TALLINN UNIVERSITY OF TECHNOLOGY
School of Information Technologies

[Ebru Shentyurk 214251IVGM]

Data Protection Regulations Effect on Startups: GovTech Ecosystem in Lithuania

[Master's thesis]

Supervisor: Richard Michael
Dreyling III
PhD Candidate

Tallinn 2020

TALLINNA TEHNIKAÜLIKOOL
Infotehnoloogia teaduskond

[Ebru Shentyurk 214251IVGM]

Andmekaitsemääruste mõju idufirmadele: GovTech ökosüsteem Leedus

[Lõputöö liik: magistritöö]

Juhendaja: Richard Michael
Dreyling III
PhD kandidaat

Tallinn 2020

Author’s declaration of originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature, and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

Author:Ebru Shentyurk

[07.05.2023]

Abstract

This study focuses on Data Protection Regulations Effect on Startups in the case of GovTech Ecosystem in Lithuania. Even though the government system needs to be adaptative to innovations, there are challenges for start-ups that provide services.

The study aims to investigate the relationship between startups and data privacy regulations, especially focusing on startups that provide digital services to public institutions. Within the scope of this research challenges and opportunities of the GovTech startups were analyzed. For the examination, the case study method was chosen, and the case of Lithuania was investigated. For leading conclusions and finding answers to the research questions, a qualitative approach has been obtained. Different impacts of regulations theories and case studies were analyzed among European startups. Empirical data collection was also an integrated part of the study during which interviews with policymakers and start-up founders and the questionnaire differentiated for their expertise.

As a result of the research, the impact of data privacy and cyber security regulations on startups was evaluated, and a possible future study was imposed.

Keywords: GovTech, Regulations, Data Privacy, Start-ups, Cyber Security, Innovation, Legal Framework

This thesis is written in English and is 74 pages long, including 5 chapters, 9 figures and 0 tables.

Annotatsioon

Andmekaitsemääruste mõju idufirmadele: GovTech ökosüsteem Leedus

Käesolevas uuringus keskendutakse andmekaitsemääruste mõjule idufirmadele Leedu GovTech ökosüsteemi puhul. Kuna valitsus ei kohandu uuendustega, on idufirmadel keeruline teenust pakkuda.

Uuringu eesmärk on uurida idufirmade ja andmekaitseregulatsioonide vahelist suhet, keskendudes eelkõige idufirmadele, kes pakuvad avalike asutuste jaoks digiteenuseid. Selle uuringu raames analüüsiti GovTechi idufirmade väljakutseid ja võimalusi. Uurimise jaoks valiti juhtumiuuringu meetod ja analüüsiti Leedu juhtumit. Järelduste tegemiseks ja uurimisküsimustele vastuste leidmiseks kasutati kvalitatiivset lähenemisviisi. Analüüsiti regulatsioonide teooriate ja juhtumiuuringute erinevaid mõjusid Euroopa idufirmade seas. Empiiriline andmekogumine oli samuti uuringu integreeritud osa, mille käigus viidi läbi intervjuusid poliitikakujundajate ja idufirmade asutajatega ning nende ekspertiisi jaoks koostatud küsimustikud erinesid.

Uuringu tulemusel hinnati andmekaitse ja küberturvalisuse regulatsioonide mõju idufirmadele ning määrati kindlaks võimalik tulevane uuring.

Märksõnad: GovTech, Määrused, Andmekaitse, Idufirmad, Küberturvalisus, Innovatsioon, Õigusraamistik

Lõputöö on kirjutatud inglise keeles ning sisaldab teksti 74 leheküljel, 5 peatükki, 9 joonist, 0 tabelit.

List of abbreviations and terms

DPI	Dots per inch
IA	Department of Computer Systems
GovTech	Government Technologies
EU	European Union
GDPR	General Data Protection Regulation
ICT	Information and Communication Technology

Table of contents

List of figures

1 Introduction

1.1 Overview of the Research

Lithuania is one of the leading e-government technology among European countries [1]. Proper integration of e-government technologies is also a significant opportunity for start-ups. However, government regulations pose challenges for start-ups, a disincentive for their growth and innovations. The General Data Protection Regulation (GDPR) is the European Union (EU) regulation that restricts the collection, storage, and processing of personal data [2]. The GDPR applies to all member states of the EU and respectively institutions based in Europe [3]. In this regard, startups in the Lithuanian ecosystem are subject to GDPR and other local regulations, even their activities of collecting investments [4] .

The GDPR has a big impact on startups in Europe, particularly services or products that rely on user data for their business models [5]. To reduce the impact of GDPR, startups need to implement strategies and invest in resources and expertise [6]. Startups may find it challenging to comply with GDPR and other data privacy regulations [7].

According to a study by the US Small Business Administration, regulatory compliance is affecting small businesses negatively. Small businesses with less than 20 employees spend more than 30% of larger businesses on regulatory compliance [8].

At first glance, it is thought that regulations would be more flexible to startups because the concepts of entrepreneurship and innovation are closely related to concepts such as the country's economy and economic development. Start-ups are bringing innovation with new job opportunities. In 2020, more than 25.000 created new jobs in the job market by start-ups [9]. In addition to job creation, start-up ecosystems generate revenue, investment and bring their funding sources. Only in 2020, more than €41 billion in venture capital investment was obtained by start-ups in Europe [9]. From the view of opportunities that start-ups created, government regulations need to reduce barriers and promote the growth of small businesses.

While the growing stage of start-ups, they are trying to enter new ecosystems. Conversely, governments are strict about their internal market regulations to protect consumers. One example of a start-up that faced regulatory challenges in Europe is Palantir. Data privacy and storage are highly important in Europe. Palantir was founded in the United States for providing data analytics software for government agencies and other organizations [10]. The start-up faced critical regulatory challenges in Europe. Data-related concerns on the development of digital government solutions are opposed by Germany. Palantir's data collection has been found extensive and infringed on individuals' rights [11]. This particular reason made Palantir disappointed and less engaged with different markets. Palantir's experience demonstrates that the potential values of start-ups could face regulatory challenges.

Well-designed regulations and encouraging approaches to start-ups reduce the negative effect of legal regulations and administrative limitations. Kim and Lee argue that legal regulations are necessary to protect consumers and maintain fair market competition. In addition to this, policymakers need to consider the needs of start-ups. Designing legal regulations with new businesses. could contribute to economic growth and innovation [12].

Start-ups often have limited access to finance and the impact of regulations could increase the cost of doing business. According to Alvarez, Amoros, and Urbano, policymakers have the power to simplify regulatory frameworks. There are two different approaches to simplifying regulations for reducing the barriers to the growth of start-ups. First, more transparent, and predictable regulations for them. Second, reducing the costs and providing exemptions for entry to the market [13]. In both ways, entrepreneurs will be encouraged to bring innovation.

In the last years, regulations have become crucial challenges. As much as governments want to protect citizens and investors from risky technologies, start-ups need to navigate their legal route. Regulations can affect start-ups in both positive and negative ways. Start-ups that collect personal data must comply with data privacy and General Data Protection Regulation (GDPR) in Europe. In many countries, start-ups face critical data collection and storage regulations. Implementation of legal compliance can be time-consuming, expensive, and exhausting for early-stage start-ups.

Another regulation that most affect positively is financial regulations for small-size businesses. Startups can raise capital or engage in financial transactions like crowdfunding, ventures, or equities.

The main purpose of this thesis is to bring the experience of start-ups that work in digital public services or e-government services. In addition to that, identify their limitations against the regulatory environment.

Lithuania will be discussed as an ecosystem to enter or establish an e-governance-related start-up. From the view of the Lithuanian ecosystem, the complex relationship between start-us and regulations will be gathered in this research. This work will gather empirical data from interviews as well as secondary data, and legislative experience in Lithuania, look at them through various start-ups and innovative perspectives, and analyze the challenges of entering the Lithuanian ecosystem over the cybersecurity regulations. These findings would be beneficial for future studies.

Within the scope of this study, the regulations of the countries regarding their cyber security strategies, the strategy documents, and the practices start-ups have done and are doing in the field of digital public services have been evaluated in detail.

1.2 Research Motivation

In recent years, start-ups have been impressively growing without borders. Because of this, they have faced more regulations. Intending to solve problems, transform the needs of innovations, and develop new technologies, start-ups involve data collection and digital public services. The first motivation is to discover how these innovative and dynamic start-ups often conduct technological progress while digitalization of public services. Still, start-ups are challenged by several regulations or consequently changing legislation.

On the other hand, regulations are typically put in place to protect citizens, ensure fair competition and promote the country's welfare. Regulations can also help to decrease the significant costs or bureaucratic processes on startups. Nevertheless, regulations may not always keep pace with technological improvements and start-ups' needs even if they helped to improve government services. If we are talking about digital transformation in public services, I would like to investigate the tension between startups and policymakers.

The research started with the curiosity to discover this topic further since I had a degree and experience in policymaking and start-up ecosystems. During the whole process of working on my thesis, I had contact with regulators, stakeholders, NGOs, and start-ups

Therefore, there is a need for research that explores the relationship between digital public services provider start-ups and regulation, with the aim of informing practice and policies.

By addressing these points, this thesis aims to contribute to a better understanding of the challenges and opportunities facing start-ups in regulated environments and to identify how digital public services could improve with cyber security and data protection regulations. Hopefully, this thesis will identify the policy recommendations that can both maintain privacy and innovations.

1.3 Research Questions and Objectives

The study will investigate the dependent relationship between startups and regulations. Specifically, the research will focus on startups that provide digital services for public institutions and how they adopt cybersecurity, data privacy, and other related regulations. However, the topic is not popular in literature in this field or assessments of regulative barriers to entry and growth of startups in Lithuania.

This study is exploring the e-governance technologies startups comply with the regulations in Lithuania and the policymakers' involvement in growth and entry into Lithuanian Market.

To explore these, the main question formed: *How do regulatory frameworks affect the business strategies of startups?* Therefore, the two research questions below will guide the all research:

- *RQ1: How do startups evaluate regulatory compliance as a significant barrier to entry and growth, and what strategies do they adopt to overcome these challenges?*

This question would identify the common challenges that startups face and explore strategies that startups obtained. Answering this question will demonstrate the startup development in the regulative environment. Analysis of the adopted implementations and

compliance with relevant regulations including personal data for cybersecurity purposes, including issues related to data privacy, consent, and transparency.

- *RQ2: How can startups and policymakers work together to ensure that regulations keep pace with technological advancements and remain relevant and effective in promoting both economic growth and societal welfare?*

By addressing the second question, the study will evaluate the effectiveness of collaboration to keep technological development in the public sector. The question also aims to explore the balance between promoting innovative competition and the regulatory environment. Within this question, initiatives among stakeholders (e.g., investors, policymakers, cybersecurity experts, and businesses) will be examined.

Developing a hypothesis is around the research questions of the thesis. They are focusing on specific indicators for research. The hypotheses around the questions and literature reviews are;

- *H1: Startups consider regulations as a significant barrier to entry and growth. Startups need different strategies to overcome regulatory pressures.*

- *H2: Effective collaboration between startups and policymakers on regulations can lead to economic growth and balance the need for innovation. Governments keep pace with technological improvements by engaging startups as well as by establishing regulatory sandbox or other experimental frameworks.*

Based on the research scope of the thesis, the qualitative method was selected as a research methodology for gathering empirical data. This study will provide insights with interviews that imposed research questions. These interviews and participants' experiences will be evidence of how regulations keep pace with innovations. For this exact purpose, below research objectives are stated:

RO1: Review the literature on startups and their regulatory compliance efforts. The literature review would identify the interoperability of regulations following technological improvement. In addition to this, the review would enlighten regulatory requirements to protect data privacy as a part of cyber security.

RO2: Examine the regulatory challenges faced by startups that provide digital services to the public sector, including the issues related to data privacy, security, and market openness (qualitative method of online interviews conducted for this)

RO3: Demonstrate the recommendations and utilizations of startup technologies by government agencies and regulatory bodies (the demonstration has been obtained with government officials and civil servants' interviews)

1.4 Research Design and Methodology

After outlining the research questions, the chapter will represent the research design and methodology that will be used in this study.

The research of the master thesis will be implemented in two stages for analyzing startups' regulative challenges while implementing digital services for public services. Firstly, analysis of the data privacy and cyber security regulations (Stage 1), and qualitative research methods are data collection with semi-structured interviews (Stage 2). In stage 2, case study enriches the qualitative research.

The comprehension approach holds that observation alone cannot establish whether the theory is true or false. In order to reach real information, it is necessary to approach people and understand the theory in their opinion. According to Keat and Urry, in-depth interviews are the basic way of perceiving facts [14]. This perspective is leading to the aspiration of conducting interviews for this thesis. Because of that semi-structured interviews lead the data collection through semi-structured interviews.

Yin's approach to semi-structured interviews is giving a baseline for researchers. The semi-structured interview is designed for ordering a broad concept in a list of questions, extra questions can be asked however all lists must be completed [15]. The interview method is characterized by engagement and relevance [16].

The study also conducts triangulation by combining data from multiple sources. In this research, triangulation contributes to the understanding of the case. Triangulation is used for enhancement of different sources, different investigators, and different theories [17].

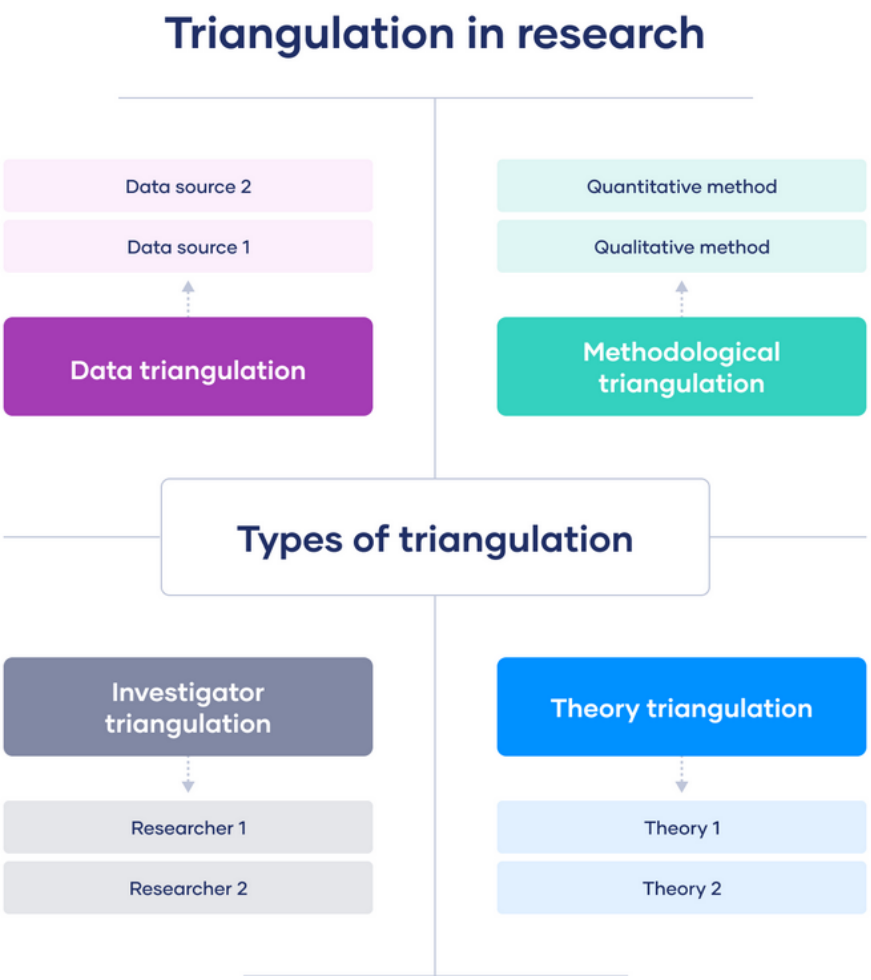

Figure 1 Types of Triangulations [18]

In this study, theory triangulation is investigated from different perspectives. In addition to this data triangulation includes interviews with startups and government officials. Findings covers the data triangulation with findings from all sources. At the conclusion, if all sources are rely on the same things, conclusion would be convergences of the evidence [19].

The study's qualitative research methodology aims to acquire a thorough knowledge of how startups and other stakeholders see the opportunities and problems related to innovation and regulations. Qualitative research with the saying of Hatch, in which the perceptions and events of human beings are examined in depth in their social reality [20], also has a holistic perspective that combines different disciplines [21]. The holistic

perspective in this research will gather the legal, economic, security, and GovTech disciplines. These all will provide rich and contextually relevant information for analysis.

