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Exploring the attitudes of Estonian working-age population towards emerging mobile e-government channels: mGov app and EU Wallet

Master's thesis

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Eesti tööealise elanikkonna suhtumise uurimine tärkavatesse mobiilsetesse e-valitsuse kanalitesse: mGov äpp ja EU Wallet

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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.

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Abstract

Mobile services are becoming an integral part of many governments' e-government service portfolios. Research focusing on the adoption of these services has been centred around countries with developing economies, and the user adoption mechanisms of m-government services in countries with high e-governance maturity have not been thoroughly researched yet. The main objective of this thesis is to research the opinions of the Estonian working-age population towards two new mobile channels of e-government service provision: an mGov app and the EU Wallet. Estonia was chosen due to its unique position: the country's high e-government maturity and no existing m-government apps. The research is guided by the Unified Theory of Acceptance and Use of Technology, and the research objectives are reached through a mixed method approach: 296 questionnaire responses are collected among the Estonian working-age population and 5 semi-structured one-on-one interviews are conducted with Estonian e-governance experts. The quantitative data is analysed through descriptive statistics in the SPSS tool, while Atlas.ti is used to conduct a thematic analysis of the qualitative data. The quantitative results show that digital documents, digital medical information, secure online identification, and digital wallet features are the most desired m-government functionalities. Qualitative data analysis shows that successful mGov and EU Wallet app adoption depends on the value that the apps are able to bring to the end users. Further research is required once the apps are developed and in use in Estonia.

Keywords: m-government, mGov, EU Wallet, mobile app, UTAUT, technology acceptance

This thesis is written in English language and is 69 pages long, including 7 chapters, 11 figures and 6 tables.

List of abbreviations and terms

ARF	Architecture and Wallet Reference Framework
eID	Electronic Identification
eIDAS	Electronic Identification, Authentication, and trust Services Regulation
EUDI	The European Digital Identity Regulation
ICT	Information and Communication Technology
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology

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1 Introduction

Mobile technology is becoming increasingly more accessible, as evidenced by the growing amount of habitual mobile device users. According to Eurostat (2024), 89.94% of Europeans used a smartphone or a tablet to access the internet in 2023, while only 73.30% did so in 2016. In addition to browsing the internet, mobile devices allow users to download apps; platforms such as Apple's App Store and Google's Play Store allow their users to choose from approximately 3.836 and 2.437 million apps respectively (Statista, 2024a; Statista, 2024b).

Apps providing e-government services are only beginning to appear and the public sector is still in the process of adapting to the societal change of using services through a mobile medium. The author has chosen the term "mGov app" to signify an app developed or procured by the government, which provides citizens and residents access to the country's e-government services.

In addition to the emerging national mGov apps, the European Union is planning to establish the EU Digital Identity Wallet (EU Wallet) in the next coming years, implementation of which will be mandatory for each Member State. According to the information available at the time of writing, the EU Wallet is planned to have functionalities that might overlap with the functionalities of some national mGov apps, e.g. holding digital identity documents (European Commission, 2023). Currently it is not yet clear what type of role will each Member State's implementation of the EU Wallet take parallel to their existing national mGov app(s).

By creating and implementing these apps, the European Union and its Member States are entering an era of mobile e-government service provision – together via the EU Wallet, and each member state separately through their own mGov app(s). As with any such change, it is important to study the user adoption mechanisms and the effects these apps will have on the end-users' life. As the user adoption mechanisms of mGov apps in developed countries are not yet studied in depth (Wirtz *et al.*, 2021), this thesis aims to shed light on Estonian working-age populations' attitudes and opinions towards two new

mobile e-government service provision channels: an mGov app and the EU Wallet. The research is guided by the Unified Theory of Acceptance and Use of Technology and supplemented with the opinions of Estonian subject matter experts from both public and private sectors.

1.1 Estonian context

Estonia is known for the country's high e-government maturity level (Lipinska *et al.*, 2021), which is reflected in the country's ranking in the e-Government Index (United Nations, Department of Economic and Social Affairs, 2022) and the GovTech Maturity Index (The International Bank for Reconstruction and Development / The World Bank, 2022). Regardless of a robust e-governance system, Estonia has yet to develop its own mGov app. However, there are plans to create one in the near future: Estonia's app "mRiik" (translated from Estonian, mState) is in the beginning stages of its development (Krjukov, 2024).

Estonia has been chosen as the EU Member State to conduct the research due to the country's unique position of being highly developed in the area of e-governance and not yet having its own mGov app in place. Additionally, since neither the mGov app nor the EU Wallet has been developed yet, Estonia is a suitable country to study the attitudes of the working-age people towards a new e-government service provision channel. By researching the above-mentioned attitudes in a country where such a channel does not exist yet, novelty bias and familiarity bias can be reduced and a more level playing field created for the research of the two apps (Wells *et al*., 2010; Greul *et al.,* 2023).

Studying these attitudes and adoption tendencies in Estonia is also relevant due to the country's high level of e-governance maturity, Estonia has an additional responsibility of a role model towards the rest of the world, and insights from Estonia could be also valuable elsewhere.

1.2 Research Motivation and Relevance

The author's decision to investigate mobile e-government apps stems from having closely followed the creation journey of Estonia's mGov app (mRiik) and participating in beta testing of said app since March 2023 (Majandus- ja Kommunikatsiooniministeerium,

2023). Testing the app provided the author firsthand experience of using an mGov app in the capacity of the available functionalities, which resulted in curiosity about how this new e-government service provision channel would be accepted by the Estonian people.

Additionally, Estonia will be expected to implement the EU Wallet once the Digital Identity Regulation enters into force (European Commission, n.d., a). Based on the information available at the time of writing, both apps will coexist in parallel to each other. As both of the apps are similar in nature and will be available to the Estonian people in the next few years, the author made the decision to include both in this research.

With mRiik and EU Wallet coming in a few years, Estonia is at the cusp of implementing a new way for its citizens and residents to stay connected with the government. Although it is currently possible to use some e-government services through a browser on a mobile phone, there has never been a "one-stop shop" app made by the government where a variety of public services are available. With an mGov app, there is potential to provide a more streamlined experience with the "anytime, anywhere" approach, and save time and effort for the citizens and governments alike (Parcell, 2015, as cited in Bicen & Shali, 2021).

Estonia is in a unique situation, and it is a special time in the country's e-governance journey, therefore it is a relevant moment to research the people's attitudes towards an upcoming channel of mobile m-government service provision and the particularities of its adoption.

1.3 Problem Statement

In order to develop and implement new technologies and services successfully, it is important to catalogue and analyse the factors that influence its acceptance and adoption. As m-government is still a relatively new development in the field of e-governance, it is necessary to make sure the upcoming mGov app and the EU Wallet bring value to the end users.

Otherwise, the developer, the state and the EU risk creating a product that fails to fulfil its role, potentially resulting in lost resources and lost goodwill. As there is a need for more research on m-government's development and acceptance, specifically in a

developed country (Wirtz *et al.*, 2021), this thesis seeks to alleviate the knowledge gap in the context of Estonia and Estonian working-age population.

1.4 Research Questions and Objectives

The aim of this thesis is to research the opinions and attitudes of Estonian working-age people towards two new mobile e-government service provision channels, which are a national mGov app and the EU Wallet. In order to reach the aims of the research, the following research questions were formulated:

RQ1 What are the attitudes of the Estonian working-age population towards two new mobile e-government service channels (mGov app and EU Wallet). The objective of this question is to understand Estonian working-age people's opinions on the upcoming apps. The goal is to examine each app separately, without comparison.

SQ1 How do working-age individuals in Estonia perceive a new e-governance service provision channel (mGov and EU Wallet), in terms of performance expectancy, social influence, facilitating conditions and effort expectancy? This question is built on the basis of the Unified Theory of Acceptance and Use of Technology and its four core components. This question sheds light into the Estonian people's opinions on whether they believe the apps will help them achieve a desired result, their opinions on how easy it is to use the apps, whether they are affected by social pressure to use the apps and to which degree they think Estonia and the EU are ready to implement these apps.

RQ2 What are the perceptions of e-governance experts' towards the adoption of a new e-government service provision channel (mGov and EU Wallet), such as an mGov app and the EU Wallet, by the Estonian working-age population. The goal is to understand the opinions of e-governance experts toward the new channels of e-governance service provision. The expert opinions are collected and analysed to supplement the results from RQ1 and SQ1.

SQ2 How should the adoption of a new e-government service provision channel (mGov app or EU wallet) be designed to achieve adoption within the working-age population of Estonia. This question is aimed to harness the experts' professional

experience and to provide insight into the best course of action regarding the adoption of a new e-government service provision channel.

