced IT infrastructure, the advanced digitalization level, and the high level of trust towards government. In the same country, we also found strong foundations regarding the collaborations between public and private sector that may derive from the e-government lessons [15]. In Latvia we found the legal framework as a strong barrier and at the same time as a success factor. Moreover, it is mentioned that Covid-19 pandemic acted as an accelerator in Latvia's digital transformation. Covid-19 triggered the necessity of human centricity in the online services that is also identified in the literature. In both countries we found as a success factor the efforts to eliminate discriminations against people, groups of citizens and the need for higher cyber security level.

The findings of the literature review indicate that the scholars who insist that digital transformation is not about technology and emphasize on the organizational and cultural changes are right, since the case studies corroborate our findings. However, we have to note that the case study of Denmark showed that a technology related factor; the advanced IT infrastructure of the country was the one that allowed the continuity of e-services during Covid-19.

The present study confirms and validates the most identified factors in the literature and contributes additional evidence that suggests every country and government to invest in these factors but also to take into account its background and needs and to set priorities.

6 Future Work

This dissertation has thrown up many questions in need of further investigation. It would be interesting to interview some citizens, managers, and employees of the Latvian and Danish public administrations to gain a holistic view on the phenomenon of digital transformation. Moreover, this qualitative research would provide us additional evidence with respect to the leadership skills and managerial support.

Lastly, future research might investigate the most identified factors in the context of non-European countries

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Appendix

Table 6: Keywords for the literature review

Success Factors	Barriers	Public Sector
Effect	Challenge	Public administration
Impact	Obstacle	Countr*
Success		
Influence		

Table 7: Success Factors

	[2]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
IT infrastructure	X			X	X			
Information technology architecture			X					
Trustworthiness of the telecommunication systems			X					
Interoperability/lack of silos	X		X		X			
Access to data	X		X					
Strategy	X			X	X		X	
Communication	X			X		X		
Skillful workforce	X				X			
Privacy threats/ cybersecurity	X		X					
Trust to government	X							

Citizens' willingness to adopt services/ Participation	X		X	X	X	X		
Funding	X		X	X	X			
Culture		X	X		X	X		
Vision		X				X		
Accept change as natural phenomenon						X		
Common understanding of what digital transformation is		X						
Leadership		X	X	X		X		
Change management			X			X		
Trainings	X		X			X		
Alignment between IT and business			X				X	
Legal and regulatory framework	X		X		X			
Political environment			X					X
Setting out prerequisites of digital transformation							X	
Timeframe of projects				X				
User-friendly environment				X				
Managerial support				X	X			
Internet use					X			
Managerial accountability				X				
Recruitment and retainment of employees				X				
Involvement of employees				X				
Sense of urgency						X		

Acceptance of re- sistance						X		
Employees owner- ship						X		
Clear measurement performance				X				
Political support				X				
Use well-known technologies				X				
Clear implementa- tion plans				X				
Gradual implemen- tation				X				

Table 8: Barriers

	[2]	[3]	[10]	[20]	[42]	[43]	[46]	[47]
Resistance to change	X		X	X			X	
Bureaucracy			X					
Discriminations against people	X							
Culture	X						X	
Lack of infra- structure	X				X	X		
No access to data	X							
Silos	X	X					X	
Privacy threats	X			X				
Lack or com- plexity of le- gal/regulatory framework	X					X		
Lack of user centric ap- proach	X	X		X				
Conflicting incentives		X			X			

Vertical structures		X					X	
Lack of digitization				X				
Lack of trainings					X		X	
Lack of skillful personnel			X		X	X	X	X
Lack of managerial support			X		X	X	X	X
Lack of political support			X		X	X		
Lack of communication			X		X		X	
No adoption of services by citizens				X				
Awareness of citizens				X				
Organizational complexity						X		
Lack of workforce			X					
Fear towards innovation			X				X	
Lack of agility and innovation							X	
Influence of trade union internally							X	
Lack of leadership							X	
Lack of awareness of middle managers regarding digital transformation							X	

Table 9: Characteristics of Denmark and Latvia

	Denmark	Latvia
Population	5.867million[52]	1.908 million[53]
Capital city	Copenhagen	Riga
Official languages	Danish[52]	Latvian, Russian[54]
Country's size	43,094 km ² [55]	64,574km ² [53]

Form of Government	Constitutional monarchy[55]	Republic, parliamentary democracy[53]
Government	Social Democratic Party[52]	President (Mr) Egils Levits and multi-political parties' system[53]
EU member	1973[52]	2004[53]
Population growth rate	0.36% [56]	-64% (2020 compared to 2019)[57]
Life expectancy at birth	81.2 years[56]	75 years (2019)[57]
Urbanization rate	87.99% [56]	68.325[57]
GDP	356.09 billion US dollars[56]	29.3 billion euro (2020)[53]
GDP per capita	59,861.61 US dollars[56]	15.431 euro (2020)[53]
Inflation rate	0.33% [56]	0.2 % (2020)[53]
Unemployment rate	5.66% [56]	8.1 % (2020)[53]
WJP Rule of Law Index (2021)	Rank-1[58]	Rank-24[58]
Corruption Perceptions Index (2020)	Rank-1 Score 88/100[59]	Rank -42 Score 57/100[59]

Table 10: The Most Identified Factors

	Articles view it as success factor	Articles view it as barrier	Total number of articles
Citizens' willingness to adopt the services	[2], [41]–[44]	[20]	6
Culture	[40], [41], [43], [44]	[2], [46]	6
Skillful personnel	[2], [43]	[10], [42], [43], [46], [47]	6
Silos/ interoperability	[3], [41], [43]	[2], [3], [47]	5
Communication	[2], [42], [44]	[10], [42], [46]	5
Leadership skills	[40]–[42], [44]	[46]	5
Trainings	[2], [41], [44]	[42], [46]	5
Managerial support	[42], [43]	[10], [42], [43], [46],	5

		[47]	
Strategy	[2], [42], [43], [45]	[2], [42], [46]	5
Resistance to change	[44]	[2], [10], [20], [46]	5
Funding	[2], [41]–[43]	[2]	4