The research design engaged the case study approach with qualitative data collection using thematic analysis coding. For the thematic analyze and thematic map; NVIVO14 software visualization by the mind map. Through analysis coding and creating notes with annotations in this software, mapping is efficient to identify, analyzing and visualize outcomes and concluding.

The thematic analysis is a way of search for themes that emerge to be the description of the phenomenon [22]. The coding process to thematic analysis involves while process of interpretation [23]. According to Boyatzis, good code captures the qualitative richness of the fact. The good code is a pattern with minimum description and possible observations at the maximum interprets [23]. According to Braun and Clarke, six phases of thematic analysis are explanatory way to coding the analysis [24].

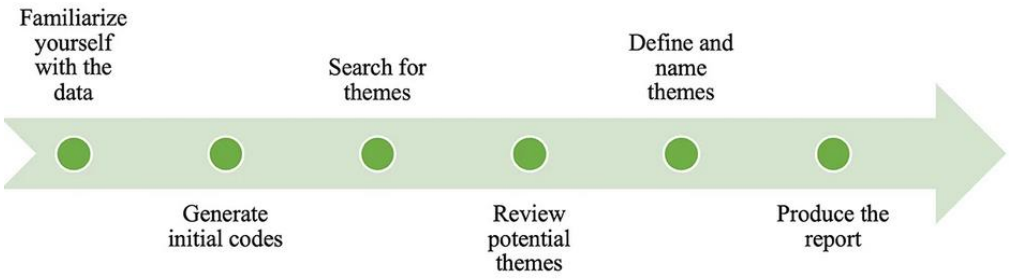

Figure 2 Six phase of Thematic Analytic process [24]

The study will present the thematic analysis code with the following data collection from 5 people and document analysis of the Lithuanian and European scholars with policies, both interview and identification of startup themes are undertaken. Potential themes are evaluated as future impacts.

Specifically, the thesis is based on interviews with start-up founders, policymakers, start-up hubs, and experts in this field. By analyzing these interviews, this thesis aims to provide insights into cybersecurity legislation, challenges related to it, and strategies they use to comply with regulatory scope. Implementation of innovations, entrepreneurship, and economic growth will be demonstrated with the experiences of the interviewees.

In Creswell's words, collecting qualitative data is closely related to understanding what people think. It matters "how" context affects what people say. Thus, Creswell advised that open-ended questions during the qualitative data collection phase, perceiving what the context is like provide in-depth data for researchers. Data needs to be analyzed and processed to make it meaningful [25]. Considering this, the primary data collection method for this study is the semi-structured interview. Open-ended discussions with participants during interviews allow for a deeper understanding of their opinions and how their experiences are shaped concerning the subject of innovation and laws.

In the context of semi-structured interviews, triangulation can obtain by cross-checking data from different interviewees, using multiple lists of questions, or combining the interview with other sources of data [26]. The semi-structured interviews are ensuring external validity with detailed descriptions and standardized interviews [27]. Because of that interview questions are divided for startups and policymakers to standardize.

To provide internal validity, participants feel comfortable sharing their experiences and thoughts. This can be enhanced with clear questions and establishing trust [28]. For this, a small sample size is selected for this research.

Purposive sampling will be used as the sampling approach for this study to identify individuals who have knowledge and experience in the fields of innovation and regulations. Participants have been chosen based on their involvement in companies in the GovTech industry, policymaking, regulation enforcement, or startup investment. To obtain a varied spectrum of opinions, efforts will be made to guarantee that participants. Unlike the other sampling methods, purposive sampling is not randomly selecting people, it's mainly focusing on the characteristics of people in that area of interest [29]. To reach this expertise and particular characteristics, the main interviewees are selected at the beginning of the research. The main criteria were reaching out to the people who directly work in the startup ecosystem, or whose work is related to the startup ecosystem. The ecosystem is narrowed down to the Lithuanian ecosystem and who has an interest in the Lithuanian startup environment. Five interviewees and one organization are selected based on their involvement in GovTech-related startups, policymakers, or investments in startups in the GovTech sector.

Three of them are from Lithuania, and the remaining two are Turkish startups that have the experience to enter the Lithuanian market. Lithuanian participants are representing the Ministry of Economy and Innovation of the Republic of Lithuania, the Ministry of National Defense of the Republic of Lithuania, and Wellness Travels. Their experiences and active collaborations are the main determinants of selection.

After the primary data collection, the secondary data sources were documentation and a literature review. From a specific perspective, the analysis of primary sources and literature review will be applied to bring what kind of legislation countries have. The secondary data sources analysis is chosen due to beneficial reasons such as the reliability of the interviews as well as the readiness to compare with different data sources. To understand the processing and motivations of the governments, secondary data sources are providing different aspects and variations of the time. Also, the investigation of the interconnection between legislative freedom and innovation growth will be searched in these data sources to understand all perspectives.

Altogether, the research design and methodology for this study include qualitative research and interviews as the primary data collection method. The data analysis of the research will be on innovation and laws, it has also addressed the challenges of startups and data privacy.

2 State of Art

This chapter provides a comprehensive analysis of the existing literature related to the topic. The assessment of the literature is based on a careful examination of academic journals, books, papers, and other online resources, with a particular emphasis on the difficulties and opportunities related to innovation and legislation in the context of GovTech startups. Additionally, the literature review contains the issues of data privacy and startups, which are important considerations in this research. Following chapters will summarize the findings that startups in the GovTech sector face challenges.

The literature review will start to picture the environment of startups in Europe. This big picture will show the current state of Europe's startup ecosystem and the key functions of ecosystem stakeholders based on the ecosystem approach. In addition, it aims to present the existing situation and previous literature for the establishment of innovative new startups by evaluating the regulations encountered by entrepreneurs in the startup ecosystem.

Compliance with data protection regulations may need collaborations with established companies or governmental bodies. In recent years, the GovTech startups in Lithuania have been involved with innovative startups to provide solutions [30]. The need for the GovTech ecosystem in Lithuania has led to the establishment of the GovTech Lab agency which provides solutions for startup challenges [31]. Similar agencies can invest in or implement the privacy-by-design at the beginning [32]. In addition to this, startups can obtain guidance and support in establishing data protection regulations. This chapter provides an overview of the current state of the art regarding data protection regulations and innovations.

The impact of the data protection regulations can be a burden for startups, as it requires resources [33]. While compliance with regulations and developing innovations can be challenging. The following chapters demonstrates how startups provide these together.

In the literature review, not only the situation of enterprises in Europe but also the situation of those who want to enter the European startup ecosystem was examined. As a case, national innovation policy and strategy documents have been evaluated to determine the place and position of Lithuania in the startup ecosystem at the national level.

2.1 Startups and Innovations

In today’s world, the services or products people use are mostly technology-centered, low-investment, or even zero-capital "startups" that started their activities as "entrepreneurship" [34].

Even with the familiarity of the word “startup”, there is no common description in the literature for this. According to Steve Blank an entrepreneur and author, a startup is an organization established to seek a repeatable and scalable business model [35] . Despite

Blank's description, other scholars have defined entrepreneurship as companies formed at points where the solution is uncertain. Whereas Blumenthal says startups are "companies that work to solve a problem for which the solution is not clear, and success is not guaranteed.'' [36]. Similarly, Ries is agreed on the uncertainty point of Blumenthal by describing the startup as a "' human institution designed to introduce a new product or service in conditions of extreme uncertainty." [37]. Resulting of scholars who are rooted in entrepreneurship and experienced in the startup ecosystem, in terms of its literal meaning, the startup is positioned as a business model.

In other terms, the startup is the name given to different projects and innovations that have both growth and development characteristics [38]. Many studies examined startups with the term innovation [39] [40]. According to this view, for an enterprise to be considered a startup, it has to offer people something new beyond what they are used to [41]. The aim of startups is to both offer something innovative to consumers [42] and aim to grow rapidly [43]. Although we often see that such projects move with technology, the startup does not have to be a technology-related project.

With the number of startups increasing day by day, researchers are working on the role of startups in increasing innovation capacity and social development. According to the results of the empirical studies in the literature, it is revealed that there is a significant and positive relationship between entrepreneurship and innovation [44].

Innovation is seen as one of the most important factors affecting economic growth by providing competitive advantage and accordingly wealth. In addition to this, the role of entrepreneurship in the development of innovation emerges as a curious and much-researched subject [45]. According to OECD Oslo Guideline, one of the frameworks that affect the startup ecosystem is the level of innovation [46]. The innovation level of startups is seen as one of the most important factors affecting economic growth by providing competitive advantage and accordingly wealth [47].

In this context, in the study conducted by Huggins and Thompson, the basic framework of the relationship between entrepreneurship and economic growth [48] is shown in the figure. As seen in the figure, while the culture of the society directly affects the activities related to entrepreneurship, entrepreneurial activities have an impact on social

development, recovery, and economic growth (Figure 3 The Basic Framework of the Relationship Between Community Culture, Entrepreneurship, and Development).

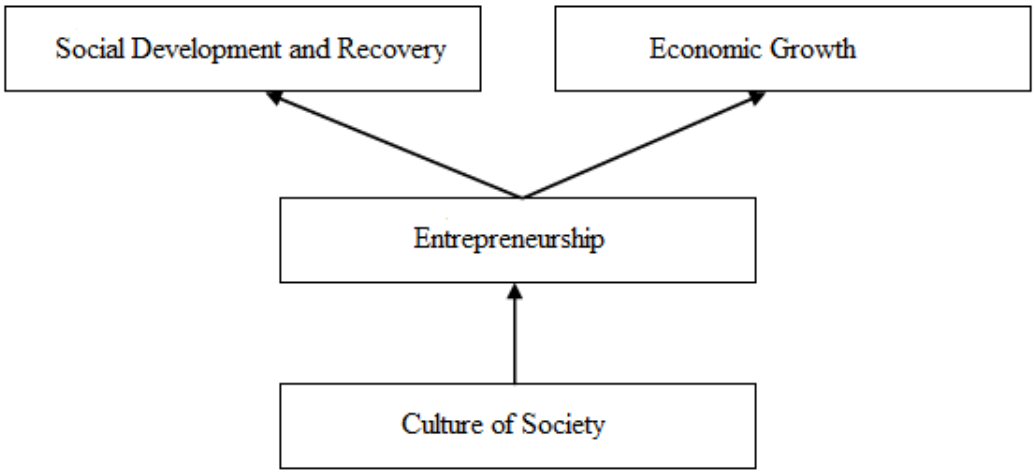

Figure 3 The Basic Framework of the Relationship Between Community Culture, Entrepreneurship, and Development

Some of the definitions of startup made up to the above were intended to define the scope of the enterprise, such as the operating environment, capital ownership, or function of the enterprise. International organizations carrying out studies in the field of startups focus on current trends and their economic effects. In their studies, startups are any attempt to establish a new business or to expand an existing business [49]. Similarly, OECD defines startups as activities carried out to create value by starting a new economic activity or expanding an existing activity by identifying and using new products, processes, and markets [50].

After all aspects of different scholars and organizations in terms of startup definition, Startups are defined as temporary organizational structures that aim to reach a repeatable and scalable business model to create a new product [37] and serve innovation in an environment of extreme uncertainty [51].

Within the scope of this definition, the main distinguishing features of start-ups are;

- To have the aim of creating a new product and service,

- Aiming to create a repeatable and scalable business model. In particular, the definition of having a scalable business model reveals the necessity of rapid growth for a business to be defined as a start-up.

- It can be considered as a server of innovators. Innovation is the source of new business ideas.

In parallel with the definitions given above, we can define startups in the most general way as the act of producing economic value by developing new products, services, processes, or markets. As can be seen, a startup is a business model that is affected by many factors such as uncertainty, seizing opportunities, taking risks, organizational capability, and innovation, and is focused on creating added value as the goal.

2.2 The Context of the Cyber Security and Data Regulations for Startups

Since startups are a new business model, the aim of developing entrepreneurship is an area where more than one actor should operate in harmony. For this reason, legal regulations should focus on the creation of an ecosystem that allows successful initiatives to emerge, rather than the success of individual entrepreneurs [52].

Once Steve Jobs said that “Innovation distinguishes between a leader and a follower” [53], Rather than focusing on innovations, policy makers focused on the concept of "innovation" to draw its framework and boundaries in the legal field. Correspondingly legal boundaries started to affect startups. Startups started to make headlines because of the legal regulations they couldn't comply [54] [55].

Before approaching the concept of data privacy from a legal point of view, it is important to specify the field of study of policymaking. It emerges as a discipline that bases the basis of legal regulations on the protection of human freedom and rights [56]. Therefore, in the legal dimension, the concept of data is handled in parallel with the concept of data privacy. Data privacy is a phenomenon that constitutes most of a person's fundamental rights [57].

The rise of the digital era and the increasing importance of data for businesses have led to a growing concern for data privacy and cyber security. In response to this concern,

several regulations and laws have been put in place to protect individuals' data privacy rights and mitigate the risks of cyber-attacks.

As there are rapid developments in technology and innovation, new legal regulations such as e-commerce regulations, blockchain regulations, and artificial intelligence regulations have emerged in recent years [58]. Apart from these, it has been the subject of two other legal areas: cyber security and data. With the effect of digitalization, they see the data used as commercial elements. After the stored data of the users are analyzed, they can be classified and used in a way that will increase the profitability of the said commercial organization [59]. As seen in some examples, it can also be used in ways that individuals and/or institutions do not want or allow [60]. In particular, the transformation of personal data into commercial commodities and the fact that they have become tradeable has accelerated the updating of legal regulations [61].

Therefore, scholars who study regulatory frameworks on startups argue that regulations are necessary to protect the public interest [62] [63]. With the importance of personal data with fundamental rights and freedoms, their protection and storage have also become public interest [56]. As the legal regulations regarding data privacy have been implemented, the rapid development of technology has shown that the issue of data storage should also be regulated [64].

It is possible to state that automatic data processing is the process performed with innovative software or hardware tools and without the need for human intervention [65]. Since such data processing is possible from outside, GDPR rules have been regulated from top international organizations to national levels. Especially in Europe, EU decisions and regulations are attracting more attention as they also affect regulations at the national level [66].

The scope of GDPR basically, covers the data operations of individuals [67]. GDPR states that personal data only updates in mandatory cases and with the knowledge of individuals [68]. This principle offers the residents free choice about how users accept the proceed of their data [69].

In its basic aspects, GDPR, in the processing of personal data [67];

- Compliance with the law and the rules of honesty,

- Being accurate and up-to-date, when necessary,
- Processing for specific, explicit, and legitimate purposes,
- Being connected, limited, and restrained with the purpose for which they are processed,

It has become obligatory to keep them for the period required for the purpose for which they are processed or to comply with the principles stipulated in the relevant legislation.

As with other legal obligations, GDPR also brings with it some regulatory compliances. The amount to be paid in criminal cases is 4% of the annual turnover or 20 million Euros [70]. In this respect, even if a business is processing data outside the European Union, if it processes the data of people residing in the EU, it is obliged to act following the GDPR. So, when a startup fails to comply with GDPR, it will be penalized based on its turnover.

There is a broad jurisdiction in terms of GDPR coverage. GDPR regulates all kinds of data operations, including the sharing and use of personal data, for all companies that collect, process, and store the personal data of anyone living within the borders of the European Union, regardless of where the company finds it [69].

From this point of view, it can be said that GDPR imposes responsibilities not only on those who process data in the country where the startup is established but also on all natural and legal persons who process the data of people residing in the European Union.

The principles of GDPR are impacting new businesses and high-tech startups in Europe [71]. There are three scenarios that startups need to pay attention to in the field of GDPR from the establishment of enterprise:

1- Which part of your operations is in the EU

2- Whether it offers services or products within the EU, even if it is not within the EU.

3- Even if they are not in the EU, they have the authority to manage and monitor the data of the people in the EU [72].

According to studies in data security and startups, two types of measures should be taken to ensure the appropriate level of compliance necessary for the protection of personal

data: technical and administrative. Within the scope of administrative measures, unnecessary processing of personal data should be avoided, employees should be informed about these regulations, and unnecessary information should be destroyed at regular intervals. In technical measures, systems should be protected, there should be a data backup strategy, an infrastructure to prevent data leaks should be available and penetration tests should be performed [73].