1.5 Thesis Outline

In order to ensure a logical flow of information, the author has structured the work in the following way: the first chapter presents the overall context of the research (including Estonian particularities), describes the research motivation and relevance, presents the research problem, outlines the research questions and objectives, and lays out the thesis outline.

The second chapter explains the concept of an mGov app and the EU Wallet and provides examples of existing mGov apps in Europe. In addition, it contains an overview of the possible functionalities of the apps, as well as the timeline for EU Wallet implementation and the regulatory framework that facilitates it.

The third chapter provides an overview of the relevant literature regarding technology acceptance theories, justifying the usage of the selected theory. Presented theories include the Technology Acceptance Model, The Unified Theory of Acceptance and Use of Technology and UTAUT2.

The fourth chapter provides an overview of the research design and applied methodology. The research is conducted by using a questionnaire to collect the opinions of the working-age people of Estonia, which are supplemented by the opinions of e-governance experts and industry professionals, gathered through semi-structured one-on-one interviews. This chapter contains a table with an overview of the types of experts interviewed, as well as a description of how the questionnaire and interview questions were formulated.

The fifth chapter serves to describe the research findings. The respondent's prior experience with technology and voluntariness of technology use is highlighted in this chapter. Findings from the questionnaire are structured based on the four domains of UTAUT: performance expectancy, social influence, facilitating conditions and effort expectancy; as well as divided based on the respondents' gender and education levels. The findings from the semi-structured expert interviews are also structured based on the four domains of UTAUT. The findings from both research methods are presented separately for the mGov app and the EU Wallet.

The sixth chapter discusses the results of the research. When discussing the results of both research methods, the findings from the questionnaire regarding the mGov apps are compared with relevant findings from the expert interviews regarding the mGov apps, and the findings regarding the EU Wallet are compared with relevant findings from the expert interviews about the EU Wallet. In addition, this chapter lists and explains the limitations of the research, as well as provides suggestions for future research on this topic. The last chapter concludes the research.

2 Concept of an mGov App and the EU Wallet

Mobile apps have become a common component of smartphones and tablets: some demographics habitually use them on a daily basis (Rashid *et al.*, 2020) and throughout the day (Böhmer *et al.*, 2011). Nowadays almost any service can have an app enhancing the service portfolio, and governments are beginning to adapt to this change as well, as shown in the following sections. An app created by the government is a new way for the citizen (or resident) to interact with the government, and such apps could perform a complementary function to the existing e-governance ecosystem (Kirillov *et al.*, 2011).

In the absence of governmental apps, citizens and residents in Estonia are currently able to interact with the government through "traditional" means by using their web browser and state portals. The Estonian State Portal Eesti.ee is the hub of nearly all Estonian e-government services and nearly 99.9% of governmental services are available 24/7 in Estonia (Nõmmik, 2021). With the right type of functionalities, an app created by the government could fill a gap that the "traditional" government portal is not able to – supporting the citizen is on the go.

2.1 MGov App

Within the context of this thesis, the term "mGov app" refers to a mobile app created or procured by the government, which is able to provide e-government services. The mGov app is downloadable onto the users' smartphone or a tablet and contains identification software to allow the user to securely identify themselves before gaining access to their own information or being able to perform any actions.

Based on the preliminary research, the author categorises the existing mGov apps in Europe into two categories[1]: 1) "whole-of-government" where all services, which are intended to be provided through a mobile channel, are provided through one app; and 2)

[1] The author would like to highlight that the definition was a result of collaboration with the supervisors.

"part-of-government" where several apps with different functionalities are created by the government. Within the context of this thesis the term mGov app refers to the whole-of-government type of app to match Estonia's plans and vision for its own app.

As mentioned above, Estonia is currently developing its own mGov app "mRiik" (mState). Based on the latest information (Turovski, Ed, 2023), the mRiik could have the following functionalities:

- hold digital copies of the person's identity documents (national ID card, passport, driver's licence),
- show information about children/dependants,
- show prescriptions and sick leave documents,
- show vehicle information and related motor insurance history.

In addition to the functionalities listed above, the mRiik app could allow its users access to three external services: Land Board's map service, public maintenance environment and an AI-powered chatbot Bürokratt (Turovski, Ed, 2023).

The app's development has not been smooth sailing. At the time of writing, the procured developer company has changed from Nortal to Net Group (Pau, 2024). Currently it is not clear whether mRiik will end up having the same functionalities as the current beta version functionalities listed above.

Another challenge is the uncertainty of the legality of digital documents. Before it is determined that digital documents are legal versions of the physical copies (or relevant laws changed), the app will display the documents for information purpose (Turovski, Ed, 2023).

2.1.1 Examples From Europe

Some European Member States have implemented mGov apps, whereas others have not. This chapter serves to provide a brief overview of the most notable achievements of European Member States in the field of m-governance.

Out of those that have implemented mGov apps, some have used the "part-of-government" approach. For example, Croatia has several apps for several purposes: mPorezna was created by the Ministry of Finance Tax Administration for tax-related

services (mPorezna, 2022), HRana was created by the Ministry of Agriculture and serves to warn citizens about possible dangers in the food items sold in the Croatian market (HRana, 2020), mPretinak allows the citizen to communicate with the government (mPretinac, 2015), Mudrica provides discounts on products and services to parents of families with children (Mudrica, 2020), mGrađanski Portal provides access to several Croatian e-government services (mGrađanski Portal, n.d.), Portal Zdravlja allows its users to perform a wide variety of health-related actions (message doctors, view prescriptions, vaccinations, book appointments) (Portal Zdravlja, 2020), and Nautical Info Service Croatia, created by the Ministry of Maritime Affairs, Transport and Infrastructure for information and nautical search and rescue efforts (Nautical Info Service Croatia, n.d.).

Austria has a "whole-of-government"-type mGov app: Digitales Amt (Digitales Amt, 2024). Impressively, this app allows its users to:

- find information about official services and public administration,
- use a cross-platform search (including RIS - legal information system, Data.gv.at, USP - corporate service portal) for all administrative topics,
- stay up to date with the latest news on the subject of digitalization,
- use a chatbot for questions,
- use the secure login using ID Austria and keep track of their ID Austria usage history,
- receive official letters digitally,
- use the PDF signature and sign your PDF documents digitally with ID Austria,
- change their residence, including registration, de-registration, and re-registration of main and secondary residence,
- receive a personalised checklist from pregnancy to birth and beyond, along with the initial issuance of birth certificates,
- begin the renewal of their passport, including the possibility to save a passport picture (this service includes a notification to the passport holder in advance before the passport is expired, which is a great example of a proactive service),
- apply for a voting card,
- and order extracts from the central civil status register.

Some European Member States do not have any mGov apps implemented yet, e.g. Finland. The country was in the middle of creating the app Autoilija, which would have held the citizens' driver's licences, however the work had to be discontinued due to the COVID-19 pandemic (Traficom, 2020).

2.2 EU Wallet

The EU Wallet is an upcoming app that each EU Member State will offer to its citizens and residents once the European Digital Identity Regulation is adopted. The EU Wallet will allow each EU resident the ability to control their own data and who they share their data with (European Commission, n.d., a).

Based on the most recent information available, the app will contain the following functionalities (European Commission, n.d., b; European Commission, 2023):

- the ability to download, store and share one's documents (travel documents, driver's licence, graduation diplomas, European Health Insurance Card, social security verification documents),
- the ability to access digital public services (national and cross borders) by authenticating oneself with the EU Wallet,
- to authorise payments and identify oneself to bank accounts,
- to verify one's identity online when opening a bank account,
- the ability to digitally sign documents,
- to integrate the EU Wallet with other wallets,
- the ability to report alleged violations of data protection,
- and others, possibly.

Each Member State's version of the EU Wallet will be made by at least one "Wallet Provider." that the country has given the mandate to. Once the app is created and published, end users will be able to download the app and identify themselves to a Digital ID issuer of their country, which will authenticate the user's identity and issue a Digital ID to their EU Wallet. The wallet's Digital ID is what will allow the user to verify their identity to service providers (European Commission, n.d., c).

2.2.1 Regulatory Framework and Stages of EU Wallet Development

The framework of digital identity and authentication in Europe is currently facilitated by the eIDAS regulation, which has allowed for the creation of national electronic identification methods (eID) that are recognized in all Member States. The recognition is achieved when the eID meets the regulatory criteria and the country has duly notified the European Commission about it (European Commission, 2024a).

Despite the success of the eIDAS framework, challenges related to unequal adoption and low interoperability of eIDs between Member States still persist. In order to address this issue, the European Commission proposed a new *Regulation establishing a framework for a European Digital Identity* (EUDI), which will amend eIDAS (European Commission, 2024a). The new EUDI Regulation will allow for the creation of the EU Wallets, as it builds on top of the existing eIDAS framework and eIDs of each Member State (European Commission, 2024b).