The studies illustrate that the protection of the infrastructure is also crucial for the storage of data. Startups should perform penetration testing to maintain a high level of continuous security against possible attacks. Because of the legislation on data breaches and cybersecurity, startups should perform penetration testing to maintain a high level of continuous security against possible attacks [74].

The EU Cybersecurity Act aims to establish a cybersecurity certification framework for products and services. EU has recognized the importance of cybersecurity as a crucial element in its digital transformation strategy [75]. The Commission aims to high a common level of cyber security across all Member States [76]. In addition to that, the EU strengthening the legislation in the EU on Artificial Intelligence (AI) and healthcare sectors through the NIS Directive [77].

This EU Cybersecurity Act allows enterprises doing business in the European Union to certify that their products, processes, or services satisfy EU cybersecurity criteria. For the time being, firms can choose whether to engage in this certification procedure [78].

Considering the usage of AI and IoT systems in newly established enterprises in the EU is 29% [79]. At this point, startups that develop AI systems or use third-party vendor systems are required to protect their systems. According to the European Legal Framework for AI, 4 basic principles in the protection of personal data with which Artificial Intelligence systems are related will be examined closely:

• Compliance with the law and non-discrimination

• Processing for specific, explicit, and legitimate purposes

• Data minimization

• Transparency and Right to Information [80].

Existing studies and ongoing discussions in the EU looking into startups and small-medium enterprises (SMEs) in this demonstrated legislation. Most applications working with AI need huge amounts of data to learn and make logical choices. Considering that startups have limited resources; trying to find a fair balance between the public interest to be achieved by the implementation of artificial intelligence systems [81]. Observations regarding the high-tech startups in this regulative environment affect the financial services primarily as much as cyber risk is settled there [82].

Whereas some studies are discussing that the EU Act could be more specific and inclusive [75]. Even EU wants to regulate the high risk of AI, people can still be affected by trustworthy AI. Unacceptable practices of AI would be risky and annotate people's thoughts in harmful ways [83]. Also, cyber-attacks on AI systems would be harmful to individuals and businesses. Damage to equipment, breach of data, or data transfer across the border are possible consequences and EU authorities must maximize the level of regulations on this [84].

As a result of the scholars who suggested new regulations, the European Council and the European Parliament agreed on the update in 2024 with the study of ENISA. Also, the ENISA advised Member States to transpose NIS2 Directive to their national legislative system [85].

Complying with the regulations is also necessary for startups and it's believed to increase the growth in the market [86]. As much as the EU has made progress in improving its cybersecurity, there will be some compliance processes to be done to ensure that startup remains a secure technology solution.

2.3 The Impact of the Regulations on Startups

A study by the World Bank examines that regulatory compliances are a major obstacle for startups in many countries. Entrepreneurs often find the regulations can be "unpredictable, non-transparent, beyond measure". The report presented that startups in countries with high regulatory environments had lower survival rates [87].

Salinaz's article examines how regulations affect formal startups and entrepreneurs in developing countries. More specifically, regulations on businesses can increase the cost of doing business and limit access to finance [63]. Likewise, an empirical study on the

cost of regulations for small enterprises presents costing an average of $12,000 per year for small firms [88]. The study also found that regulatory compliance unfairly affects small businesses, and startups with fewer than 20 employees spending 36% more per employee than larger firms on regulatory compliance.

McKean highlights legal burdens for enterprises going forward to EU to US transfer in their growth as a “headache” [89]. Correspondingly, another study shows the impact of the GDPR and data breaching fines as a “lesson” for business [90].

The EU regulations are engaging each business model in the market. While determining the conditions of the regulations, the criteria are kept as strict as possible to prevent abuse, the number of enterprises and companies that can benefit is limited and it is expected to be used in a beneficial way to achieve the expected effect throughout the EU [91].

Scholars discussed that it would not be fair to blame all the negative consequences on the authority that provided this regulation. It is common for startups to investigate their legal compliance inefficiently [92]. Studies illustrate that, the regulations made to ensure public order should not be perceived as a disadvantage while support and incentives are provided [93].

Lee and Kim argue that regulations can affect the competitive level of startups positively. In some examples, regulations may provide an advantage since they can afford to comply with regulatory standards. However, startups may be forced to redirect resources away from innovation to meet legal compliance demands [94]. The authors suggest that policymakers could reduce the negative effects of regulations on startups. One approach to reducing effects could be reducing compliance costs and encouraging innovation. Another approach is planning regulatory compliances according to startups to reduce legal burdens.

The approaches are followed by other scholars by highlighting the balance between regulatory requirements and the needs of innovations. For this instance, one suggested approach is simplifying the regulatory frameworks on entrepreneurship and make more predictable [13]. Dulkenberger explored that startups are not fully aware of how the law impacts them in different regulative environments (US and EU) [78]. As a concrete example, the EU cybersecurity act applies to all ICT processes, services, or products. This legislation is all-covering and not directly applied to EU national markets, also businesses

that deploy this. In comparison with U.S rules set by the government, the EU act is offering the decision to obtain certification or not, however, consequences of being without certification could be penalties or not competing in the market. As from the example of AirBnb or Genesis' Cayla Doll [95]. No matter how innovative the IoT devices produced by entrepreneurs are, they will be out of the competition when they cannot enter the EU market due to regulations. Cayla Doll produced by Genesis is a smart toy that can connect internet or Bluetooth, features of the doll are way more innovative than usual toys [96]. However, this innovative product couldn't take a place in the EU market because of the GDPR consent, Data Processing Agreement (DPA), and EU cybersecurity act [97].

Another example of a successful startup that faced data privacy and GDPR in Europe is AirBnb. Airbnb's innovative business model has not complied with the regulatory environment of the EU and led to opposition from regulators and industry groups concerned about issues such as safety, tax compliance, and fair competition [98]. Airbnb's experience has shown the importance of understanding and compliance the complex regulatory environments. Despite the challenge in the EU, Airbnb has continued to grow and expansion of the services around the EU states [99]. This example actively demonstrates that compliance with regulations brings opportunities in the market.

In the study conducted by Salinas, authors examine the relationship between regulative framework and being formally registered to the specific market by using data from World Bank's Enterprises [63]. Findings demonstrate that the legal environment has a significant impact on the being registered in the ecosystem. They discover that more inconvenient regulations are linked to a lower possibility of formal entrepreneurship, but generous regulations for startups are linked to a higher likelihood of formal entrepreneurship.

Correspondingly, McCahery and Vermeulen analyzed the high-tech startups in 12 European countries for the analysis of the relationship between regulatory competition and the emergence of new businesses. The study found that regulatory competition has a positive impact on the establishment of high-tech startups [100]. The study implies that countries that provide more favorable regulatory environments for new enterprises are more likely to engage and establish innovative start-ups.

The audit period and the difficulty of compliance with regulations are restrictive processes for the entrepreneur to start a new business or venture [101]. For entrepreneurs to be supported by the stakeholders in the ecosystem, they must first be identified and comply with the regulations [102]. In the strategy document prepared by TEPAV and İZKA for the development of entrepreneurship; they revealed the components and policymaking conditions of the entrepreneurship ecosystem (Figure 4 Entrepreneurship Ecosystem and Implications within Legal Framework Conditions) [103].

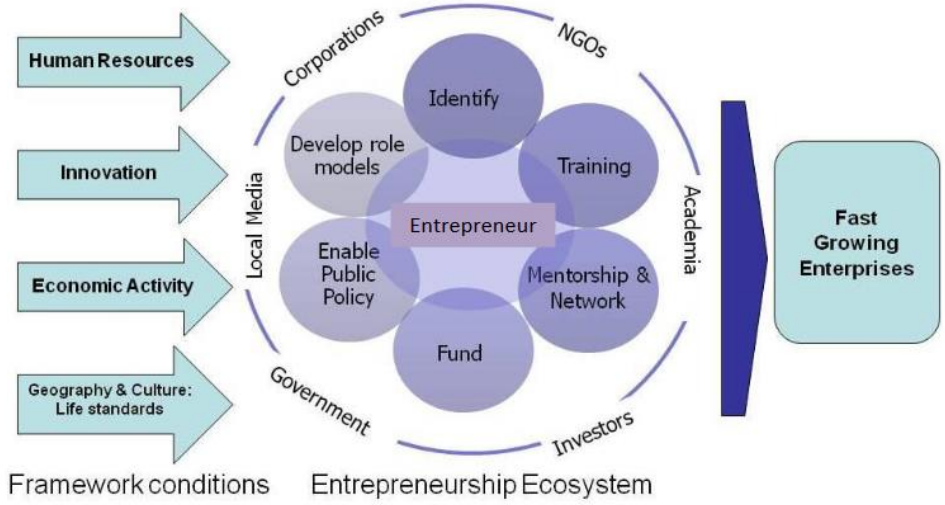

Figure 4 Entrepreneurship Ecosystem and Implications within Legal Framework Conditions [103]

45% of entrepreneur candidates in Europe describe the policymaking process and current legal complexity of starting a business as very difficult [102]. This situation confronts Europe as an important barrier for new businesses to enter the market. The report also suggests in order to minimize the problem; simplifying the political environment, reviewing the regulations, reducing the administrative burden, reducing and facilitating the bureaucratic burden by sharing the necessary documents on the internet, and using efficient methods instead of the long procedures required [103].

Moreover, scholars and international organizations are suggesting considering existing regulations except for small businesses [13]. Studies suggest that policymakers need to consider the potential impact of regulations on different types of entrepreneurs. For example, women and minority entrepreneurs may face unique challenges due to regulatory frameworks, and policymakers need to design inclusive regulatory frameworks that do not discriminate against these groups [104].

The United Nations Conference on Trade and Development (UNCTAD) has created a framework on how countries should create an entrepreneurial policy in the report "Entrepreneurship Policy Framework and Implementation Guide" dated 2012. In the report, examples of good practices in various countries were compiled and recommendations were made to policymakers within the framework of these examples. UNCTAD's entrepreneurship policy framework proposal can be seen in the figure (Figure 5 Entrepreneurship Policy Framework and Key Components of the Framework).

Figure 5 Entrepreneurship Policy Framework and Key Components of the Framework [105]

UNCTAD framework highlights that the Regulatory environment is one of the most critical measurements for entrepreneurs to bring their ideas to life and keep their startups alive and growing. In a mature ecosystem, there should be a variety of different regulations that can meet the needs of entrepreneurs according to the startup's stages.

Stevenson and Lundstrom argue that regulations need to consider different factors for the encouragement of the establishment of startups [106]. According to this study, legal regulations are required to divide the entrepreneurial processes in the pre-start, start-up, and post-start-up stages as a target. Secondly, it is important to create regulations designed and expanded for motivation, opportunity, and ability areas. Finally, the main goal is to have coverage that encourages more people to own their businesses.

In this way, with the peaceful regulations of governments; policymakers determine the direction of entrepreneurship by influencing the quality, number, and accessibility of startups [107]. Verheul and others found that five different regulations affect the entrepreneurial activity and the startup ecosystem. First, governments determine the demand side of entrepreneurship by influencing the quality of opportunities with legal regulations [108]. These policies: income policy and competition policy can be given as examples [109].

Second, governments influence the supply side of startups by influencing the quality and quantity of the entrepreneurial pool [110]. Regulations such as immigration policy [111], regional development policy [112], and financial aid regulations for families with children can be given as examples [113].

Third, governments, with their policies, prepare the appropriate environment for entrepreneurs to receive technical and financial support. Governments do this by developing the risk market in legislation and providing direct financial and technical support to entrepreneurs. For this reason, the EU adopted the HORIZON 2020 [114] and EASME programs [115]. Within the scope of Horizon 2020, 7 Startup Hub project is managed, and over 150 startups are granted [116].

The fourth is to ensure that the social and educational regulations need to evolve in favor of entrepreneurship through the education and media tools provided in schools. Research shows that 15-20% of students who have participated in an entrepreneurship program later set up their own companies [117]. Regardless of whether they are profit-oriented or social enterprises, the participation of young individuals in entrepreneurship education significantly increases their employability.

Fifth, governments should minimize the risks that entrepreneurs face while doing business with legal regulations. Corporate and income tax policies, social security policies, employment policies, and bankruptcy policies can be given as examples in this regard. Research shows that 96% of bankrupt businesses experience cash flow problems due to late payments of their receivables in the market [101]. However, the content of bankruptcy laws is subject to auditing, regardless of startup size. This auditing period and the difficulty of bureaucracy are restrictive processes for the entrepreneur to start a new business or venture. Some countries even have laws that restrict a bankrupt entrepreneur from re-establishing a business for an extended period of life [52].

Governments directly or indirectly affect the startup ecosystem with the designed legal regulations. Based on the above studies, it can be said that EU policies aim to shift from "compensatory" to "increasing and developing competitiveness" in this context.

2.4 Overview of the GovTech Startups in Europe

In the digital transformation era, when the government is mentioned, the first thing that stands out is probably public services. The government is considered an institution that performs many services (such as security, health, education, transportation, communication, etc.) in society. GovTech is the name of the technologies for delivering these services of the state to the citizens in the fastest, most effective, and easiest way, in a safe, high quality, and uninterrupted manner in the electronic environment [118].

While defining the concept of GovTech, it is necessary to consider the systems and factors surrounding the e-Government phenomenon. For example, it is not possible to understand national e-Government applications by abstracting them from the integration process with the European Union, globalization and international competition, and the global market dynamics of new technologies [119].

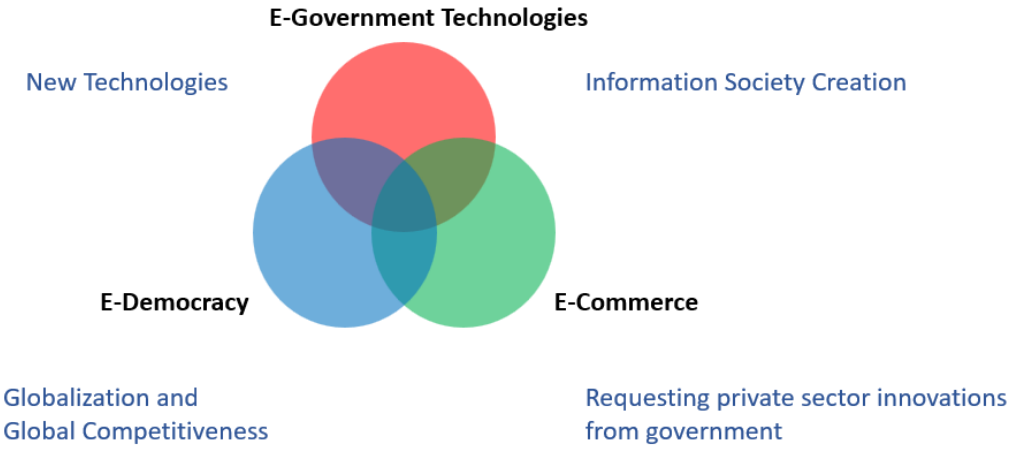

Figure 6 Systems and Factors Intersecting and Surrounding E-Government [118]

GovTech startups bring new technologies and innovations in the private sector to the government so that the government can reach and serve the citizens quickly and at a minimum cost.

The concept of the GovTech in Europe was improved by the Digital Government of Europe, funding programme [120]. Within the scope of the funding programme, Europe highlights three common elements:

- Engagement of the public sector and startups for innovative solutions
- Procurement of tech-based products and services
- Innovate public services and solve the major challenges [121].

It is possible to see different approaches in European countries that have completed GovTech activities with startups and have related incentives. According to the report by the Public, GovTech startups in Europe offer four core services or products [122].

First, Govtech startups provide information in the digital environment. For example, Archii is an AI secretary for providing legal and financial documents and AI-based technology provides the services for Danish Government [123]. Archii is working with public agencies and raising grants from EASME to develop their businesses [124].

Secondly, developing the online provision of some services by the government. As an example, paying taxes, utilities and other services of public administration can be given. Satispay is a mobile application for payment systems in Italy. The system collaborates with a third-party vendor of the Italian universal public electronic system, pagoPA [125].

Thirdly, creating a structure to create a portal, delivering services from a source. Novoville is the GovTech startup that provides a portal of citizen engagement in more than 80 local authorities in Europe [126]. The Novoville provides different interfaces for local councils for the need to apply for public services, share opinions, and any engagement with local authorities.

The last one is a startup that covers the emergence of innovations. One of the leading GovTech platforms is DreamApply, which provides an admission platform for both national universities and private colleges [125]. Dreamapply is funded by EASME and its EU project that digital solution for student recruitment [127].

Since 2016, the EU aimed to inclusive digital transformation in public services in the EU [128]. Within this aim, 37% of the provision of the services and 31% of digital public management tools are delivered by GovTech and digital services startups [129].

The focus of the Digital Europe Programme is on offering funds for GovTech startups which technological solutions to governments and other public sector organizations

[130]. These GovTech startups work in a variety of public industries, including energy, transportation, healthcare, and education. To encourage transparency and cooperation, many GovTech startups also place a high priority on the use of open data and open government principles.

With the developments in e-government applications, Molenwaard Municipality in the Netherlands, which continues to serve without the need for a physical municipality building, is one of the most impressive examples of digital municipalities [131]. Implementation of the technology solution to local authority has become with the using external service providers and innovative startups.

Significant moves in some European countries are more noticeable, like Estonia, encouragement, and lower barriers to the establishment of startups [132]. Again, in this context, at the EU Ministerial Conference held under the presidency of the Estonian President on October 6, 2017, a statement called the Ministerial Declaration on eGovernment, also known as the Tallinn Declaration was published, signed by EU member states and EFTA (European Free Trade Association) countries.

The topics briefly mentioned in the Tallinn Declaration are as follows [133]:

- Although the European e-Government Action Plan (2016-2020) is an important step in this transformation process, it is still necessary to ensure that digital dissemination is expanded to cover all public policy areas and to create a user-oriented structure that will center the citizen and business world. that there is work to be done,

- Developments in the field of e-Government play a central role in utilizing emerging opportunities and eliminating the mentioned problems,

- It has been stated that e-Government applications in Europe can play a catalyst role in digital innovation for the data economy and the Digital Single Market.

The approach of each of the European countries to GovTech startups and the incentives they provide have been evaluated by researchers. While Belgium, England, Austria, and Lithuania formed a separate status among the twelve European countries examined; it has been seen that the others are not arranged by the existing digital services. In Lithuania, it

is seen that a new startup cooperative has been established. In addition to all these structures and regulations, there is a certification system in Poland [134].

Another important study that reveals the European Union's approach to e-Government is the 2017 eGovernment Benchmark 2017 report prepared by the European Commission. The report draws attention to the importance of citizen-oriented design and delivery of e-Government services, as highlighted in its subtitle [135]. It is seen that one of the most important driving forces for the implementation of the e-government process is the EU membership process. In order not to fall behind the new digital age in EU countries and to benefit from its opportunities, the "E-Europe" initiative has been launched and a series of goals have been determined for the purpose [136]. The E-Europe is motivated GovTech startups to provide innovative and smart solutions. The digital transformation of government services is supported by a €1.3 billion fund [137].

2.4.1 Challenges Faced by GovTech Startups in Europe

The challenges that engaging GovTech startups are mostly dependent on the complexity of bureaucracy in different member states and regulation differences of government organizations. Governments frequently demand extensive paperwork, authorizations, and security clearances, which can be expensive and time-consuming for startups.

The regulatory environment for GovTech startups is challenging to navigate between countries. Policy Report by Joint Research Center highlights that cross-border harmonization difficulties are required for startups that extend operations to different EU countries [138].

Another challenge is the need for collaboration with government organizations. Building trust is harder in comparison with market-dominant integrators. GovTech start-ups are typically acquired before they mature and become serious competitors. Before being purchased by established, prosperous private sector companies that serve the public sector as suppliers, some GovTech start-ups may benefit from being nurtured by incubators that are publicly funded. However, they need to build accomplished projects or unique innovations [138].

Startups may also struggle to comply with regulations and the effectiveness of their solutions to government stakeholders. GovTech startups must establish a secure

environment within their online environment because they will have to digitize all governmental data and because the private information of their citizens is valuable [139].

To develop e-government and GovTech startups; ensure the establishment of the necessary technical and administrative infrastructure, establish the legal structure, engage in successful projects, and ensure compliance with international policies and practices.

2.4.2 Opportunities for GovTech Startups in Europe

Despite challenges, there are opportunities for GovTech startups in Europe. Collaboration between startups and government obtains successful outcomes. In Europe, the GovTech market's estimated size is €166 billion and is estimated to multiply 3 times in the next 3 years [140]. These potential benefits of the sector are recognized by the EU and its agencies.

In different levels or different fields of public institutions, the way of working is shifting towards digitalization. Because of that, there are constant calls for working with start-ups and SMEs. These calls are facilizing the interaction with entrepreneurs and increasing the innovations in government [138].

Since 2015 in Italy; in the Netherlands, since 2017, public institutions only accept electronic invoices for documenting their expenditures [141]. These practices clearly show that there is a huge gap for GovTech startups [142]. So, this gap would return them as resources, investment, and reputable growth.

Through programs like the European Innovation Council (EIC) and the Digital Single Market strategy, the European Union has been actively encouraging the growth of GovTech startups. These programs support and fund new businesses while also encouraging international cooperation and innovation.

EU offers a fascinating chance for the public sector to innovate within digital transformation. While GovTech startups face considerable difficulties navigating the complex regulatory landscape and establishing connections with governmental agencies, there are also sizable opportunities for cooperation and development. GovTech startups will probably play an increasingly significant role in determining the future of EU public services as the demand for digital solutions in government continues to rise.

3 Case of Lithuania

In recent years, there has emerged interest in digitalization of services. Lithuania is a small European country however it has an active startup ecosystem. Also, the government is supportive of the development of GovTech startups. For this reason, the Ministry of Economy and Innovation established the GovTech Lab in 2019 [143].

This chapter will provide an overview of the GovTech startup ecosystem in Lithuania. Regarding this, Lithuanian governmental support will be analyzed. In this scope, startups' characteristics, challenges, and opportunities will be examined according to research in the ecosystem.

The second sub-chapter will be the analysis of the regulative environment in the Lithuanian ecosystem. The public sector and building relationships with government organizations will be introduced in the complex regulatory environment.

3.1 Overview of the Lithuanian GovTech Ecosystem

GovTech startups in Lithuania are quite engaging and trying to be building a strong GovTech hub in the Baltics. In 2021, over 40 innovative solutions were implemented [140]. Overall eGovernment maturity in Lithuania is higher than EU with %83 [144]. It is claimed that many factors such as the absence of a serious legacy system inherited from the past when leaving the socialist system and the high number and quality of local IT experts and suppliers in the post-soviet countries [145].

Last report from the GovTech Lab, there are 13 GovTech startups in Lithuania. These startups are creating solutions for three different facilitators [146]:

1- Policymakers

2- GovTech Ecosystem Intermediaries

3- Funders.

The services or products offered by GovTech startups target three user groups: personal, commercial, and service provider organizations [147].. Lithuanian public sector organizations were invited by the Agency for Science, Innovation, and Technology

(MITA) and its GovTech team to submit their problems and request funding to build a prototype of a GovTech solution in mid-2021. The contest supports entrepreneurs and the GovTech market [148]. Startups and the public sector work together to create GovTech solutions. As a digital transformation process, inclusive GovTech solutions for all these user groups are important.

Lithuania's strategy of participation in the field of e-Government is focused on maximizing information openness and transparency. One of the startups that emerged in this context is Okredo. As a GovTech solution, Okredo offers open data about companies regarding credit scores, credit limits, and other ratios about companies like valuation [149].

There is a variety of GovTech startups in Lithuania in the field of data analysis, software development, and digital communication tools.

Another innovative solution in the Lithuanian ecosystem is assisting citizens and accessing public services information in real life portal. Trafi is significantly focused on public transportation. Trafi’s innovation is across the borders of Lithuania and advantages from the small size of the market in Lithuania to become experienced. Trafi is the first MaaS that reinvented mobility and GovTech in the Baltic States [150]. Trafi provides real-time guidance assistance that helps users reach their destination and buy tickets. Most importantly. Trafi has led Vilnius City to digitalization.

Some GovTech startups in Lithuania also prioritize technological education and developing the skillsets to promote digitalization and tech recruiting. Trafi and BitDegree are notably data-driven online learning platforms. These startups are collaborating with Lithuanian Public Employment Service [151]. BitDegree also provides opportunities to engage the Fintech sector for the challenges of tomorrow [152]. The e-learning platform of BitDegree obtained the EU funds investment for the common project with Vilnius University [153].

GovTech startups in Lithuania are facing the struggle of the market size of Lithuania. Demand for the GovTech solutions is limited because the population is just under 3 million people. The small size of the market could affect the slow and difficult growth of the ecosystem [154]. Whereas GovTech Lab examines the small size of the market as an

advantage of “user-centric” products. Digital public services often tend to be more aligned with populism rather than dynamic user center [155].

Additionally, the regulatory environment is challenging to navigate in Lithuania. In Lithuania, there are some barriers for foreign founders of enterprises like visas and work permits. These regulatory challenges will be examined in the next sub-chapter.

Another challenge for GovTech startups is the need for collaboration with public organizations. Skepticism and lack of experience could be a barrier for newly established startups. However, EU initiatives and funding would promote innovation.

The Lithuanian ecosystem is missing grant programs and pre-acceleration for an idea to establish [156]. So, entrepreneurs with ideas but who haven’t gotten a prototype cannot get attention from startup hubs.

Lithuania's GovTech startups offer a fascinating opportunity for the public sector to innovate and digital transformation. While these startups face considerable difficulties navigating the complex regulatory landscape and establishing connections with governmental agencies, there are also sizable opportunities for cooperation and development.

3.2 Regulatory Environment for GovTech Startups in Lithuania

The Lithuanian ecosystem is growing and keeping pace with global trends. Startups that are established or growing in Lithuania must be obliged to the Lithuanian regulatory system and legal environment. This sub-chapter will provide an overview of the regulatory environment of Lithuania for startups. The overview will contain the challenges, opportunities, and current conditions.

The regulatory environment in Lithuania is multi-layered and complex. This complexity is caused because of the transparency through the policy-making cycle [157]. Nevertheless, the Ministry of Economy and Innovation aims to implement better regulations within the Better Regulation Programme [158]. This programme prioritizes the reduced administrative and legal burdens of the business.

The World Bank’s Doing Business rating is 11th for business conditions. This business condition contains the “Starting Business” factor [159]. In this regard, Lithuania is

developing new projects and regulatory environments to attract newcomers to the Lithuanian market. For these newcomers, Lithuanian Bank has a Newcomer Programme, a One-stop-shop, for consulting regulatory matters and assessing the feasibility of business models [160].

The government and the Ministry of Economy and Innovations pay significant attention to startups. In 2019, an official legal definition for “startups” was approved [156]. As a result of this, favorable regulations are approved, namely for the regulations, tax regulations, employee shares regulations, migrations, and visa regulations. Since the regulations are evolved as beneficial for startups; more than 650 participants have consulted to one-stop-shop programme [161], 35 foreign startups registered [156], and a 61% increase obtained in digital infrastructures [162].

Moreover, Lithuania introduced the regulatory sandbox for new startups in the market in 2018. This regulatory sandbox is important for taking steps for establishing or extend operations to the Lithuanian ecosystem [161]. This regulatory sandbox provides a ground for testing business models when regulations are not clear for newcomers or limited availability for consulting.

Furthermore, Lithuania has trying to be developing a reputation for startup-oriented regulations. This could help to attract investments and entrepreneurs to the county and GovTech ecosystem.

TransferGo is a successful startup founded in Lithuania. This FinTech startup is providing a service that allows you to transfer money and exchange currencies [163]. TransferGo has been funded by Lithuanian VC Practica Capital, this funding was launched with the collaboration of Lithuanian branches of Swedbank to accelerate the startups and improve the harmonization of the newly established startup for financial regulations [164].

Since Lithuania is raw and new to creating a startup-friendly environment, there are still significant challenges in the context of existing regulations [165]. The political stability of Lithuania is 22% according to survey results of Invest Lithuania [162]. In the dynamic world of business, an unstable political environment affects the resources of startups.

Lithuania complies with EU regulations. The range of regulations and directives is different for startups. However, GDPR and Data Protection Directives are subjected to all

business models without exceptions [166]. These regulations are hard to implement while entry-level startups if they exercise data collection or processing.

Karantinas was the mobile application during the Covid Pandemic and the startup company and governmental partner (National Public Health Centre) were both fined for the negligence of GDPR [167]. The fines could be unfair to charge without considering their size or without warning for enhancements.

Lithuanian Law on Cyber security could be defined as strict and protective at the national level but not in the market. Cyber security laws and regulations of Lithuania haven't stated startups or small-size enterprises separately. All cyber security regulations are considering any enterprises as regular business operations [141]. In this perspective, all enterprises haven't equal opportunities for establishing or implementing a cybersecurity policy inside the enterprise.

Cybersecurity regulations are essential for national security; however, startups need supervision or regulatory balance according to their size. Startups that have operations of collecting, analyzing, or storing data or valuable operations are under the radar of cyber security regulations. The last proposal of the Lithuanian government for cyber security is stated the administrative fines for any failure in compliance with cyber security regulations including personnel to the whole institution [168].

Startups in Lithuania need to compliance the regulatory environment. There are also attractive opportunities for startups in last years, including government support, access to EU markets, and funding. Also, there are challenges to decelerating innovation and being out of focus of the ecosystem.

4 Results

This chapter will present the findings of the interviews and questionnaires conducted with participants in the GovTech sector or close to the startup ecosystem. The primary objective of the chapter is to understand the challenges or opportunities related to innovation and regulations on GovTech startups.

At the end of the chapter, recommendations will be made for startups, policymakers, and regulators to navigate the complex ecosystem of innovation. The questionnaires were distributed between both policymaker bodies like ministries and startups. Those startups are divided into Lithuanian startup examples which are obliged to Lithuanian regulations, on the other side two Turkish startups that were previously interested in the Lithuanian ecosystem.

As a way of introduction to participants;

Ernestas Černis is an advisor in the Innovation Department in the Ministry of Economy and Innovation of the Republic of Lithuania. Within the scope of his department, he advises and manages business collaborations and maintains relations with the ecosystem. His contribution was unique and he contributed the research with future goals and collaboration projects insights to the thesis.

Rimantas Kurauskas is a project manager in the Cyber Security Department in the Ministry of National Defence of the Republic of Lithuania. His direct duty is cyber security policies and actively engaged with innovations. He gave clear and extended insights from the security perspective. He addressed the point of data privacy and cybersecurity measures for GovTech innovations.

Gediminas Kondrackis is a social entrepreneur and co-founder of several enterprises. He is leading projects for youths and contributing the other initiatives with his experiences. He is particularly chosen because he is a both co-founder of an NGO and a former owner of a startup. His successful and awarded startup Wellness Travel is a good example of how data privacy could be issued while doing business between countries.

Ceyhun Aslan is both Co-Founder and CTO of the Sertifier. Sertifier is a startup that develops a digital service for the government to validate certificates and automatize the documentation and storing of digital badges. Ceyhun's input was not only crucial for understanding different legislations in different countries but also valuable for a better understanding of how collaboration with governments is. He shared his experience with developing a digital service for the government and following the legislation strictly.

Mustafa Erkin Samut is Co-Founder of Kobakus. The startup is built for intelligent cash management solutions. Kobakus is a startup that works with both public banks and public institutions for providing a digital bridge for triggering payment systems. Recognizing by public institutions and providing cash management is critical for cybersecurity and data privacy.

All the interviews were recorded and transcribed with their approval. For two interviews with Turkish startups, the interview language was Turkish with respect to their native language. Transcription and translations of the transcript texts were done manually by the author of the thesis.

4.1 Insights from the Policy Makers

As mentioned before, Lithuania has a Ministry that works on opportunities for innovation. For startups, the Ministry has collaborations for the growth of the economy by providing a positive ecosystem for startups.