The European Commission, Parliament and the Council of the EU reached a final agreement on the EUDI Regulation in November 2023, and the Parliament gave its final approval in February 2024. Once the EUDI is published in the Official Journal, Member States will have 24 months to implement their own EU Wallet (European Commission, 2024b).

In order to make the wallet's adoption simpler, the EU is currently working on a Toolbox, which contains the best practices, common technical specifications and standards for the app. Within the Toolbox the Commission is building the Architecture and Wallet Reference Framework (ARF), based on which, a set of reusable code libraries is being created to aid the Member States with future implementation of the EU Wallet (European Commission, n.d., d).

The prototype of the EU Wallet is currently being tested in four large scale projects, which will take place until 2025. A total of 360 private companies, as well as Iceland, Ukraine, Norway and 26 Member States are participating in the projects (European Commission, n.d., e).

3 Literature Review

In order to achieve a comprehensive overview of the relevant literature and trends in the field of technology acceptance within m-governance, the author has performed a literature search and reviewed relevant publications from scholarly databases, academic journals, books and conference papers.

In a recent content analysis, Bicen and Shali (2021) looked into the literature published in the field of e-governance and m-governance between the years 2000 and 2021. To get an overview of the types of publications, the authors used the terms "e-gov," "m-gov," "Electronic Government" and "Mobile Government" and found 184 publications through Scopus, all of which were included in their research. The authors found that publications started to appear in 2003, began growing in numbers around 2010-2013 and were at the peak in 2020, with approximately 9 new works appearing yearly on average (Bicen & Shali, 2021). This shows that research in m-governance has attracted interest and gained momentum in the mid-2000s, which is also supported by findings in another recent literature review on m-government (Wirtz *et al.*, 2021).

Bicen and Shali (2021) also looked into the disciplines in which literature on e-government and m-government was published. They categorised 325 disciplines into groups and found that Computer Science and Social Sciences had the greatest number of publications (42.76% and 18.76% respectively), followed by Business, Management and Accounting, Engineering, Decision Sciences, Mathematics, Economics, Econometrics, Finance, and others in lesser amounts (Bicen & Shali, 2021). This supports the opinion that e-governance and m-governance are both multidisciplinary fields.

3.1 Theories of Technology Acceptance

This chapter serves to provide an overview of the most used technology acceptance theories in the field of e-governance and m-governance. Based on the literature reviewed, technology acceptance in these fields has mostly been studied with the help of the following theories: Technology Acceptance Model, The Unified Theory of Acceptance and Use of Technology and UTAUT2. Other theories have been derived from those listed, however they will not be analysed in this review for the sake of specificity.

The Technology Acceptance Model (TAM) has been found to be one of the most prevalent theories in m-government research towards the end of the last decade (Alshammari *et al.,* 2018) and is considered to be the most used for innovation acceptance (Abuhassna *et al*., 2023). Presented by Davis (1987), this theory is one of the simplest theories in technology acceptance.

In TAM, the attitude of the person towards the technology is hypothesised to be a determinant on whether he or she decides to use it or not. The system's design features (external stimulus) have an effect on both perceived usefulness and the perceived ease of use of the technology (cognitive response). The perceived ease of use has a causal effect on perceived usefulness. Both of these beliefs have an effect on the attitude towards using the technology (affective response), which has an effect on the actual system use (behavioural response) (Davis, 1987). In short, the system's features have an indirect effect on the person's attitude towards using the technology. To better illustrate the theory, Figure 1 is provided below.

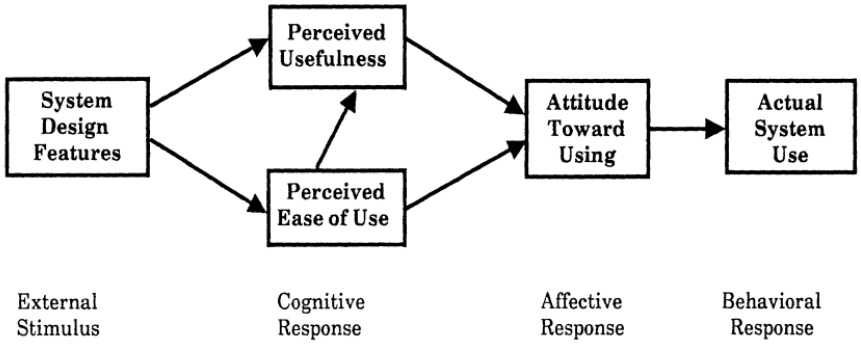

Figure 1. Technology Acceptance Model (Davis, 1987)

Over the years this theory has been further developed and built upon, resulting in iterations such as TAM2, TAM3 (Gupta *et al.,* 2022). Through combinations with other theories, TAM has found use in many fields, from social psychology to sociology and information technology, and has been used to improve the explanatory powers of existing theories within those fields of study (Al-Emran & Shaalan, 2021, as cited in Gupta *et al.*, 2022).

Although versatile, the TAM has been criticised to be outdated (Bagozzi, 2007, as cited in Gupta, *et al.,* 2022) and overworked (Goodhue, 2007, as cited in Gupta, *et al.,* 2022).

Bagozzi (2007) states that although TAM has been broadened over the years, it has hardly been deepened by the published works. Other critics have stated that the theory lacks practical value and has limited explanatory and predictive power (Priyanka & Kumar, 2013). In light of TAM's simplicity and criticism, it has not been used within this research.

The next common technology acceptance theory is the Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh *et al.* (2003). This theory expands and unifies TAM and other previous theories and proposes four core determinants that have an effect on the usage of technology: performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh *et al.,* 2003).

In UTAUT, Venkatesh *et al*., (2003) defined performance expectancy as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance." Effort expectancy is defined as "the degree of ease associated with the use of the system," whereas social influence is defined as "the degree to which an individual perceives that important others believe he or she should use the new system." Lastly, facilitating conditions are defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system (Venkatesh *et al.*, 2003).

According to UTAUT, the performance expectancy, effort expectancy and social influence have an indirect effect on technology use behaviour (through behavioural intention), while facilitating conditions is theorised to have a direct effect on technology use behaviour. In addition, Venkatesh *et al*., (2003) proposed that factors such as gender, age, experience with similar technology and voluntariness of use have varying relationships with the four core determinants, and thus ultimately affect the technology use behaviour. Gender has an effect on performance expectancy, effort expectancy, and social influence, whereas age has an effect on all four variables. Prior experience with similar technologies has an effect on effort expectancy, social influence and facilitating conditions, whereas voluntariness of use only has an effect on social influence. To test these relationships, various statistical analysis tools are employed (Venkatesh *et al*., 2003). In order to illustrate the theory, Figure 2 is provided below.

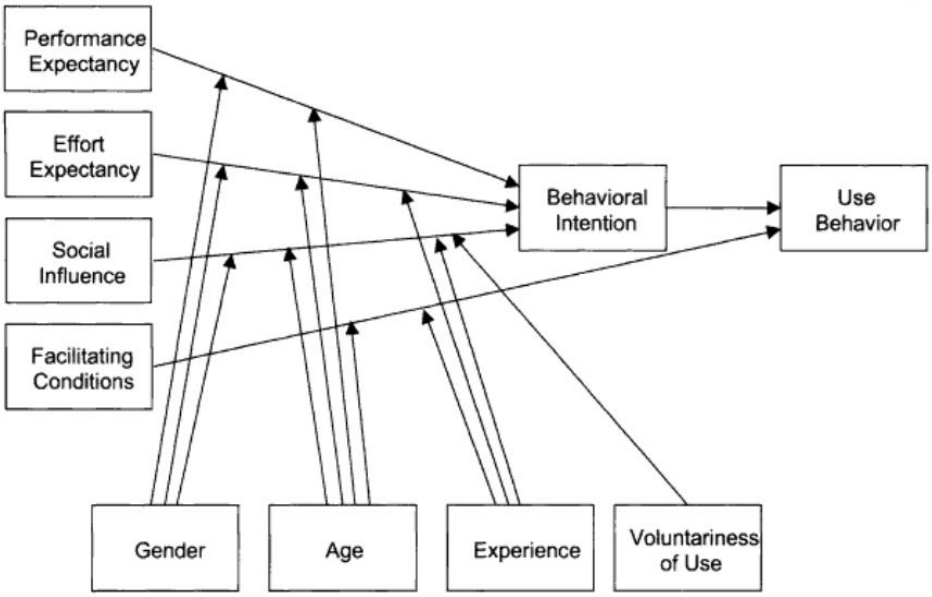

Figure 2. The Unified Theory of Acceptance and Use of Technology (Venkatesh *et al*., 2003)

Throughout the last two decades and across multiple disciplines, UTAUT has been one of the most popular theories in information technology acceptance research. In a literature review on UTAUT, Williams *et al.,* (2015) performed an electronic search through ISI Web of Knowledge and Google Scholar and found 174 research papers that had used the theory between the years 2004 and 2011. In a recent bibliometric analysis, Wang *et al*., (2021) searched the Web of Science database for UTAUT-related literature and found 1694 documents written by a total of 4194 authors between the years 2003 and 2021.

The UTAUT has been selected as the basis for this thesis, as its core determinants (performance expectancy, effort expectancy, social influence, facilitating conditions) are measurable and transferable to this research, as are the factors affecting them (age, gender, experience, voluntariness). Examples of UTAUT use in e-government and m-government literature are provided in the next section of this chapter.

The next commonly used theory is UTAUT2, which is an extension of UTAUT. This theory contains the same initial four variables as UTAUT, with the addition of hedonic motivation, price value and habit (Venkatesh *et al.*, 2012). This theory is not employed in this thesis, due to its complicated nature and due to the added variables (habit, price value) not being transferable to this research.

3.2 M-governance and mGov Apps

E-governance and m-governance are among the fields where UTAUT has been used to study technology acceptance. When e-governance studies began to appear in larger amounts approximately a decade ago (Bicen & Shali, 2021), Alsheri *et al.*, (2012) used the theory to study the effects of website quality on the adoption of e-government services in Saudi Arabia. The researchers defined prior experience as internet usage experience and added "website quality" as the fifth core determinant, moderated by gender, age and internet experience. The study was based on two pillars, website quality and information quality, both measured by a questionnaire. Alsheri *et al.*, (2012) found that performance expectancy, effort expectancy, facilitating conditions and website quality had a strong effect on e-governance usage behaviour, while social influence did not. While informative, a core limitation for this study is that it is applicable mostly in the cultural context of Saudi Arabia.

In a recent literature review on m-government adoption, Wirtz *et al*., (2021) found that throughout observed studies, perceived usefulness and perceived ease of use had the most effect on intention to use mGov apps. Additionally, the researchers found that social influence and trust in government were one of the most important factors in mGov app acceptance (Wirtz *et al*., 2021).

Koivumäki *et al*., (2006) used UTAUT to study the early adoption of mobile phones and mobile services offered through them. They found that technologically more skilled users rated the usefulness of the services (performance expectancy) higher than less skilled participants. Social influence was found to be stronger within the technologically more skilled participants, resulting in the researchers theorising that those skilled in technology might consider themselves pioneers and find value in being among the first ones to use the new service. The researchers found that the attitudes of more skilled participants were more positive, which had an effect on the intention to use the service again (Koivumäki *et al.*, 2006).

More recent research on m-government and m-services adoption tends to focus on countries with developing economies: India (Kumar *et al*., 2021), Indonesia (Nurul Huda, 2023), United Arab Emirates (Eid *et al.*, 2021), Saudi Arabia (Althunibat *et al*., 2022), Bangladesh (Talukder *et al*., 2019), Tanzania (Ishengoma *et al*., 2018), Egypt

(Elbatanouny *et al*., 2023), Qatar (Faisal and Talib, 2016), Kingdom of Bahrain (Moharam *et al.*, 2024), Jordan (Althunibat *et al.*, 2024). Isagah and Wimmer (2019) looked into m-government development in developing countries and identified technology standards, requirement engineering, stakeholder management and budget allocation as the most problematic aspects that m-government service designers face in developing countries.

Research in the area of mobile technology and mGov app adoption in Europe has been conducted around topics such as m-learning (Aytekin *et al.*, 2022), using mGov apps to assist the elderly (Molnar *et al.*, 2020), using mGov apps to better integrate refugees in Germany (Rosenbaum *et al.*, 2018). Wirtz *et al*., (2019) studied mobile government services usage within German public administration students and found that interactivity was not a significant factor in their intention to use the services, and that word-of-mouth recommendations happen when users intend to use the service themselves. Although mobile app adoption has been studied in Europe, it has been studied much less than in previously mentioned countries with developing economies and not always in the context of m-governance.

In Estonia, Kirillov *et al.*, (2011) studied the prospect of m-governance and people's expectations toward possible m-services. They were able to send their questionnaire to the topmost active users of government portal Eesti.ee (citizens and residents) and found that out of 497 respondents 54.3% owned a smartphone and mobile internet was used by 94.1% of those who owned a smartphone. They also found that 83% of smartphone owners had apps installed on their phones. When asked about preference, 35.6% strongly preferred apps, 14.1% preferred using services through a web-based browser, while the majority remained neutral (37%).

Kirillov *et al*., (2011) included an option to request services and 81.1% of respondents agreed that they would benefit from using a health-related mobile application. The second most popular requested m-service was accessing and updating their personal information in state registers. The third most popular category of services requested was connected to cars and boats. Educational services received the lowest priority (Kirillov *et al.*, 2011). While performing a literature review, the author noticed a lack of similar research that would illuminate the current opinions of smartphone users in developed countries.

3.3 E-Wallets

Similarly to mGov apps, the research on e-wallets is also prevalent in developing economies. A recent systematic literature review found 77 relevant publications in Scopus and Google Scholar between 2016-2021, most of which focused on technology acceptance (Ramli & Hamzah, 2021). Another recent literature review looked into the publications within Emerald Insight and found that perceived usefulness (within the TAM model) was the most prevalent in the intention to use an e-wallet (Liswanty *et al.,* 2023).

Tusyanah *et al.,* (2021) used UTAUT and Mulyati *et al.,* (2023) used modified UTAUT to research the determining factors of e-wallet use in Indonesia. Tusyanah *et al.,* (2021) found that all four core components of UTAUT had a positive effect on behavioural intention to use e-wallets. Mulyati *et al.,* (2023) found that only effort expectancy, satisfaction and performance expectancy had an influence on behavioural intention of using the local e-wallets. They also found that performance expectancy was influenced by perceived enjoyment, and satisfaction was influenced by effort expectancy, perceived enjoyment, and performance expectancy (Mulyati *et al.,* 2023). Similarly to studies discussed in the section above, the results of these studies are not entirely transferable to the European context due to cultural differences, as well as differences in the e-wallet services available.

Research regarding the EU Wallet has started to appear within the last few years. Some authors have mentioned the app to suggest features, such as a succession functionality (van Erp & Zimmermann, 2022). Leijnse and Scheers (2023) analysed the first public version of the EU Wallet's ARF from the perspective of education document storage. The researchers stressed the importance of common standards between the different types of educational credentials, adequate representation of education institutions at EU level, the importance of active knowledge sharing and the importance of a smart design of the education credential ecosystem roles (Leijnse & Scheers, 2023).

Lukkien *et al*., (2023) studied the barriers of adoption of digital identity wallets in the Netherlands, and found that a lack of standardisation, lack of a common understanding regarding the concept of a digital identity wallet and the absence of a collaborative public-private governance are the largest barriers. Based on the information available about the EU Wallet, these barriers are taken into account in its development.

4 Research Design and Methodology

This chapter will explain the research methods, data collection methods and data analysis methods used in this thesis. To reach the research objectives, the author chose to conduct a mixed methods research that includes both qualitative and quantitative elements.

In order to quantitatively capture primary data and assess the opinions of the Estonian working-age population towards a new channel of e-governance service provision (mGov and EU Wallet), the author developed and employed a questionnaire. Based on the secondary data obtained through the literature review, conducting a questionnaire is one of the most common data collection methods within the field of technology acceptance (Koivumäki *et al*., 2006; Kirillov *et al*., 2011; Isagah & Wimmer, 2019; Wirtz *et al*., 2019). The data collected with the questionnaire is analysed with descriptive statistics by using IBM SPSS Statistics software, and Microsoft Excel is used to summarise demographic data of the respondents.

The target population of this research is the working-age population of Estonia, who are either employed, unemployed or economically inactive. The economically inactive group includes people that either do not or cannot work, i.e. homemakers, non-working students, disabled people (Statistikaamet, n.d., a).

People under 18 years old are excluded from this research, as the additional legal considerations and possible parental involvement associated with minors' use of mobile apps present unique challenges that warrant a separate investigation, which is outside the scope of this thesis. People over 74 years old are also excluded from this research. Although research shows that people in this age demographic are willing to use mobile phones for browsing, calling, and sending text messages (Choudrie *et al*., 2020), they are still less likely to adopt ICT (Menéndez Álvarez-Dardet *et al*., 2020). As people in this demographic have their own sets of needs, their technology acceptance of m-governance also warrants a separate study.

The working-age population (aged 18-74) in Estonia was 960 200 in 2023 (Statistikaamet, n.d., b). With a target group of 960 200, margin of error 6%, confidence level of 95%,

and population proportion of 50%, the calculated sample size is 267 (Calculator.net, n.d.). To ensure a more diverse respondent pool, the author chose to use two sources for collecting quantitative data:

1. survey service Pollfish[1]
2. the author's personal and professional contact networks.