The overall focus of the Ministry of Economy and Innovations is highlighted in the point of openness for accelerations: *"Our Ministry is preparing the program for inviting international accelerators to Lithuania. Our usual focus is accelerating local startups, but also, we do focus on other countries' as well" (*Ernestas Černis*).*

An in-depth overview of the Lithuanian ecosystem benefits and how a startup-friendly ecosystem is building in the background represented by Černis: *"Lithuania is, at least in my opinion, quite a startup a friendly country where it's not that hard to start with the programs like Startup Visa, which allows, startups from other countries to bring their business in here. Countries like Ukraine, get the opportunity with this visa and then start up here" (*Ernestas Černis*).*

Another crucial aspect of establishing startups is investment. Lithuanian level of private sector involvement in the investing and acceleration program funded by the Ministry is explained within the perspective of the character of status in the ecosystem. As an advisor who is working alone in the Startup field, direct involvement of the Ministry financially is limited: *"Innovation Agency, not by the ministry, will have the finance to implement it and it will choose how to construct it."*. His subjective opinion on the availability of finance was *"Lithuania is quite similar to Estonia. In comparison to Poland, startup investment like indexes or ratings we are quite up high in comparison. We want to be seen by Europe" (*Ernestas Černis*).*In regards to the private sector involvement: *"We're planning to have a few specialized accelerators which will focus on a specific field, and we are obviously in a stage of discussion at this moment, but we want to like with the specialized accelerators, fill in the gaps in the fields which we are kind of lacking or we're behind a little bit." (*Ernestas Černis*).*

From the prior literature review, keeping pace with startups is important while policymaking and becoming close to the ecosystem helps for regulative transparency and is seen as a supportive approach [103]. Insights from the ecosystem relations described the collaboration point: *"Bring experts from the private sector to help them implement it because maybe they don't have enough specialists on it. Overall, it will be up to the Innovation agency to get insights in the way would construct it. We're just, you know, in the level of ministry we put requirements, we put KPIs (Key Performance Indicators)." (*Ernestas Černis*).*

Altogether direct engagement with startups by Ministry is not common, however, information flow from the ecosystem is obtained through Innovation Agency and working groups: *"Big flow of information between ecosystem and innovation agency. Then, they will bring it to us. I guess different ministries work, but I cannot say that there are right now any measures planned measures when it comes to like direct collaboration." (*Ernestas Černis*).*

Černis expressed engagement with policymakers, particularly in the information flow. Based on the literature review of this topic, governments determine the demands of entrepreneurs [108] with collaborations and activities in the ecosystem.

One important essential explanation in this interview was how they create a regulation to leverage innovations and encourage the GovTech startups in Lithuania: *"We could create opportunities for, startups in certain fields to have means to get subsidies to grow. That is probably the most, the, the only measure that I can think of that where we like you know trying to specialize, trying to focus on something smaller instead of looking at the big picture." (*Ernestas Černis*).*

4.1.1 GovTech Startups in the Public Institutions

During the interview with the Ministry of National Defense; the issue of strengthening cybersecurity through advanced innovative solutions provided by startups has been addressed: *"The Ministry of Economy and Innovation and INVEGA with the expert support of the Ministry of National Defence, curate the MIL Invest initiative. It is an experimental development and innovation activity in the field of defense and security in Lithuania by investing in startups in the field of defense and security."* (Rimantas Kurauskas).

Another example from the Ministry of National Defence to get closer to startups is: *"Lithuanian NCC with the Consortium members has applied to the Digital Europe Programme call in the cybersecurity, one of the agreed activities between Lithuanian NCC and IA is to organize the "TechHub goes Cyber" mentoring program for a 6-month duration in 2024. NCC will launch calls for up to EUR 60,000 in funding for projects in the field of cybersecurity innovation for startups."* (Rimantas Kurauskas).

With the indirect result, the Ministry of Economy and Innovation, along with other ministries it works with, positively stated the involvement of startups to keep pace with technology: *"Collaborations with Ministry of Education within their measures, Ministry of Finance is there. I think there are even some projects in the Ministry of National Defense. They are trying to get the startups inside their ministry" (*Ernestas Černis*).*

Theoretically, we can observe a unifying approach between ministries. If there is a preference for a startup partnership in terms of service, including the standards for how a startup should be structured and operated, the ministries will prefer the Innovation Agency as a priority platform and use their measurements. This perspective enriches the hypothesis in regard to governments keeping pace with technological improvements by engaging.

4.2 Cyber Security and Data Privacy Regulations

Actors of politics mostly see startups as a structure of the traditional business. Therefore, they do not consider them separately in legal regulations, but create general data privacy regulations: *"The national organizational and technical regulations for cybersecurity entities are created based on Governmental decree No 818 on the Implementation of the Cybersecurity Law."* (Rimantas Kurauskas).

For efficient compliance with data privacy and cyber regulations are held in the perspective of mitigating the risks:*" First of all we suggest performing a cybersecurity risk assessment and mitigate the risks. This process will allow startups to avoid regulatory and compliance issues. As part of a cybersecurity risk assessment, a startup could continuously improve its cybersecurity culture, by participating in cybersecurity exercises, training and consultations, and/or by confirming its internal cyber incident management plans."* (Rimantas Kurauskas).

According to the Ministry of Economy and Innovation, feasibility studies can be done on the situation of domestic startups with a higher rate of legal regulations. Each country's regulation has parallels with its definition of a startup. Thus, it may be possible to reduce the inconveniences that may arise in many issues, especially data security, and obstacles to growth: *"Same policy for all of Europe would be harmful because it would limit countries to choose their path. That is why there's such a difference in that. But overall, when it comes to specific measures, we focus on the Lithuanian ecosystem. But of course, we're not forgetting about international aspects of European main actions" (*Ernestas Černis*)*.

4.3 Insights from Startups

The startups are divided here into successful Lithuanian startups and startups that'd like to enter the Lithuanian ecosystem. As a result of the topics discussed and insights received; 4 strategic aspects have been mentioned:

1- Improving the business and investment environment

2-Increasing innovation capacities

3- Facilitating access to finance

4- Regulations are aimed at developing startups. The first things that startups interested in the Lithuanian ecosystem look at are to have a sustainable investment that creates an ecosystem and to develop entrepreneurship. To achieve these goals, some main topics have been compared. These comparison points were;

- Developing an entrepreneur-friendly regulatory framework,
- Supporting innovative GovTech in governmental agencies,
- Network development between entrepreneurs,
- Facilitating entrepreneurs' access to finance.

According to these comparison points, insights from the start-ups' interviews will be sorted as a sub-chapter.

4.3.1 Developing an entrepreneur-friendly regulatory framework

According to the subjective evaluations of the startups, even the choice of the place where the startup will be established depends on how compatible the regulations are for the startups. According to Sertifier's CTO: *"When the company was first established, there was a thought about whether it would be reasonable to do this business in Lithuania and Estonia. As the main idea, tax-related regulations differences are affected by country selection. The reason we chose America as the first choice was tax regulations was more elastic. Delaware was very good in terms of tax peace and the use of payment infrastructure options."*.

On the other hand, integrating innovations into the public administration system is as difficult a process as ensuring compliance with legal regulations. The founder of Kobaküs said, *"We must ensure the same level of legal compliance with the applications developed by banks in-house. Therefore, the legal process of the vendors we choose must also be compatible with the country or market that we enter. As a startup that provides services to the government, we must first comply with financial laws, and then to gain trust, we must not be under the radar of security regulations."*. Alike with the Yin's theory on it, gaining trust and trustworthiness are obtaining by compliance with legal framework [28]. Complying with legal framework brings opportunity to leverage the trust level of the startup.

Lithuania-based, international startup founder Kondrackis says that compliance with regulations creates a safe environment for the integration of new technologies and ways of doing business with states: *"We did not view cyber security regulatory compliance as a hindrance to our startup's growth. They were safe and transparent. Although it presented challenges, compliance regulations served as a catalyst for us to improve our digital infrastructure and adopt best practices, ultimately contributing to our overall growth and success.".*

4.3.2 Supporting innovative GovTech in the governmental agencies

It is important that the governmental agencies for technology implementation in the public sector to contribute the activities to be carried out for national coordination and cooperation. Sertifier's collaboration with TUBITAK is an example of this: *"The Turkish state wanted to establish a digital credential infrastructure and make it available throughout the country. TUBITAK contacted us and since we have done this job before, they wanted to give us an opportunity here. We started to develop it together with Tubitak and then they transferred us to develop the whole system. They were responsible for white-labeling".*

Another example was Kobakus, international cooperation. Kobakus stated that while opening up to the international arena, especially to Europe, there were no agencies they could reach in some countries, and that they saw the support of their local government agencies and startup hubs here. *"When we realized that countries such as Germany, the Netherlands, Estonia, and Lithuania did not have a payment verification and payment transfer system that works in partnership with the government. We wanted to expand our service to those markets. However, there was no organization we could reach on the other side. At that time, we were in the acceleration program in ITU Çekirdek infrastructure. We asked our mentors to contact their partners in these countries about how we should make a regulatory entry, and what kind of business regulations we should make. At that time, our mentors suggested that agencies and startup hubs in these countries do not have such programs, and instead, we get support from other Turkish startups in the ecosystem."(*Erkin Samut*).*

As the hypothesis expressed in previous chapters, interviewees highlight that effective collaboration between startups and policymakers on regulations is essential for growth and bring innovation.

When asked whether the startup in Lithuania was supported by any agency; received a negative response. Kondrackis said to have entered the market without any initial support from governmental agencies.

4.3.3 Network development between entrepreneurs

The creation of locally based public technologies in joint projects through improving knowledge sharing with other startups in the industry is seen in the SEMA project developed by Sertifier. *"One situation we faced while providing a project called SEMA to the T.R government was that the data should not go abroad. There were tools that we used as 3rd party with which our system was integrated. But when developing a local project, it was recommended that we use a local substitute. In this case, the ministry had to either allow us to use a foreign-based data storage tool or find a local tool. We left this to their discretion and as a result, another alternative company that created a local tool for us brought us together."* (Ceyhun Aslan-Sertifier). In this way, it may be possible to complete the digital transformation cycle in this industry by integrating the existing startup ecosystem with the government. Also, the saying demonstrates the how ecosystem can develop with Legal Framework Conditions [103].

A networking effect on startups could be financial freedom. According to Erkin Samut: *"When you first want to get a loan from banks as a startup, banks are approaching it as precarious. To enter such a costly business, you need to have a good network."*.

Another example who trying to expand the business to European countries, Kobakus highlights the lack of network in European countries which could be useful for decision-making to enter the country: *"We, as DEIK (Foreign Economic Relations Board) FinTech in Turkey, are trying to bring Fintech startups together. The reason we come together is that when our companies want to expand abroad, we try to strengthen our mechanisms among ourselves, the support we could not find there. With our Digital Transformation and Finance office, our main goal is to support startups that want to expand abroad. Currently, we have not seen such a structuring abroad."* (Erkin Samut). Finally, one of the main goals is to receive social support while carrying the success and performance of services to different countries, but this is not a very common situation abroad.

4.3.4 Facilitating entrepreneurs' access to finance

This comparing factor is highlighted by the founder of Kobakus: *"While newly developing startups are not yet able to recruit personnel to provide themselves with extra workforce; a lot of regulatory troubles arise when states do not regulate properly for startups.*

In Europe, company licensing regulations contain such capital, and equity liability terms. If the startup cannot find an investor there, it leads to increased risk capital. An increase in venture capital means that the investor does not take kindly to the licensing investment. This leads to a decrease in innovation diversity.

If solid steps are not taken in the ecosystem at first, the disadvantages and negative effects are even greater in the progress.". In this context, the investment of digital content created in Turkey in a way that will increase mutual benefit and not harm national security may be beneficial for innovation in European Union countries.

4.4 Regulatory Challenges Faced by Startups

According to the interview findings, respondents highlighted the complexity of regulations and the cost of compliance as the most significant challenges.

The most important issue about carrying out the innovation of startups is to ensure compliance of current and future projects and applications with legal regulations. Ceyhun Aslan described how the regulations are determinant of moving to another ecosystem: *"When entering another ecosystem, dealing with a lot of paperwork, ensuring compliance is a hassle. For an American customer, the server must be in the USA, for a European it must be on the European server. Sometimes legal regulations are only country-based. There is an environment that is difficult to analyze. Corporate transport, tax relief, and less responsibility for data privacy. Such places already stand out in general and have a lot of startups."*.

The effects of regulations on startups of different sizes vary. Erkin Samut diversified the barrier level of the regulations of this: *"It creates a hump for new startups that do not have the financial power and try to introduce innovations but do not have enough ammunition. However, these regulations are now turning into an advantage for startups*

that have exceeded a certain level. The strong startup continues to grow, as startups that don't adapt get out of the way.

Similar to McKean's "headache" description [89], the interviewer mentioned the regulations as a "hump". It shows that regulatory compliance is described as a struggle in different ways.

While newly developing startups are not yet able to recruit personnel to provide themselves with extra workforce; with the policymakers who not making proper regulation for startups, there is some regulatory trouble on the early-stage startups. ". As it can be understood from here, innovations in the early-stage face unfair regulations as a major barrier.

Ceyhun Aslan says that while choosing the ecosystem between America and Europe, it can be understood whether the company will be successful or not, according to the level of regulations: *"No matter how much global work is done, there are obligations for the country where the customer is located. In practice, sometimes this is effective, according to the rule sets. You may need to change according to your needs and the effectiveness of the service you provide cannot remain the same. These are tiring events.*

For a newly established business, the effect of other regulations is extremely important, just as the tax issue is regulated. The factor that determines what you will do and where you will do it. You can understand whether a job will be successful or not, according to the legal regulations of that country. ".

The interviewer expressed concerns about entry to another country within the regulatory environment. Ceyhun Aslan mentioned that many consider regulations to be a significant barrier to entry and growth. This consideration is presented in the hypothesis, startups are looking for regulations that cannot be a barrier.

Similarly, the comments made by Kobakus's side are that it is not fair that the regulations apply the same for all business models: *"I don't quite agree with the application of the same rules on security and data privacy as other business models to startups. For example, there are different ways to move data abroad, and keeping startup structures at the business level is not an obstacle to doing this. Just as it does not prefer to carry this data, this startup can also choose whether to comply with the regulations or not."*. An

unexpected outcome of this, startups' preferences cannot be forced to do right. They are not changing their attitudes when the regulations categorize them the same as other business models.

Ceyhun Aslan stated that regulations are one of the main reasons why you stay behind when you enter a different ecosystem. *"We want to use technology, but the permissions given to this technology between two countries can be as different as day and night. Therefore, the services we provide can make such a difference. And sometimes, when using the technologies or infrastructures we currently use in other ecosystems, situations that actively harm us may arise. It also leads to the situation of not being able to keep up with its competitors all over the world."*. Apparently, it shows that innovations and technologies could be different while adapting to new regulatory compliances.

Accordingly, Lithuanian-based startups could be effective on local startups. Kondrackis: *" To effectively meet both needs, we underwent a cultural shift in our working practices. We moved away from a "move fast and break things" mindset to a more thoughtful and compliant approach. We prioritized legal considerations and carefully evaluated the implications of our actions on data privacy and compliance."*.

Similar to the study by McChaery and Vermeulen, Lithuanian startups are obtaining positive impacts by changing their mindsets and prioritizing large engagement with regulations [71].

There is an accelerator side input of discussing the topic outside of the framework; their maturity measurements contain legal optimization of the startup. This maturity is determined by; preventions from a legal burden, personal data protection and GDPR compliance, and having optimized implementations that are ready for legal obligations and can show to the investor in key business processes. When these are viewed by start-ups, it is seen that; Lithuanian accelerators cannot evaluate early-stage startups for acceleration level.

Overall, this chapter demonstrates the challenges and barriers to entry to another country for expanding business. The interviews demonstrate the hypothesis of the research on regulatory pressures linearly.

4.5 Regulatory Strategies and Opportunities for Startups

The hypothesis of the research presents; "Startups need different strategies to overcome regulatory pressures". During the interviews, several strategies were identified that startups to overcome regulatory compliance challenges. One of the most common strategies is to advise their investors and mentors. According to Erkin Samut, *"We have one professional investor and an angel investor who is not very knowledgeable in this field. Our professional investor, while looking at the new regulations; Since he works in this field and his knowledge is different, his approach is different.*

Since our angel investor has no previous experience in the subject; While evaluating the new legal regulations, it supports us to get faster legal support, which is prone to apply the regulation more quickly rather than putting the company in a dangerous situation. Our professional investor, on the other hand, provides more flexibility and can choose to take advantage of legal loopholes by taking risks.". The interviewees noted that startups could engage with regulatory authorities to get a better understanding of the regulatory requirements. Startups encounter when implementing cyber security measures with the elasticity of their investor board. It shows that collaboration exists between stakeholders to enhance their cyber security posture.

Startups identified various strategies for overcoming regulatory burdens, including seeking guidance and support from regulatory bodies alike both hypotheses framed in the research.

Another strategy is to employ technology solutions to automate compliance processes. Kondrackis underlined that implementing the GDPR measures could be enhanced by digital practices: *"Regulations had a positive impact on our startup. As we prioritized compliance with these changes, we were compelled to enhance our digital practices to ensure efficiency and transparency.*

By implementing measures to protect data privacy and intellectual property, we were able to build trust with our clients, particularly medical tourists coming from abroad. Our commitment to compliance and security measures provided them with confidence in our services, which ultimately translated into increased revenues.".