The questionnaire contains seventeen questions, which are listed in Appendix 1. Questions 1-3 are included to collect demographic data on the respondents' age, gender, and the levels of completed education. Question 4 is used to track whether the respondent has completed the questionnaire through Google Forms or Pollfish. Questions 5-7 are used to collect information on the respondents' prior experience with using mobile services and the types of services used. Question 8 is used to gather information on the reasons for using the services mentioned in questions 6 and 7, reflecting voluntariness. This question contains an option to suggest other reasons as well.

Questions 9 and 11 are used to collect the preferred functionalities of an mGov app and the EU app, respectively. The functionalities of both apps are listed as they appear in the latest publications, which are discussed in Chapter 2. Both questions have the option to include more functionalities. The three external services that are mentioned in Estonia's proposed mGov app are not included in the question about preferred mGov functionalities.

Questions 10 and 12-17 are based on the four core components of UTAUT. Questions 10 and 12 are based on **performance expectancy**. Question 10 measures the respondents' opinions on whether they think that using an mGov app will enhance their speed of finding needed information within the topics presented in question 9. The respondents are asked to contrast the speed of finding information through an app versus through the traditional means, i.e. government portals and websites. The response options are based on a 5-point Likert scale, varying from "Very Unlikely" to "Very Likely." Question 12 asks the respondents a similar question about the EU Wallet. It asks how likely they think they are going to choose the EU Wallet over the existing methods or tools for performing

[1] https://pollfish.com/

the tasks mentioned in question 11. The response options are also based on a 5-point Likert scale, varying from "Very Unlikely" to "Very Likely."

Question 13 is based on the **effort expectancy** component and asks which characteristics related to ease of use should be prioritised in the mGov app and/or EU Wallet. This question contains an option to suggest other functionalities as well.

Questions 14-15 are based on the **social influence** component and ask how much the opinions of the respondents' social circles would affect the choice to start using the mGov app and the EU Wallet. The response options are based on a 5-point Likert scale, ranging from 1 = "not at all" and 5 = "would start using (the app) immediately."

Questions 16-17 are based on the **facilitating conditions** component. These questions ask how confident the respondents are in the existing technical resources to implement both the mGov app and the EU Wallet, with response options also based on a 5-point Likert scale, ranging from 1 = "not at all ready" and 5 = "could be implemented right away."

In order to gain a broader qualitative understanding of the topic, the information gained through the questionnaire is supplemented with primary data collected from semi-structured one-on-one interviews with four Estonian e-governance industry experts and one cybersecurity expert. All interviewed e-governance experts have a broad range of professional knowledge in the field, with working experience ranging up to 20+ years. All four e-governance experts have a background in digital transformation, with varying specialisations. One of the e-governance experts is a specialist in eIDAS regulation and its implementation. Another is a specialist in e-governance solutions and infrastructure, who has worked in project groups developing e-government systems around the world. The cybersecurity expert has extensive knowledge of the industry best practices and experience with mobile app development, including security testing and other cybersecurity functions.

The author has chosen to maintain the anonymity of the experts, in order to encourage honesty and trust during conversations. Additionally, anonymity is maintained to facilitate a more open conversation around the challenges and opportunities of mGov and EU Wallet adoption, as well as to collect a more diverse range of perspectives. All of the interviews are recorded via Microsoft Teams and four are transcribed through the same program. The fifth interview is transcribed through Otter.ai, due to the interviewee's

work-issued laptop's settings, which did not support simultaneous transcription through Microsoft Teams. In order to gain insights from the interviews, a deductive thematic analysis (Braun & Clarke, 2012) based on the core components of UTAUT is performed. The transcripts are analysed through Atlas.ti. Information about the experts is presented in Table 1 below, including whether they represent the public or the private sectors.

Table 1. Information About Interviews and Interviewees (Source: author)

Interviewee Number	Interviewee role	Interviewee sector	Interview medium	Interview date
Interviewee A	e-governance expert, researcher	Private	Teams Recording	11.04.2024
Interviewee B	Cybersecurity expert	Private	Teams Recording	15.04.2024
Interviewee C	e-governance consultant, expert	Private	Teams Recording	15.04.2024
Interviewee D	e-governance expert, researcher	Public	Teams Recording	15.04.2024
Interviewee E	e-governance expert	Public	Teams Recording	24.04.2024

The interview questions for the experts are listed in Appendix 2. Interview questions 1 and 2 are used to understand the experts' opinions on which of the proposed features of the Estonian mGov app and the EU Wallet would have the most impact on users' willingness to start using the apps. These questions correspond to questions 9 and 11 of the questionnaire and contain the same app functionalities.

Interview questions 3-6 are based on the UTAUT core component **performance expectancy**. Questions 3 and 5 used to understand the experts' opinions regarding what outcomes or goals users will want to achieve by using an mGov app and the EU Wallet. Questions 4 and 6 are asked to understand the experts' opinions on how likely the people will choose to use an app for the described functionalities instead of the "traditional" means. These questions correspond to questions 10 and 12 of the questionnaire.

Interview questions 7-8 are based on the **effort expectancy** component. Question 7 asks what are the key factors that contribute to individuals' perceptions about the ease of use

of a new e-governance service provision channel, such as the mGov app and the EU Wallet. Question 8 asks about the aspects of user interface and the apps' design that should be prioritised in the experts' opinions to positively influence people's perception of the apps' ease of use. This question corresponds to question 13 of the questionnaire.

Interview questions 9-11 are based on the **social influence** component. They are used to ask the experts their opinion on social strategies that could be used to encourage mGov app and EU Wallet adoption. Interview questions 12-15 are based on the **facilitating components** component. These questions measure the experts' confidence in the technical readiness to implement the mGov app and the EU Wallet, as well as their opinions on the challenges and opportunities related to their implementation.

5 Research Findings

A total of 296 questionnaire responses were collected, consisting of 98 responses from the survey service Pollfish, 143 responses from the author's professional network and 55 responses from the author's personal network. Based on the responses to question 4, five responses were disqualified as duplicate, resulting in a total of 291 responses analysed. This exceeds the number of desired responses, as discussed in Chapter 4.

A slight imbalance is seen towards female responders; however, this reflects the gender ratio in the Estonian society (Statistikaamet, n.d., c). Additionally, 85.9% of responders are above the age 24 and 53.9% of responders are above the age of 34. Individuals with higher education (bachelor's, master's, and PhD or higher) make up 71.1% of the responders. Trade school, vocational school or technical school is not considered as higher education within the context of this research (Statistikaamet, n.d., d).

Table 2. Demographic Information of Respondents (Source: author)

Variable		Frequency	Percent
Gender	Male	134	46.0
	Female	155	53.3
	Other/Prefer not to say	2	0.7
Age	18-24	41	14.1
	25-34	93	32.0
	35-49	119	40.9
	50-64	27	9.3
	65-74	11	3.8
Education	Less than a high school diploma	3	1.0
	High School graduate or equivalent	67	23.0
	Bachelor's degree	108	37.1
	Master's degree	92	31.6
	PhD or higher	7	2.4
	Trade/Technical/Vocational school	14	4.8

5.1 Prior Experience, Voluntariness

Respondents' prior experience with mobile devices and services was studied with questionnaire questions 5-7. Out of 291 analysed responses, only two people did not own a smartphone or a tablet, representing 0.7% of the total responses. Overall, twenty-six respondents reported not using a mobile banking application in their daily life, representing 8.9% of the total responses. Therefore, the majority of the surveyed participants own a phone or a tablet (99.3%) and use a mobile banking application in their daily life (91.1%).

Prior experience was also measured through question 6, where respondents could choose which eID apps they use for electronic identification and document signing (if any). The eID apps include Smart-ID, Mobile-ID and RIA Digidoc (e-Estonia, n.d.). The results show that Smart-ID is most popular within males and females of all ages, followed by Mobile-ID and RIA Digidoc as the least used. Overall, 11 respondents reported not using any of the options, representing 3.8% of all respondents. Following this, 96.2% of respondents used one or more eID. More detailed information about eID popularity within males and females can be found in Table 3 below. Two responses from persons who chose not to disclose their gender were not included in Table 3. Within their responses, Smart-ID was chosen twice, and RIA Digidoc was chosen once, which does not skew the overall results of this question.

Table 3. Estonian eIDs Used by Female and Male Respondents (Source: author)

eID Usage by Gender

			Gender		
			Female	Male	Total
Mobile Services Used[a]	Smart-ID	Count	123	102	225
		% within Gender	79.4%	76.1%	
	Mobile-ID	Count	45	38	83
		% within Gender	29.0%	28.4%	
	RIA Digidoc	Count	28	26	54
		% within Gender	18.1%	19.4%	
	I don't use any of the options	Count	5	6	11
		% within Gender	3.2%	4.5%	
Total		Count	155	134	289

Percentages and totals are based on respondents.

a. Dichotomy group tabulated at value 1.