The interviewees also emphasized the importance of building a legal structure within the organization. Sertifier's CEO is a lawyer and highlights the importance of rooted with legal harmonization*: "Regarding GDPR, on the legal side, our CEO, Arda, is also a lawyer, so he makes the arrangements. Due to GDPR, obligations can be misunderstood. Compliance with obligations is not a big deal when thoroughly examined. Originating from investors and stakeholders, we are in an order where we have to comply with all obligations.".* This misunderstood was discussed on Turkish startups by scholars. The literature matched with Ceyhun Aslan's thought. It is common to investigate legal compliance inefficiently for startups [92].

In addition to this, Aslan gave the example of transparency in the regulatory environment: *"The openness and transparency in the regulatory environment make a difference on startups. The company is noticing ecosystems where there is less responsibility in terms of data privacy, such as ease of transportation, tax relief, etc. Such places already stand out in general and have a lot of startups. The easiest example can be said Netherlands, Ireland, the US- Delaware. Here, it is clear how much the systems are made more comfortable and those who provide regulations for the business have already come to the fore and grown. How many startups there are in a place is an indicator of how much their liabilities are open to startups."*.

Startups need to prioritize compliance as a core value and ensure that compliance is integrated into the company's operations from the outset. Kondrackis points out the research hypothesis by saying: "*In terms of ethical considerations, we recognized the importance of respecting the privacy and confidentiality of the personal data we collected. We adhered to the principle of informed consent, ensuring that patients were fully aware of how their data would be used for cyber security purposes, and obtained their explicit consent before collecting any information.*

From a legal perspective, we ensured compliance with relevant laws and regulations governing data protection and privacy, namely the GDPR. We invested in relevant tools and practices, such as encryption and multi-factor authentication, to safeguard personal data from unauthorized access or data breaches.".

Building infrastructure and engaging with other stakeholders in the ecosystem are solutions that are supported by interviewee responses. As foreseen in the hypothesis and

literature, businesses engage with regulations with strategies and spend their investments on data protection regulations [91].

5 Discussion and Conclusion

The findings of the research indicate that regulatory frameworks have a considerable impact on the business strategies of startups. Startups view regulatory compliance as a significant obstacle to their entry into the market and growth. As a result, they implement various strategies to address these challenges, such as building up their start-ups in a transparent regulatory environment and compliance professionals and investing in technology to ensure compliance with regulations.

The challenges that startups face when implementing data protection regulations include a lack of financial and legal resources, expertise from governmental agencies, and network guidance. However, they overcome these challenges by outsourcing third-party vendors, leveraging cloud-based solutions like AWS, and prioritizing transparent regulatory environments for new ecosystems.

Collaboration between investors, policymakers, and ecosystem stakeholders can enhance their legal posture. Startups must work with earlier experience of the startups in that ecosystem and regulators to ensure that regulatory playground.

Policymakers must balance the need for innovation with the imperative to foster competition and growth in the regulatory environment. Startups must comply with their need for innovation and agility with their responsibility to protect clients' data and privacy.

In the Lithuanian case, recent legislative improvement and compliance with the EU market related to data privacy had significant impacts on the startup ecosystem. New startups and others will attract by these changes and the raw ecosystem to continue to innovate.

It has been observed that there is not enough startup collaboration in Lithuanian public institutions and organizations. It is also among the findings that an innovative strategic

plan is not made with startups. All the work summarized above; shows that the regulatory environment needs to be improved to make Lithuania a more open country to IT sector startups with the improvement of its regulations.

All in all, startups are facing critical challenges in complying with regulations, particularly in cybersecurity and data privacy. However, they can implement various strategies to overcome these challenges, including outsourcing, investing in technology, and collaborating with stakeholders. Policymakers have a main role in promoting innovation and entrepreneurship while ensuring protection. Startups and policymakers should work together to ensure that regulations keep pace with technological advancements. It is not simple to build trust. It's harder if startups develop digital technologies for the government and work in GovTech-related areas.

5.1 Future of Research

This study has enlightened on the challenges faced by startups in the regulatory environment with empirical study. Startups who want to bring their GovTech services and the current status of Lithuania. However, several points for future research can further advance understanding of the topic.

One potential area of future research is to investigate the effectiveness of various regulatory frameworks in promoting innovation and entrepreneurship as a comparative study. While conducting a comparative analysis of different regulatory studies across Europe, the study can assess their impact on the success rate of the startup ecosystem. Moreover, the research could explore how policymakers can design regulations for the numerous startups in their ecosystem.

Another potential area of future research is to examine the perspective of the GovTech users. As data privacy concerns continue to grow, understanding how startups can comply with relevant laws and regulations while still encouraging users to adapt their technology. This could involve conducting case studies of startups that have implemented effective and newly established GovTech technologies.

Overall, there are several promising further topics in the field of startups and the regulatory environment. By continuing to investigate these topics, literature can gain a deeper understanding of the challenges and opportunities faced by startups in navigating

the regulatory environment and developing better strategies to promote innovation and entrepreneurship.

References

[1] Capgemini,Sogeti,IDC, Politecnico di Milano, "eGovernment Benchmark 2022," European Commission, Brussels, 2022.

[2] European Union, "Complete guide to GDPR compliance," GDPR EU, 2020. [Online]. Available: https://gdpr.eu/. [Accessed 01 05 2023].

[3] TUFTS, "General Data Protection Regulation (GDPR)," TUFTS EDU, 2021. [Online]. Available: https://access.tufts.edu/general-data-protection-regulation-gdpr. [Accessed 01 05 2023].

[4] Moore, "Doing Business In Lithuania 2019," Moore, London, 2019.

[5] J. E. Bessen, S. M. Impink, L. Reichensperger and R. Seamans, "GDPR and the Importance of Data to AI Startups," *NYU Stern School of Business,* vol. 33, no. 1, pp. 1-15, 2020.

[6] J. Huddleston, "The Price of Privacy: The Impact of Strict Data Regulations on Innovation and More," 3 June 2021. [Online]. Available: https://www.americanactionforum.org/insight/the-price-of-privacy-the-impact-of-strict-data-regulations-on-innovation-and-more/. [Accessed 03 May 2023].

[7] S. Kalache, "Startups GDPR Compliance," 20 April 2022. [Online]. Available: https://sifted.eu/articles/startups-gdpr-compliance. [Accessed 6 April 2023].

[8] W. M. C. Nicole V. Crain, "The Impact of Regulatory Costs on Small Firms," SBA Office of Advocacy, Easton,PA, 2010.

[9] Atomico, "The State of European Tech 2020," Atomico, -, 2020.

[10] Palantir, "About Palantir," [Online]. Available: https://www.palantir.com/about/. [Accessed 28 03 2023].

[11] L. P. Ian Johnston, "German states rethink reliance on Palantir technology," 10 03 2023. [Online]. Available: https://www.ft.com/content/790ee3ae-f0d6-4378-9093-fac553c33576. [Accessed 2023 03 28].

[12] W. L. B. Kim, "Business Sustainability of Start-Ups Based on Government Support: An Empirical Study of Korean Start-Ups," *Seoul Business School, Seoul School of Integrated Sciences and Technologies (aSSIST),* vol. 11, no. 18, pp. 1-20, 2019.

[13] C. Álvarez, J. E. Amorós and D. Urbano, "Regulations and Entrepreneurship: Evidence from developed and developing countries," *Revista Innovar Journal,* vol. 24, pp. 81-87, 2014.

[14] R. Keat and J. Urry, Social Theory as Science, London: Routledge, 1975.

[15] R. K. Yin, Case Study Research Design and Methods, California: Sage Publications, 2014.

[16] T. Hollweck, "Robert K. Yin. (2014). Case Study Research Design and Methods (5th ed.).Thousand Oaks, CA: Sage. 282 pages.," *Canadian Journal of Program Evaluation,* vol. 30, no. 1, pp. 1-5, 2016.

[17] N. Denzin, An Introduction to Triangulation, Geneva: UNAIDS, 2010.

[18] P. Bhandari, "Triangulation in Research | Guide, Types, Examples," 3 January 2022. [Online]. Available: https://www.scribbr.com/methodology/triangulation/. [Accessed 3 May 2023].

[19] N. J. Matiasz, J. Wood, P. Doshi, W. Speier, B. Beckemeyer, W. Wang, W. Hsu and A. J. Silva, "ResearchMaps.org for integrating and planning research," *Plos One*, vol. 13, no. 5, pp. 1-25, 2018.

[20] J. A. Hatch, Doing Qualitative Research in Education Settings, New York: State University of New York Press, 2002.

[21] R. S. G. Sharan B. Merriam, Qualitative Research in Practice: Examples for Discussion and Analysis, Jossey-Bass, 2019.

[22] J. Daly, A. Kellehear and M. Gliksman, The Public Health Researcher: A Methodological Guide, Oxford University Press, 1997.

[23] R. E. Boyatzis, Transforming Qualitative Information: Thematic Analysis and Code Development, California: Sage Publications, 1998.

[24] V. Braun and V. Clarke, "Using thematic analysis in psychology. Qualitative Research in Psychology," *UWE Bristol*, vol. 3, no. 2, pp. 77-101, 2006.

[25] J. D. Creswell and J. W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, California: Sage, 2017.

[26] S. Baškarada, Qualitative Case Study Guidelines, Victoria: oint and Operations Analysis Division DSTO Defence Science and Technology Organisation, 2013.

[27] R. P. Haigh, P. D. Amaratunga and C. Pathirage, "Knowledge management research within the built environment: Research methodological perspectives," in *Conference: 5th International Postgraduate Conference in the Built and Human Environment*, Salford Quays, 2005.

[28] R. K. Yin, "Validity and Reliability of Case Study Research," *Qualitative Market Research: An International Journal*, vol. 6, no. 2, pp. 75-86, 2003.

[29] P. Oliver, Purposive Sampling, Gateshead: Sage, 2006.

[30] GovTech Lab, "Here's How Tech Startups Are Shaking up Lithuania's Public Sector," GovTech Lab, 10 Mar 2021. [Online]. Available: https://govtechlab.lt/govtech-lab-wins-innovation-in-politics-award/. [Accessed 23 02 2023].

[31] GovTech Lab, "About- What is GovTech La?," GovTech Lab, 2023. [Online]. Available: https://govtechlab.lt/about/. [Accessed 05 04 2023].

[32] A. Cavoukian, "Privacy by Design," Information and Privacy Commissioner of Ontario, Ontario, 2011.

[33] N. Martin, C. Matt, C. Niebel and K. Blind, "How Data Protection Regulation Affects Startup Innovation," *Information Systems Frontiers*, vol. 4, no. 2, pp. 1-18, 2019.

[34] M. Vyas, "8 Service industries that drive the on-demand economy," Peerbits, 18 January 2023. [Online]. Available: https://www.peerbits.com/blog/service-industries-that-drive-the-on-demand-economy.html. [Accessed 18 April 2023].

[35] S. Blank and B. Dorf, The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company, New Jersey: Wiley, 2020.

[36] N. Blumenthal, Interviewee, *What Is A Startup? The Ultimate Guide.* [Interview]. 16 October 2022.

[37] E. Ries, The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, New York: The Crown Business New York, 2011.

[38] C. B. v. Hippel, "Modeling a Paradigm Shift: From Producer Innovation to User and Open Collaborative Innovation," *Organization Science* , vol. 22, no. 6, pp. 1399-1417, 2011.

[39] J. Freeman and J. S. Engel, "Models of Innovation: Startups and Mature Corporations," *California Management Review,* vol. 50, no. 1, pp. 94-119, 2007.

[40] B. Bigliardi, A. I. Dormio and F. Galati, "The adoption of open innovation within the telecommunication industry," *European Journal of Innovation Management,* vol. 15, no. 1, pp. 27-54, 2012.

[41] F. Bertoni, M. G. Colombo and D. D. Grilli, "Venture Capital Financing and the Growth of New Technology-Based Firms: Correcting for Sample Self-Selection," in *New Frontiers in Entrepreneurship*, New York, Springer, 2010, pp. 689-709.

[42] M. G. Colombo and E. Piva, "Strengths and Weaknesses of Academic Startups: A Conceptual Model," *IEEE Transactions on Engineering Management,* vol. 55, no. 1, pp. 37-49, 2008.

[43] I. Saguy and V. Sirotinskaya, "Challenges in exploiting open innovation's full potential in the food industry with a focus on small and medium enterprises (SMEs)," *Trends in Food Science & Technology,* vol. 38, no. 2, pp. 136-148, 2014.

[44] M. J. Hoogstraaten, K. Frenken and W. P. Boon, "The study of institutional entrepreneurship and its implications for transition studies," *Environmental Innovation and Societal Transitions,* vol. 36, no. 2, pp. 114-136, 2020.

[45] V. Gupta, I. C. MacMillan and G. Surie, "Entrepreneurial Leadership: Developing and Measuring a Cross-Cultural Construct," *Journal of Business Venturing,* vol. 19, no. 2, pp. 241-260, 2004.

[46] C. Yavuz, «Işletmelerde İnovasyon - Performans İlişkisinin İncelenmesine Dönük Bir Çalışma,» *Girisimcilik ve Kalkinma Dergisi,* cilt 5, no. 2, pp. 143-174, 2010.

[47] H. Iyidemirci, "Girisimcilik Ve Inovasyon Stratejisinin Ulke Kalkinmasina Etkileri: Desteklene Girisimcilik ve Inovasyon Kulturunun Rekaetci Ustunluk Elde Etmede Araci Rolu," Gazi Universitesi, Ankara, 2019.

[48] R. Huggins and P. Thompson, "Entrepreneurship, innovation and regional growth: a network theory," *Small Business Economics,* vol. 45, no. 1, pp. 103-128, 2015.

[49] GEM (Global Entreprenuership Monitor), "How GEM Defines Entreprenuership," GEM, [Online]. Available: https://www.gemconsortium.org/wiki/1149. [Accessed 12 March 2023].

[50] OECD, "Entrepreneurship at a Glance," OECD, 2017.

[51] S. Blank, Interviewee, *A Startup Conversation with Steve Blank.* [Interview]. 28 August 2012.

[52] IKA, "Gaziantep Girisimcilik Ekosisteminin Gelistirilme Stratejisi," Idema, Gaziantep, 2018.

[53] C. Gallo, The Innovation Secrets of Steve Jobs: Insanely Different Principles for Breakthrough Success, Houston, TX: McGraw Hill, 2010.

[54] Hunton Andrews Kurth, "CNIL Fines Apple 8 Million Euros Over Personalized Ads," -, 6 January 2023. [Online]. Available: https://www.huntonprivacyblog.com/2023/01/06/cnil-fines-apple-8-million-euros-over-personalized-ads/. [Accessed 20 January 2023].

[55] M. Burgess, "All the Data Apple Collects About You—and How to Limit It," 16 January 2023. [Online]. Available: https://www.wired.com/story/apple-privacy-data-collection/. [Accessed 16 January 2023].

[56] F. ÇAKIRÖZ, "Veri Gizliligi Algisinin Internet Kullanimina Etkisi: Gizlilik Politikalari Uzerinden Bir Inceleme," Istanul Universitesi, Istanbul, 2020.

[57] H. Oguz, "Elektronik Ortamda Kisisel Verilerin Korunmasi, Bazi Ulke Uygulamalari ve Ulkemizdeki Durum," in *Cag Universitesi - Elektronik Ticaret Hukuku Sempozyumu*, Ankara, 2013.

[58] Z. I. Ucgul and E. Ozun, "Türkiye'de Girişimcilik: Startup Hukuku ve Girişimcilere Yönelik Teşvik ve Destekler," Mondaq, Istanbul, 2022.

[59] J. Fingas, "Apple fined $8.5 million in France over targeted App Store ads," Engadget, 4 January 2023. [Online]. Available: https://www.engadget.com/apple-france-fine-app-store-targeted-ads-211750930.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAJ5qzt6h3hoNG-L831VNQ07_1F8BfPIYeXKZ4i4Whyz0SVoO7eLoWeQ1wTX4GFoiiqi2uVfP5e_m_LQDOEN193x9B7glQ. [Accessed 16 January 2023].

[60] S. Perez, "Apple faces new lawsuit over its data collection practices in first-party apps, like the App Store," Techcruch, 14 Novemer 2022. [Online]. Available: https://techcrunch.com/2022/11/14/apple-faces-new-lawsuit-over-its-data-collection-practices-in-first-party-apps-like-the-app-store/. [Accessed 16 January 2023].

[61] S. Karlidag, "Ekonomi Politik Açıdan Kişisel Verilerin Korunması," *Amme Idaresi Dergisi,* vol. 46, no. 1, pp. 127-152, 2013.

[62] C. Álvarez, J. E. Amorós and D. Urbano, "regulations and Entrepreneurship:Evidence from developed and developing countries," *Revista Innovar Journal,* vol. 24, no. 1, pp. 81-89, 2014.

[63] A. Salinas, C. Ortiz and M. Muffatto, "Business regulation, rule of law and formal entrepreneurship: evidence from developing countries," *Journal of Entrepreneurship,* vol. 8, no. 2, pp. 254-271, 2019.

[64] D. KILINÇ, "Anayasal bir hak olarak kişisel verilerin korunması," *Ankara Üniversitesi Hukuk Fakültesi Dergisi,* vol. 61, no. 3, pp. 1089-1172, 2012.

[65] I. Gursel, "Protection Of Personal Data In International Law And The General Aspects Of The Turkish Data Protectıon Law," *D.E.Ü. Hukuk Fakültesi Dergisi,* vol. 18, no. 1, pp. 33-61, 2016.

[66] R. N. Savas, "KVKK VE GDPR Kapsaminda Firmalarin Mevcut Durum Analizi Uzerine Bir Inceleme," Istanbul Ticaret Universitesi, Istanbul, 2020.

[67] Official Journal of the European Union, "General Data Protection Regulation," Intersoft Consulting, 04 May 2016. [Online]. Available: https://gdpr-info.eu/. [Accessed 05 April 2023].

[68] UK ICO, "Right to rectification," ICO, 201. [Online]. Available: https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/individual-rights/right-to-rectification/. [Accessed 12 April 2023].

[69] R. Bateman, "GDPR Compliance for Startups," TermsFeed, 2016.

[70] D. G. Ali Güden, "Kişisel Verilerin Korunması Kanunu "KVKK" ve Genel Veri Koruma Yönetmeliği "GDPR" Üzerine Karşılaştırma," Guden Uluslararasi Hukuk Burosu, Londra, 2022.

[71] J. McCahery and E. P. M. Vermeulen, "High-Tech Start-Ups in Europe: The Effect of Regulatory Competition on the Emergence of New Business Forms," *European Law Journal*, vol. 7, no. 4, pp. 459-481, 2008.

[72] Iubenda, "What does the GDPR actually mean for Startups," Iubenda, 25 May 2022. [Online]. Available: https://www.iubenda.com/en/help/7389-what-does-the-gdpr-actually-mean-for-startups. [Accessed 9 March 2023].

[73] Is Girisim, "Is girisim sermayesi yatirim ortakligi kisisel verilein kournmasi ve gizlilik politakasi raporu," Is girisim, Ankara, 2018.

[74] Y. Vural, "Kurumsal bilgi güvenliği ve sızma (penetrasyon) testleri," Gazi Universitesi, Ankara, 2007.

[75] Headmind Partners, "Cybersecurity in the EU: European Commission's Strategy and Legislation," Headmind Partners, 14 October 2022. [Online]. Available: https://www.headmind.com/en/cybersecurity-in-the-eu-european-commissions-strategy-and-legislation/. [Accessed 02 April 2023].

[76] European Commission, "Proposal for directive on measures for high common level of cybersecurity across the Union," European Commission, Brussels, 2020.

[77] ENISA, "Law on network and inforrmation security for domain name systems and certain digital services," ENISA, Athens, 2018.

[78] D. Dunkelberger, "Understanding the EU Cybersecurity Act and Its Effect on Businesses," IS Partners, Philadelphia, 2022.

[79] Eurostat, "Use of Internet of Things in enterprises," May 2022. [Online]. Available: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_Internet_of_Things_in_enterprises. [Accessed 02 April 2023].

[80] European Commission, "Regulatory framework proposal on artificial intelligence," 28 September 2022. [Online]. Available: https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai. [Accessed 26 February 2023].

[81] O. Kartoz, "Yapay Zeka ve Özel Yaşamın Gizliliği Raporu," Startup hukuku, Istanbul, 2018.

[82] J.-P. B. Philipp S. Krüger, "The European Union, Cybersecurity, and the Financial Sector: A Primer," Carnegie Endowment for International Peace, Germany, 2021.

[83] Access Now, European Digital Rights (EDRi), "Joint statement: The EU AI Act must protect people on the move," Accessnow, 6 December 2022. [Online]. Available: https://www.accessnow.org/press-release/joint-statement-ai-act-people-on-the-move/. [Accessed 23 April 2023].

[84] Open Access News, "An increase in cyber attack fines highlights firms' need to tighten security," Open Access Government, 9 September 2022. [Online]. Available: https://www.openaccessgovernment.org/cyber-attack-fines/143199/. [Accessed 26 February 2023].

[85] ENISA, "NIS Directive tool," ENISA, 2020. [Online]. Available: https://www.enisa.europa.eu/topics/cybersecurity-policy/nis-directive-new/nis-visualtool. [Accessed 03 March 2023].

[86] K. Sen, "List of Cybersecurity Regulations in the European Union," UpGuard, 2023.

[87] The World Bank, "Doing Business 2020," The World Bank Group, Washington, 2020.

[88] W. M. Crain and N. V. Crain, "The Impact of Regulatory Costs on Small Firms," SBA Office of Advocacy, Easton, 2010.

[89] R. Browne, "Fines for breaches of EU privacy law spike sevenfold to $1.2 billion, as Big Tech bears the brunt," 18 January 2022. [Online]. Available: https://www.cnbc.com/2022/01/18/fines-for-breaches-of-eu-gdpr-privacy-law-spike-sevenfold.html. [Accessed 26 February 2023].

[90] Cledara, "GDPR Fines and Lessons for Startups," 6 January 2020. [Online]. Available: https://www.cledara.com/blog/gdpr-fines-and-lessons-for-startups. [Accessed 26 February 2023].

[91] V. Dilsiz, "Türkiye'de Yasal Regülasyonlar Bağlamında Girişimcilik," *İstanbulMarka Bilim Topluluğu,* 2020.

[92] Ş. M. Ersungur and A. Takim, "Türkiye'de Teşvik Sisteminin Yapısı, Sorunları Ve Etkinliği Üzerine Bir Politika Önerisi: Tek Bir Uygulamacı Kuruluş Sorunları Çözer mi?," *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi,* vol. 32, no. 3, pp. 725-744, 2018.

[93] E. U. Ozek, "Devlet Destekli Yatırım Projelerinde Yatırımcının Yaptığı Hatalar ve Karşılaşılan Sorunlar ve TRB1 Bölgesinde Uygulama," Uludag Universitesi, Bursa, 2018.

[94] W. Lee and B. Kim, "Business Sustainability of Start-Ups Based on Government Support: An Empirical Study of Korean Start-Ups," *Seoul Business School, Seoul School of Integrated Sciences and Technologies (aSSIST),* vol. 11, no. 4851, pp. 2-20, 2019.

[95] M. A. Maaloufaalouf, "This Is Not Child's Play The Regulation of Connected Toys in the EU and U.S.," *Dans Archives de philosophie du droit ,* vol. 59, no. 1, pp. 221-236, 2017.

[96] AFP, "Germany bans internet-connected 'spying' doll Cayla," 18 February 2017. [Online]. Available: https://phys.org/news/2017-02-germany-internet-connected-spying-doll-cayla.html. [Accessed 03 April 2023].

[97] K. Collins, "That smart doll could be a spy. Parents, smash!," 17 February 2017. [Online]. Available: https://www.cnet.com/tech/computing/parents-told-to-destroy-connected-dolls-over-hacking-fears/. [Accessed 04 April 2023].

[98] D. v. B. Dolnicar, "The evolution of Airbnb regulations, in S. Dolnicar (Ed.) Airbnb before, during and after COVID-19," *University of Queensland,* 2021.

[99] Airbnb, "Airbnb welcomes EU rules proposals," 7 November 2022. [Online]. Available: https://news.airbnb.com/airbnb-welcomes-eu-rules-proposals-%EF%BF%BC/. [Accessed 20 February 2023].

[100] J. McCahery and E. P. M. Vermeulen, "High-Tech Start-Ups in Europe: The Effect of Regulatory Competition on the Emergence of New Business Forms," *European Law Journal,* vol. 7, no. 4, pp. 459-481, 2008.

[101] Commission of the European Communities, "Overcoming the stigma of business failure – for a second chance policy," 5 October 2007. [Online]. Available: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0584:FIN:en:PDF. [Accessed 27 March 2023].

[102] H. Duran, "Devletin Girisimcilik Desteklerinin Turkiye Girisimcilik Ekosistemi Uzerine Etkisi," Dokuz Eylul Universitesi, Izmir, 2016.

[103] TEPAV; IZKA, "Izmir Local Entreprenuership Ecosystem Strategy Document," IZKA, Izmir, 2012.

[104] T. Bates, Minority Entrepreneurship 2.0, Hanover: Publishers Inc., 2022.

[105] UNCTAD, "The UNCTAD Entrepreneurship Policy Framework and its implementation," in *United Nations Conference on Trade and Development*, Geneva, 2013.

[106] L. Stevenson and A. Lundström, Entrepreneurship Policy for the Future, Stockholm: Swedish Foundation for Small Business Research, 2001.

[107] I. Verheul, A. v. Stel and R. Thurik, "Explaining Female and Male Entrepreneurship at the Country Level," *Entrepreneurship and Regional Development,* vol. 18, no. 2, pp. 4-54, 2006.

[108] I. Pekarskiene, J. Bruneckiene, R. Daugeliene and L. Peleckiene, "The Impact of Competition Policy on the National Economy of a Country with a," *Inzinerine Ekonomika-Engineering Economics,* vol. 29, no. 1, pp. 72-83, 2018.

[109] K. Suominen, "On the Rise: Europe's Competition Policy Challenges to Technology Companies," CSIS, Washington, 2020.

[110] T. d. Lange, "Welcoming talent? A comparative study of immigrant entrepreneurs' entry policies in France, Germany and the Netherlands," *Comparative Migration Studies,* vol. 6, no. 27, pp. 2-18, 2018.

[111] F. Istad, "Start-Up Visa: Rethinking Entrepreneurship and Human Capital in Immigration Policy," *Asian Journal of Innovation and Policy,* vol. 11, no. 1, pp. 30-50, 2022.

[112] M. Carella, "Migrants and startups: a match made in the EU," EU-Startups, 2019.

[113] European Migration Network (EMN), "Migratory Pathways for Start-Ups and Innovative Entrepreneurs in the European Union," EMN, 2019.

[114] European Commission, "Research and Innovation," European Commission, [Online]. Available: https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en. [Accessed 04 April 2023].

[115] European Commission, "EASME - Executive Agency for SMEs," European Commission, 1 April 2021. [Online]. Available: https://ec.europa.eu/easme/en/. [Accessed 4 April 2023].

[116] European Commission, "Shaping Europe's digital future," European Commission, 25 March 2020. [Online]. Available: https://digital-strategy.ec.europa.eu/en/news/startup-europe-growth-h2020-projects. [Accessed 10 March 2023].

[117] C. Jenner, "Business and Education: Powerful Social Innovation Partners," *Stanford Social Innovation Review,* pp. 2-4, 2012.

[118] Y. Yurtay, O. Utar, A. Cakici and D. S. Erat, "E-Devlet Kullaniminda Turkiye ve Norvec Modeli Karsilastirmasi, Veri Madenciligi Ornegi," *Akademik Bilisim,* vol. 4, no. 1, pp. 1-7, 2015.

[119] M. Yildiz, "Elektronik E-devlet Kuram ve Uygulamasına Genel Bir Bakış ve Değerlendirme," in *Cagdas Kamu Yonetimi,* Istanbul, Atlas Nobel, 2003, pp. 37-48.

[120] Interreg Europe, "GovTech and digitalising the public sector," in *GovTech and digitalising the public sector,* 2022.

[121] M. Pattinson and A. Morisson, "GovTech and the Digitalisation of the Public Sector," in *GovTech and digitalising the public sector,* 2022.

[122] J. Hugill, "The European GovTech : 150 Startups that Driving Europe's GovTech Revolution," 2013. [Online]. Available: https://view.publitas.com/public-1/the-european-govtech-150-the-startups-driving-europes-govtech-revolution/page/2-3. [Accessed 10 April 2023].

[123] Hub, "Archii," Hub, 2013. [Online]. Available: https://thehub.io/startups/archii. [Accessed 04 April 2023].

[124] Crunchbase, "Archii," Crunchbase, 1 January 2019. [Online]. Available: https://www.crunchbase.com/organization/archii. [Accessed 12 April 2023].

[125] Fintechnews Switzerland, "6 Govtech Startups in Europe to Watch with Fintech Focus," Fintechnews Switzerland, 29 July 2019. [Online]. Available: https://fintechnews.ch/govtech/6-govtech-startups-in-europe-to-watch-with-fintech-focus/29463/. [Accessed 10 April 2023].

[126] Novoville, "Shaping the future ofgovernment-citizen interactions," Novoville, [Online]. Available: https://novoville.com/home/about-us/. [Accessed 30 March 2023].

[127] European Commission, "Specialised international student recruitment management platform," CORDIS- European Commission, 19 November 2018. [Online]. Available: https://cordis.europa.eu/project/id/836990. [Accessed 03 April 2023].

[128] European Commission, "EU eGovernment Action Plan 2016-2020," 19 April 2016. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016DC0179. [Accessed 19 April 2023].

[129] Public Tech Lab, "IE Govtech List," 2020. [Online]. Available: https://docs.ie.edu/publicteclab/IE_GovTechList_PublicTechLab.pdf. [Accessed 23 March 2023].

[130] European Commission, "The Digital Europe Programme," European Commission, 23 March 2023. [Online]. Available: https://digital-strategy.ec.europa.eu/en/activities/work-programmes-digital. [Accessed 12 April 2023].

[131] J. Bletz, "Molenwaard: the world's first digital municipality," 14 June 2016. [Online]. Available: https://joinup.ec.europa.eu/collection/egovernment/document/molenwaard-worlds-first-digital-municipality. [Accessed 9 March 2023].

[132] Founders Intelligence, "GovTech — Is Europe missing out (again)?," Accenture, 2022. [Online]. Available:

https://www.foundersintelligence.com/insights/govtech-is-europe-missing-out-again/. [Accessed 3 April 2023].

[133] European Commission, "Ministerial Declaration on eGovernment - the Tallinn Declaration," 06 October 2017. [Online]. Available: https://digital-strategy.ec.europa.eu/en/news/ministerial-declaration-egovernment-tallinn-declaration. [Accessed 04 April 2023].

[134] A. Biligli, "Sosyal Girisimcilik ve Yasal Statu: Sosyal Girisimcilik Uzerine Arastirma," Marmara Universitesi, Istanbul, 2020.

[135] European Commission, "eGovernment Benchmark 2017," European Commission, 2017.

[136] H. A. Karasoy and P. Babaoglu, "Türkiye'de Elektronik Devletten Dijital Devlete Doğru," *Karadeniz Sosyal Bilimler Dergisi,* vol. 12, no. 23, pp. 115-135, 2020.

[137] European Commission, "€1.3 billion from the Digital Europe Programme for Europe's digital transition and cybersecurity," European Commission, 24 March 2023. [Online]. Available: https://digital-strategy.ec.europa.eu/en/news/eu13-billion-digital-europe-programme-europes-digital-transition-and-cybersecurity. [Accessed 28 March 2023].

[138] M. M. I. U. P. a. M. A. Kuziemski, "GovTech Practices in the EU," Joint Research Center- Publications Office of the European Unio, Luxembourg, 2022.

[139] J. Anbouba, F. Chiarelli, A. Christiaens, B. Kudzmanaite, F. Moreau, L. Peigna, A. Zamboni and Civocracy, "European GovTech Radar," Civocracy , 2020.

[140] P. Allen, "The rise of GovTech: Why startups should work with governments," 04 August 2022. [Online]. Available: https://www.eu-startups.com/2022/08/the-rise-of-govtech-why-startups-should-work-with-governments-sponsored/. [Accessed 02 April 2023].

[141] European Commission, "eGovernment Benchmark : Taking stock of user-centric design and delivery of digital public services in Europe," European Commission, 2017.