When divided by higher education, the data shows that the main difference between the eID usage lies within Mobile-ID's and RIA Digidoc's popularity, as the former is more

popular among people with higher education and the latter among people who do not have a higher education. The data also shows that a higher percentage of people with a higher education do not use any of the apps. More precise information is shown in Table 4 below.

Table 4. Estonian eIDs Used by Respondents With and Without Higher Education (Source: author)

eID Usage by Education Level

			Education Level Numeric		
			Other	Higher	Total
Mobile Services Used[a]	Smart-ID	Count	67	160	227
		% within Education level	79.8%	77.3%	
	Mobile-ID	Count	19	64	83
		% within Education level	22.6%	30.9%	
	RIA Digidoc	Count	20	35	55
		% within Education level	23.8%	16.9%	
	I don't use any of the options	Count	2	9	11
		% within Education level	2.4%	4.3%	
Total		Count	84	207	291

Percentages and totals are based on respondents.

a. Dichotomy group tabulated at value 1.

Regarding the reasons for eID use, own convenience was reported as the most common in both males and females. Another commonly reported reason is that eID usage is mandatory at the person's workplace or educational institution. Based on the data, this reason seems to be more important for women, who chose the third option (their social circles using the app) less than the previous two. For men, the social circle-option was chosen slightly more often. However, in order to make generalised conclusions on the genders' behaviour, a more complex study of human behaviour is required. Persons who did not disclose their gender were excluded from this dataset, however both responders chose convenience and their social circles as the most important reasons. One person chose to include more context through the "Other" function, stating that they are using an eID because their bank requires it. More detailed information can be found in Table 5 below.

Table 5. Reasons for eID Use, Divided by Gender (Source: author)

Reasons for eID Use, Divided by Gender

			Gender		
			Female	Male	Total
Reasons to use eIDs[a]	It's convenient to me	Count	141	121	262
		% within Gender	91.6%	91.0%	
	It's requiered by my place of work and/or educational institution	Count	48	35	83
		% within Gender	31.2%	26.3%	
	My social circle requires me to have it	Count	46	36	82
		% within Gender	29.9%	27.1%	
	I don't use any of the options	Count	5	6	11
		% within Gender	3.2%	4.5%	
Total		Count	154	133	287

Percentages and totals are based on respondents.

a. Dichotomy group tabulated at value 1.

When looking at the reasons for eID usage from the lens of higher education, it is evident that convenience is the most popular option between the two groups of people. Additionally, more people with a higher education reported having to use eID apps because of their workplace or educational institution, whereas people without a higher education reported needing the apps because of their social circles. Non-use was reported more within people with a higher education, as seen in Table 6 below.

Table 6. Reasons for eID use, divided by higher education (source: author)

Reasons to Use eIDs, Divided by Education Level

			Education Level		
			Other	Higher	Total
Reasons to use eIDs[a]	It's convenient to me	Count	77	189	266
		% within Education level	91.7%	91.2%	
	It's requiered by my place of work and/or educational institution	Count	14	69	83
		% within Education level	16.7%	33.7%	
	My social circle requires me to have it	Count	31	53	84
		% within Education level	36.9%	25.9%	
	I don't use any of the options	Count	2	9	11
		% within Education level	2.4%	4.4%	
Total		Count	84	205	291

Percentages and totals are based on respondents.

a. Dichotomy group tabulated at value 1.

5.2 MGov App

5.2.1 Questionnaire Results

The respondents were presented with possible mGov functionalities and asked which of them they would use in an mGov app. In this question the respondents were able to choose

an unlimited amount of functionalities and throughout all answers, the most popular functionality was “Hold digital documents” (17.63%), followed by “See my pharmaceutical prescriptions” (16.64%), “See my sick leave documents” (14.08%), “See information about my vehicle” (13.55%), “See my dental information” (12.42%), “See my traffic insurance information” (11.83%), “See information about my children/dependants” (11.45%) and in last place “Chat with an AI powered assistant chat bot” (2.41%).

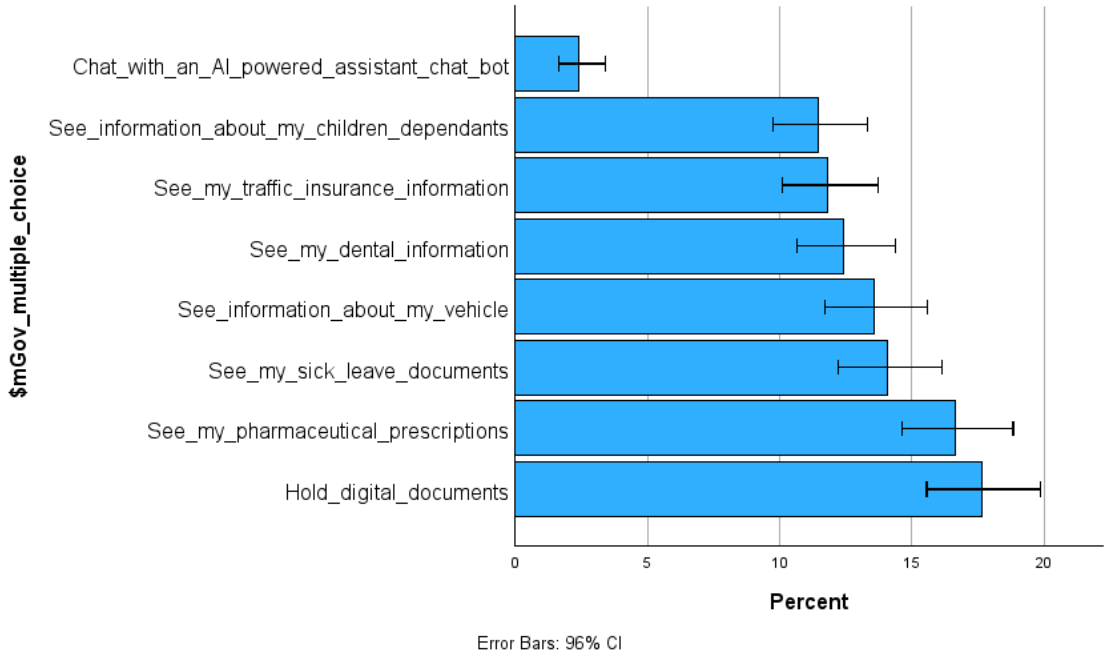

Figure 3. Most Popular mGov Functionalities, All Responders (Source: author)

Several responders provided additional information through the “Other” response option. Respondents expressed interest in the following functionalities: voting in both state and local government elections, being able to chat with one’s family doctor, access to medical test results, information regarding military training, one’s fishing licences, building permits, tax information, land property information, real estate information, access to place of residence information with the option to change it. One respondent wished to see the progress of their applications within the public sector services, while another wanted to be able to exchange messages with public service providers and request information from them.

When asked about whether the respondents thought using the mGov app would help them find relevant information faster than through “traditional” methods (government websites), the majority of respondents chose “Likely” (47.77%), followed by “Very

Likely" (25.43%), "Undecided" (19.93%), "Unlikely" (4.81%) and "Very Unlikely" (2.06%). The two highest categories "Very likely" and "Likely" together formed 73.2% of the responses, whereas the two lowest categories "Unlikely" and "Very Unlikely" formed 6.87% of the responses.

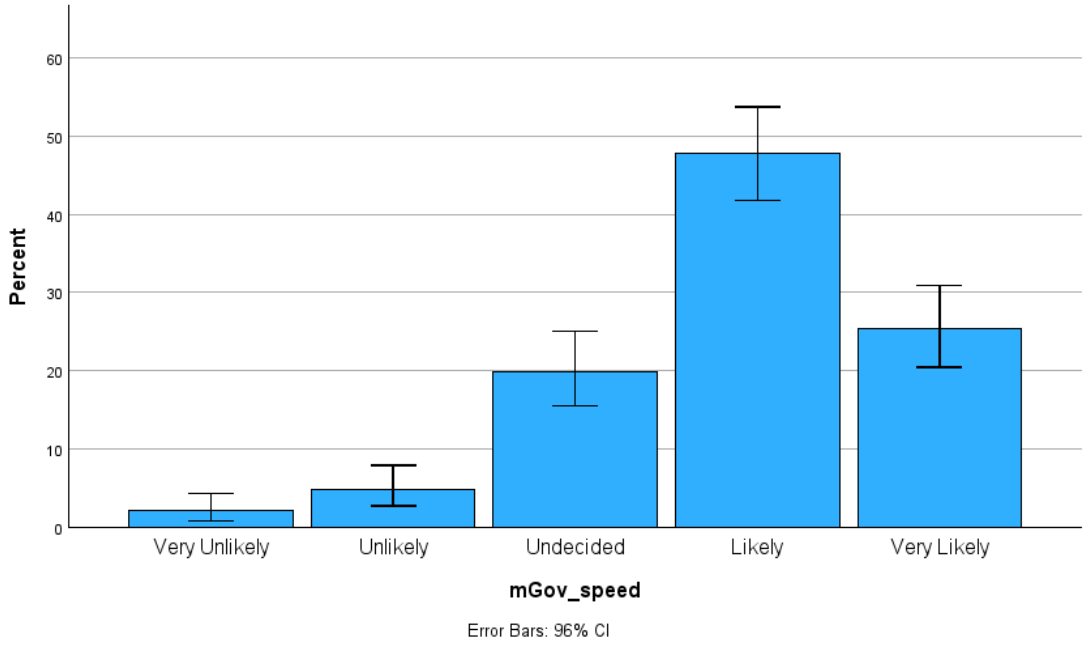

Figure 4. Respondents' Views on mGov App's Ability to Expedite Information Retrieval (Source: author)

When asked about whether their social circles' positive opinions on the mGov app would have an effect on the respondents' desire to start using the mGov app, the most popular choice was "Undecided" (41.24%), followed by "Quite a lot, I'd seriously consider starting to use the app" (31.96%), "Very little, I would perhaps consider" (12.71%), "Very much, I'd start using immediately" (8.25%) and "Not at all" (5.84%). The two highest categories together formed 40.21% of the respondents, whereas the two lowest formed 18.55%.

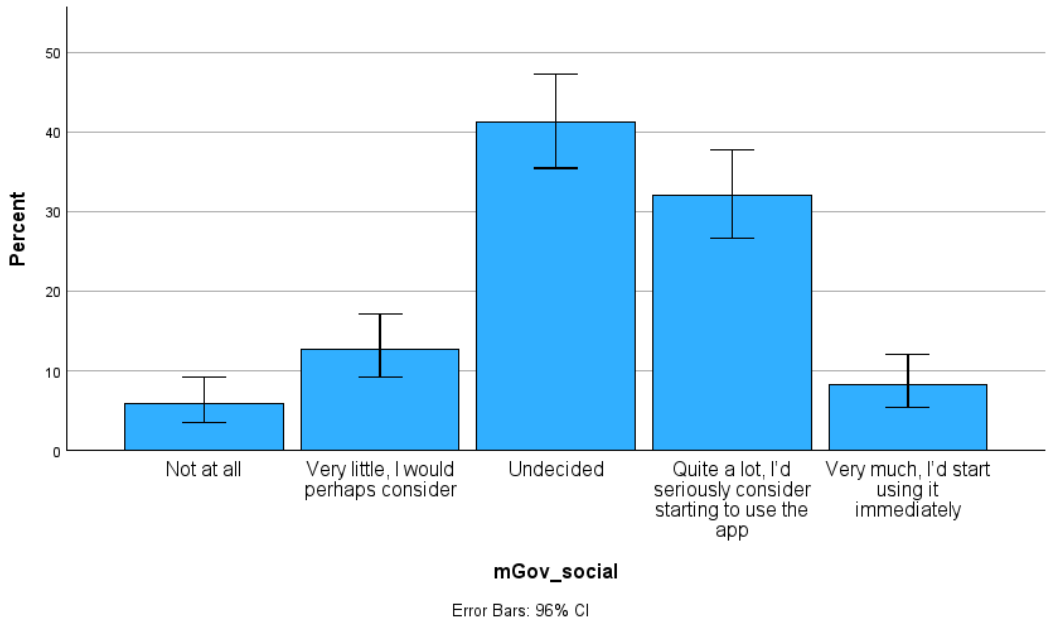

Figure 5. Respondents' Views on Likelihood of Adopting mGov App Due to Social Circle Usage (Source: author)

Regarding whether the respondents thought Estonia is ready to implement an mGov app, the most popular choice was “Could be implemented in the near future” (46.05%), followed by “Undecided” (27.84%), “Could be implemented right away” (16.84%), “Somewhat ready” (7.90%) and “Not at all ready” (1.37%). The two highest categories together formed 62.89% of the responses, while the two lowest categories formed 9.27%.

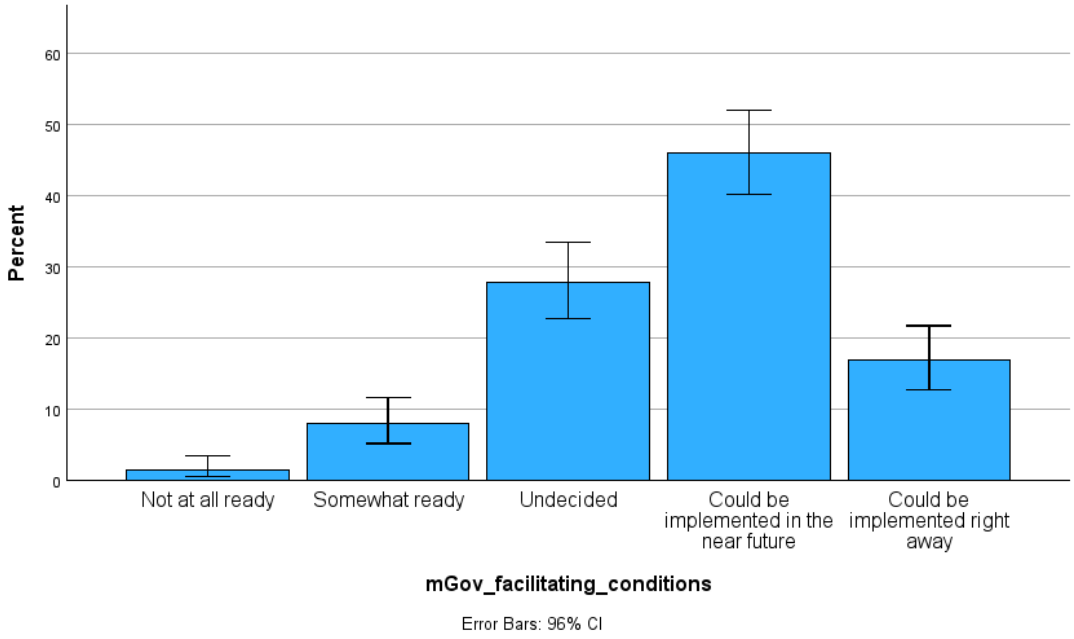

Figure 6. Responders' Opinion on Estonia's Capacity for mGov App Implementation (Source: author)

5.2.2 Interview Results

Based on the thematic analysis of the interviews, twenty-seven (27) codes were identified, and the coded sections subsequently compared throughout the five interviews. Each interview question produced a code, with additional codes identified through a deductive analysis of the transcripts, e.g. barriers of adoption, digital divide, positive sentiment, sceptical sentiment. This section will provide an overview of the common themes regarding the mGov app, whereas the EU Wallet-related themes are discussed in a separate section below.

In the context of functionalities that have the most effect on users' willingness to adopt an mGov app, the interviewed experts unanimously agreed on the ability to hold digital documents. In addition to the expected identification documents (ID card, passport) and a drivers' license, Interviewee E pointed out that the creation of an mGov app poses an opportunity to also integrate other types of documents, should there ever be a need, e.g. the COVID-19 vaccine certificate.

Another popular choice was the ability to see pharmaceutical prescriptions and other medical information. Interviewee A and D both expressed the importance of seeing not only their own, but also dependants' prescriptions, appointments, and other relevant medical information. This view was not supported by Interviewee B, who thought that information about one's children, pharmaceutical prescriptions, and other information that the mGov app is planned to include (driver's license, vehicle information, sick leaves, dental etc.) is not as important, as it might not be relevant for many users on a day-to-day basis. In this expert's opinion, the app should focus on supporting the daily activities of its users. This opinion is reflected in the interview with Interviewee E, who also highlighted the importance of making the app useful for a wide variety of people, and not focusing mainly on those who have children and vehicles. Some experts suggested functionalities which were not on the provided list, such as having access to notary documents, as suggested by Interviewee D, or being able to use a digital public transport card and vote, as suggested by Interviewee E.

Regarding the outcomes that the end users would like to achieve via the mGov app, the experts were of the opinion that most people who would want to use the app, would want to do so to make their lives easier: to be able to identify themselves even if their physical identification is not with them, use Estonian e-government services more easily when

abroad and travel with less worry. Interviewees B, D and E compared the idea of an mGov app to Estonia's state portal Eesti.ee and thought that the app will either duplicate it unnecessarily or compliment it in a functional way. Interviewee E expressed concern regarding service fragmentation, stressing the importance of consolidating all m-government services into one channel, whether its an app or a mobile browser version of the state portal.