[142] European Commission, "The Digital Economy and Society Index (DESI)," European Commission, 6 January 2023. [Online]. Available: https://digital-strategy.ec.europa.eu/en/policies/desi. [Accessed 8 March 2023].

[143] GovTech Lab, "What is GovTech Lab," GovTech Lab, 2019. [Online]. Available: https://govtechlab.lt/about/. [Accessed 5 March 2023].

[144] Capgemini, Sogeti, IDC and Politecnico di Milano, "eGovernment Benchmark 2022 Synchronising Digital Governments," European Commission, Milano, 2022.

[145] T. Kalvet, "Innovation: A factor explaining e-government success in Estonia," *Electronic Government, An International Journal,* vol. 9, no. 2, pp. 142-157, 2012.

[146] GovTech Lab, "Govtech Lithuania 2020 a year of growth for GovTech ecosystem in Lithuania," GovTech Lab & MITA, Vilnius, 2020.

[147] K. Naghizade, "E-Devlet Portallarının Kullanılabilirlik Açısından Karşılaştırılması: Türkiye, Azerbaycan, Rusya, Kazakistan, Gürcistan, Ukrayna, Moldova, Letonya, Litvanya Örnekleri," Sakarya Universitesi, Sakarya, 2019.

[148] G. Lab, "GovTech Lithuania 2021: Overview of Challenges and Solutions," Mita & GovTech Lab, Vilnius, 2021.

[149] Okredo, "Open Data Platform," Okredo, [Online]. Available: https://okredo.com/en-lt. [Accessed 8 April 2023].

[150] Trafi, "Trafi Vilnius," Trafi, 2017. [Online]. Available: https://web.trafi.com/vilnius/. [Accessed 17 March 2023].

[151] Turing College, "Upskill yourself with Lithuanian Employment Service (UZT)," Turing College, 2022. [Online]. Available: https://www.turingcollege.com/uzt-funding. [Accessed 06 January 2023].

[152] BitDegree, "The BitDegree Story," BitDegree, [Online]. Available: https://www.bitdegree.org/about-us. [Accessed 06 January 2023].

[153] BitDegree, "Common Scientific and Business Projects," BitDegree, 01 October 2018. [Online]. Available: https://www.bitdegree.org/eu-projects. [Accessed 06 January 2023].

[154] A. Riani, "The Biggest Challenges Faced By Startups," Forbes, 2021.

[155] P. Allen, "5 Important lessons the public sector can learn from unicorns," 11 July 2022. [Online]. Available: https://www.eu-startups.com/2022/07/5-important-lessons-the-public-sector-can-learn-from-unicorns-sponsored/. [Accessed 8 February 2023].

[156] R. Rudokienė, "Country Guide Lithuania," 2020. [Online]. Available: https://startupuniversal.com/country/lithuania/. [Accessed 20 April 2023].

[157] OECD, "Indicators of Regulatory Policy and Governance 2021," OECD, 2021.

[158] Ministry of Economy and Innovation, "Better Regulation in Lithuania," 09 September 2020. [Online]. Available: https://eimin.lrv.lt/en/sector-activities/business-environment/better-regulation-in-lithuania. [Accessed 19 March 2023].

[159] OECD, "Ease of Doing Business In Lithuania," 2019. [Online]. Available: https://archive.doingbusiness.org/en/data/exploreeconomies/lithuania#. [Accessed 30 March 2023].

[160] VMI , "OSS (One Stop Shop)," 1 January 2022. [Online]. Available: https://www.vmi.lt/evmi/en/moss-mini-one-stop-shop-. [Accessed 02 February 2023].

[161] E. Kvedaravičiūtė, "Developing fintech sector in Lithuania: Regulatory sandbox," Lietuvos Bankas, Vilnius, 2022.

[162] Invest Lithuania, "The FinTech Lnadscape in Lithuania," Invest Lithuania, Vilnius, 2022.

[163] TransferGo, "Our terms & conditions," TransferGo, 09 October 2018. [Online]. Available: https://www.transfergo.com/terms-conditions/transfergo-ltd. [Accessed 05 April 2023].

[164] M. Denysiuk, "Lithuanian VC Practica Capital launches new €70M fund," Ain, December 2022. [Online]. Available: https://ain.capital/2022/12/23/lithuanian-vc-practica-capital-launches-new-e70m-fund/. [Accessed 23 March 2023].

[165] K. Kvainauskas, "Why Ecovis? Why Lithuania?," [Online]. Available: https://www.ecovis.com/lithuania/fintech/why-ecovis-why-lithuania/. [Accessed 20 April 2023].

[166] OneTrust DataGuidance, "Lithuania Data Protection," April 2022. [Online]. Available: https://www.dataguidance.com/notes/lithuania-data-protection-overview. [Accessed 06 April 2023].

[167] European Data Protection Board, "Lithuanian DPA issues EUR 12,000 fine for infringements of the General Data Protection Regulation in application “Karantinas” (Quarantine)," 29 March 2021. [Online]. Available: https://edpb.europa.eu/news/national-news/2021/lithuanian-dpa-issues-eur-12000-fine-infringements-general-data-protection_en. [Accessed 9 March 2023].

[168] BNS, "Lithuanian govt proposes to fine directors of cyber-insecure institutions," 28 March 2018. [Online]. Available: https://www.delfi.lt/en/politics/lithuanian-govt-proposes-to-fine-directors-of-cyber-insecure-institutions.d?id=77560529. [Accessed 18 February 2023].

Appendix 1 – Non-exclusive licence for reproduction and publication of a graduation thesis[1]

I Ebru Shentyurk

1. Grant Tallinn University of Technology free licence (non-exclusive licence) for my thesis " Data Protection Regulations Effect on Startups: GovTech Ecosystem in Lithuania ", supervised by Richard Michael Dreyling III
   1.1. to be reproduced for the purposes of preservation and electronic publication of the graduation thesis, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright;
   1.2. to be published via the web of Tallinn University of Technology, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright.
2. I am aware that the author also retains the rights specified in clause 1 of the non-exclusive licence.
3. I confirm that granting the non-exclusive licence does not infringe other persons' intellectual property rights, the rights arising from the Personal Data Protection Act or rights arising from other legislation.

[07.05.2023]

1 The non-exclusive licence is not valid during the validity of access restriction indicated in the student's application for restriction on access to the graduation thesis that has been signed by the school's dean, except in case of the university's right to reproduce the thesis for preservation purposes only. If a graduation thesis is based on the joint creative activity of two or more persons and the co-author(s) has/have not granted, by the set deadline, the student defending his/her graduation thesis consent to reproduce and publish the graduation thesis in compliance with clauses 1.1 and 1.2 of the non-exclusive licence, the non-exclusive license shall not be valid for the period.

Appendix 2 – Interview Questions

A) Questions for startups

1. How did you perceive cyber security regulatory compliance as a significant barrier to growth for startups? What specific challenges had you encountered in this regard?

2. What ethical and legal considerations did you take into account when collecting and using personal data for cyber security concerns, and how did you ensure compliance with relevant laws and regulations?

3. How had recent legislative changes related to data privacy and intellectual property rights impacted your startup, and what were the implications for the future of innovation and entrepreneurship?

4. As a startup, how did you balance your need for innovation and agility with your responsibility to protect your customers' data and privacy? What steps did you take to ensure you are meeting both needs effectively?

5. Did you have any collaborations with other stakeholders, such as investors, regulators,and cybersecurity experts, to enhance your startup's cybersecurity posture?

B) Questions for Ministry of National Defense

1. How does the Ministry of Defence work with other government agencies and international partners to coordinate cybersecurity and regulations?

2. In the modern world, national security threats are not only physical attacks but also cyber attacks, too. How does the Ministry take into consideration of cyber security as national security concern?

3. As another Baltic country, Estonia, mostly prefers National solutions for their cyber security and data privacy tools as a national security strategy. Do you have any tendencies toward this?

4. Have the Ministry of National Defence got any program or any collaboration with startups? (e.g. CIA IN-Q-TEL / UK MI6 program) Or do you planning to get closer to start-ups that provide cybersecurity solutions?

5. What advice would you give to startups operating in the cybersecurity space who want to ensure they are compliant with national security regulations?

C) Questions for Ministry of Economy and Innovation

1. How can policymakers balance the need for consumer protection with the imperative to foster competition and growth in the startup ecosystem?

2. What steps are being taken to ensure that regulations keep pace with technological advancements?

3. How can policymakers engage with startups to ensure that regulations remain relevant and effective?

4. In your opinion, what are the main cybersecurity challenges faced by startups, and how can policymakers assist in addressing them?

5. How does your Ministry prioritize and support the growth of startups in its policymaking?

Appendix 3 – Thematic Map Representation of Interview Outcome

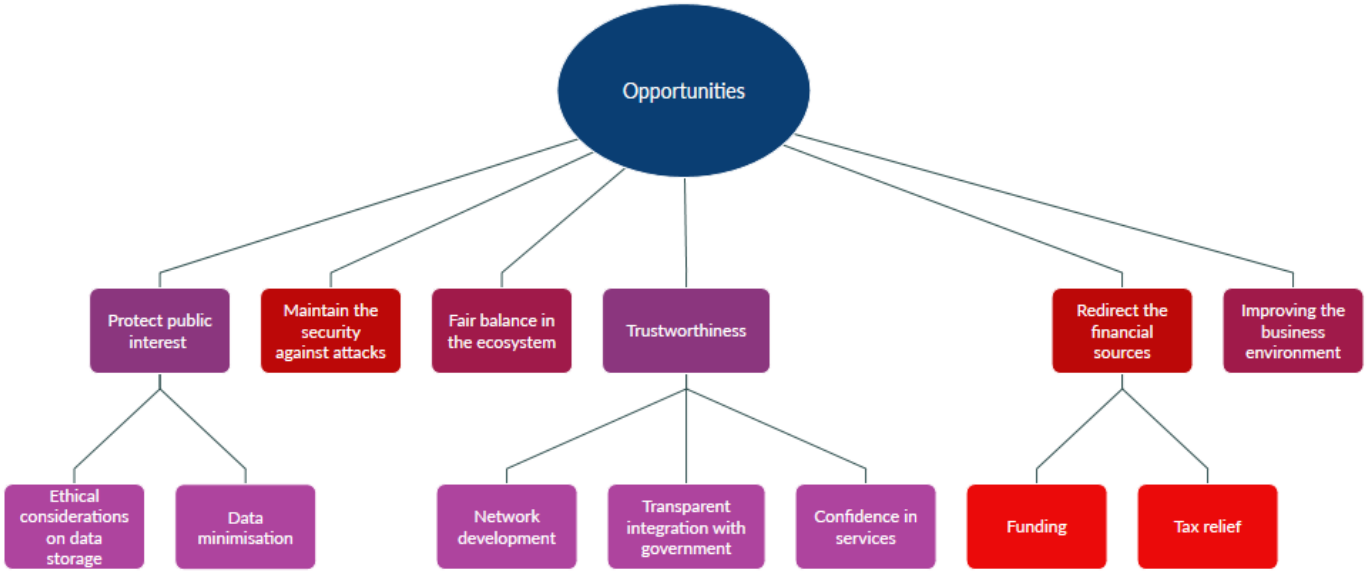

Figure 7 Key Opportunities from the Interviews

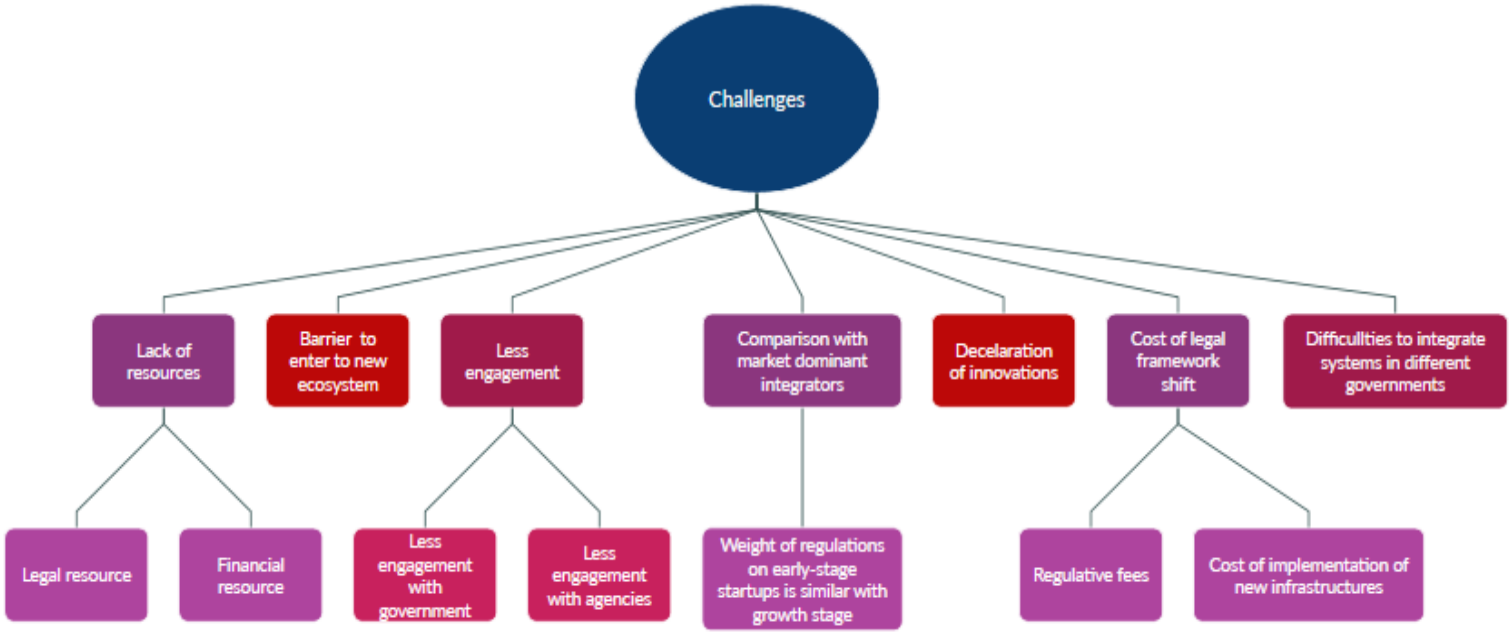

Figure 8 Key Challenges from the interviews

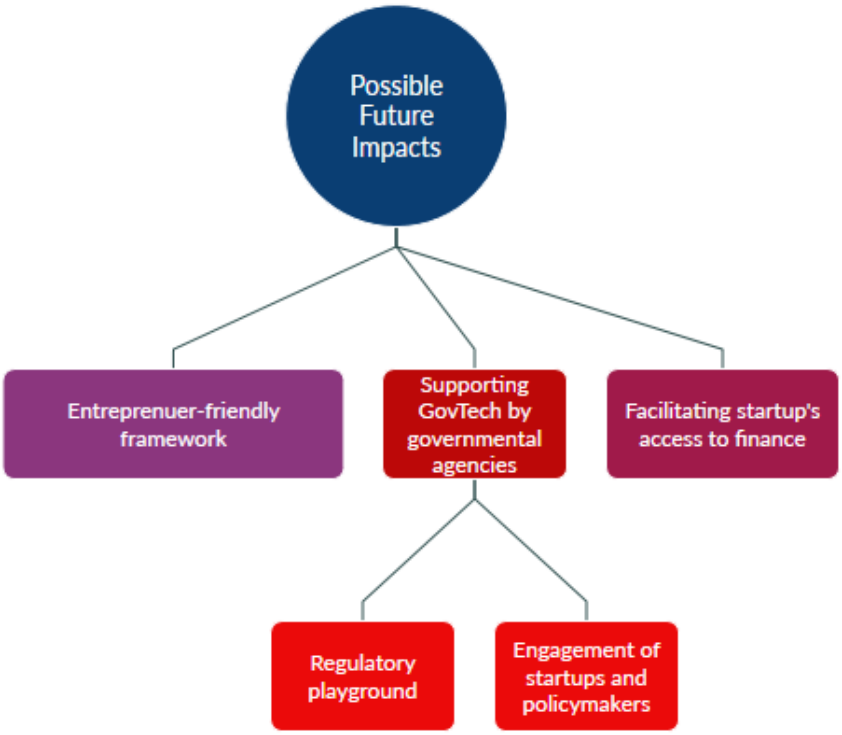

Figure 9 Key Outcomes from Interviews