The likelihood of choosing the mGov app instead of the traditional ways to achieve the same outcomes was seen to be higher if the app is created with the people's needs in mind, rather than for other reasons. Interviewee B and E stated that the focus of the app should not be to help sell Estonia's e-governance journey better. The experts stressed the importance of making the app relevant, self-explanatory, and easy to understand to people with various levels of education.

Social influence was seen as important for technology acceptance by nearly all experts. Interviewee E stated that "we adopt larger behaviour in a group" and illustrated the social effect with an example of digital signing, where one party's choice to sign digitally most likely will influence their counterpart to do the same. Social policy was seen as important by interviewee A, a sentiment echoed by Interviewee C, who highlighted the importance of understanding the social structure of a country when implementing new technologies or public services. Interviewee C shared an example from their professional experience, where during a project the local stakeholders found that the country's key community centers were the churches, and that disseminating information was most effective when done through them.

When asked about strategies to leverage social connections, the experts' opinions were divided: some agreed that social marketing campaigns could be effective – for example campaigns directed at young people pushing them to help their older family members to use a new technology or a service. However, some experts were concerned about the risk of fraud that follows, especially when people with limited technical proficiency let others help them use their digital identification methods.

Other challenges identified by the experts included possible overlaps of the functionalities between an mGov app, the country's iteration of the EU Wallet and other existing services. Specifically in Estonia's case, there are plans to include digital identity

documents into the upcoming mGov app, while secure online identification is already enabled mainly through two mobile channels (Smart-ID and Mobile-ID), and electronic wallets exist in the form of Apple and Google wallets. In addition to heavy scepticism from Interviewee C regarding whether Estonia's planned mGov app is capable of solving any societal issues (in its current form), the other experts (Interviewees C, D, E) expressed doubt whether the duplicate EU Wallet services are going to get any attention at all. Interviewee A raised a question of to which extent the two apps are even interoperable. Additionally, several experts mentioned the unfortunate rough head start of Estonia's mGov app, pointing out that it will also affect the app's perception once it comes out.

However, several opportunities related to mGov app adoption were also identified by the experts. In addition to the functionalities mentioned in the beginning of this section, Interviewee D saw value in integrating Estonia's crisis app "Be ready!" (Ole valmis!, n.d.) into the upcoming mGov app. According to Interviewee E, the proposed mGov app is a good start, however true value will come from being able to access Estonia's entire state portal from the mGov app.

When asked about their confidence in Estonia's technical resources to create and implement an mGov app (that would include the functionalities mentioned in Chapter 2.1), the experts all agreed that Estonia does have the necessary technical resources in place.

5.3 EU Wallet

5.3.1 Questionnaire Results

The respondents were presented with possible EU Wallet functionalities and asked which of them should the EU Wallet have, in order for the respondents to consider using the app. In this question the respondents were also able to choose an unlimited amount of functionalities and throughout all answers, the two equally most popular functionalities were "Open bank accounts" (17.96%) and "Securely identify myself online" (17.96%), followed by "Make payments" (13.96%), "Hold digital documents" (13.89%), "See an overview of my transactions" (11.32%), "Possibility to report alleged violations of data protection" (11.09%), "Allow interactions between other wallets" (8.91%) and "Have an ability to log into platforms, such as Amazon or Facebook" (4.91%).

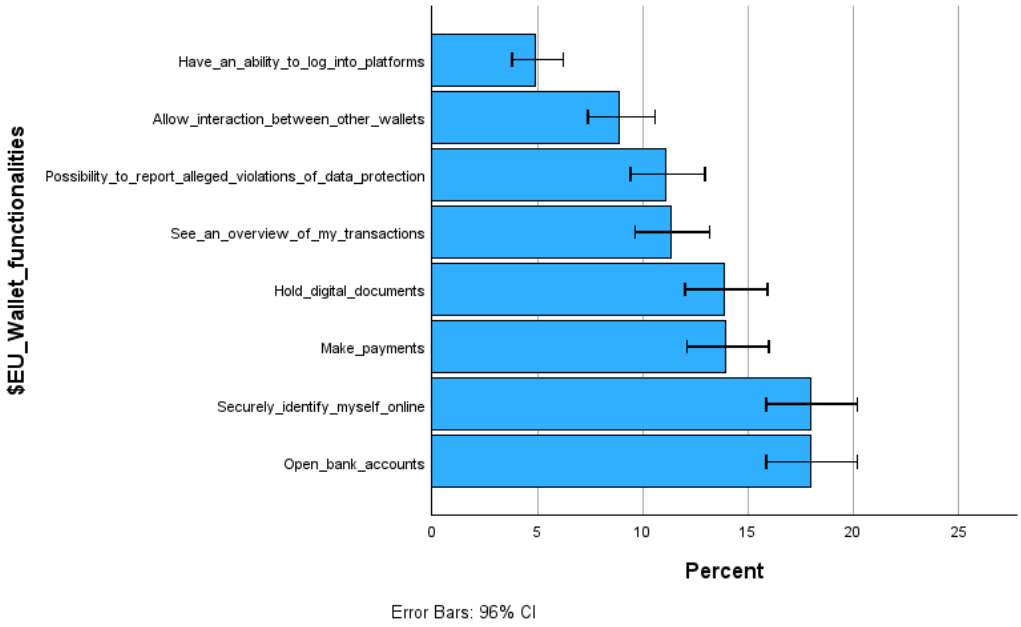

Figure 7. Most popular EU Wallet functionalities, all responders (Source: author)

This question included an option to add more desired functionalities by using the "Other" response option. Responders expressed interest in receiving notifications from the EU and having an option to back up their bank cards in case the physical card goes missing. Through this question, some people expressed their distrust in the EU Wallet, more than through a similar question regarding the mGov app (which received virtually no negative feedback).

When asked how likely the respondents would choose the EU Wallet over other existing methods or tools for performing similar tasks (e.g. opening bank accounts), most popular response was "Likely" (32.65%), followed by "Undecided" (28.52%), "Very likely" (15.81%), "Unlikely" (12.71%) and "Very unlikely" (10.31%). The two highest categories together formed 48.46% of the responses, while the two lowest categories formed 23.02% of the responses.

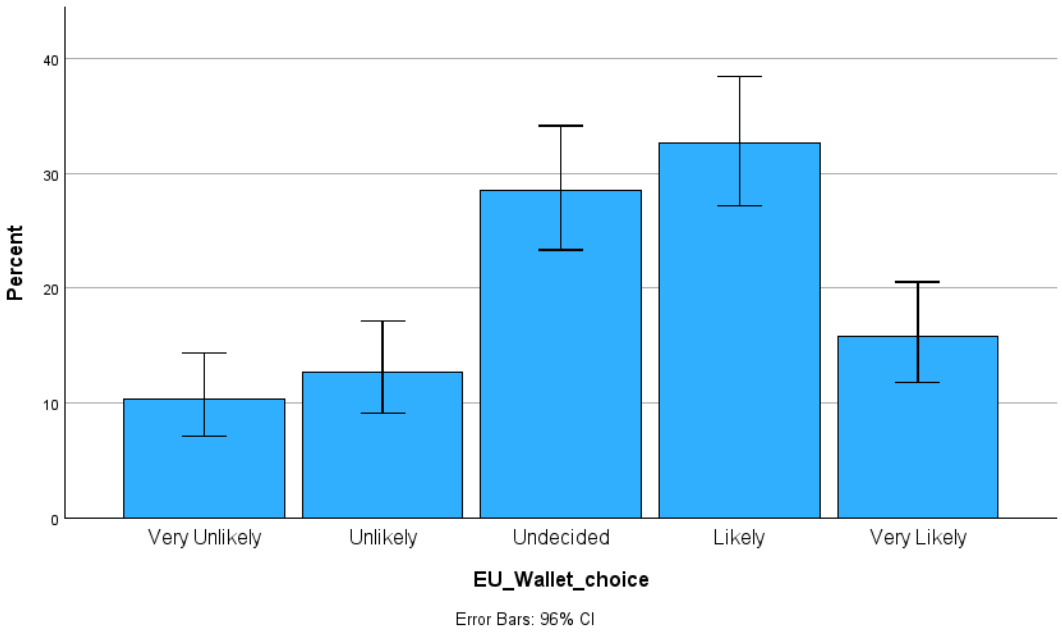

Figure 8. Respondents' Likelihood of Choosing EU Wallet Instead of Other Means to Perform Same Functionalities (Source: author)

In response to whether the responders' social circles' positive opinions on the EU Wallet would have an effect on the their desire to start using the app, the most common opinion was "Undecided" (40.55%), followed by "Quite a lot, I'd seriously consider using the app" (27.15%), "Very little, I would perhaps consider" (17.53%), "Very much, I'd start using it immediately" (8.93%) and lastly, "Not at all" (5.84%). The two highest categories together formed 36.08% of the responses, while the two lowest categories formed 23.37% of the responses.

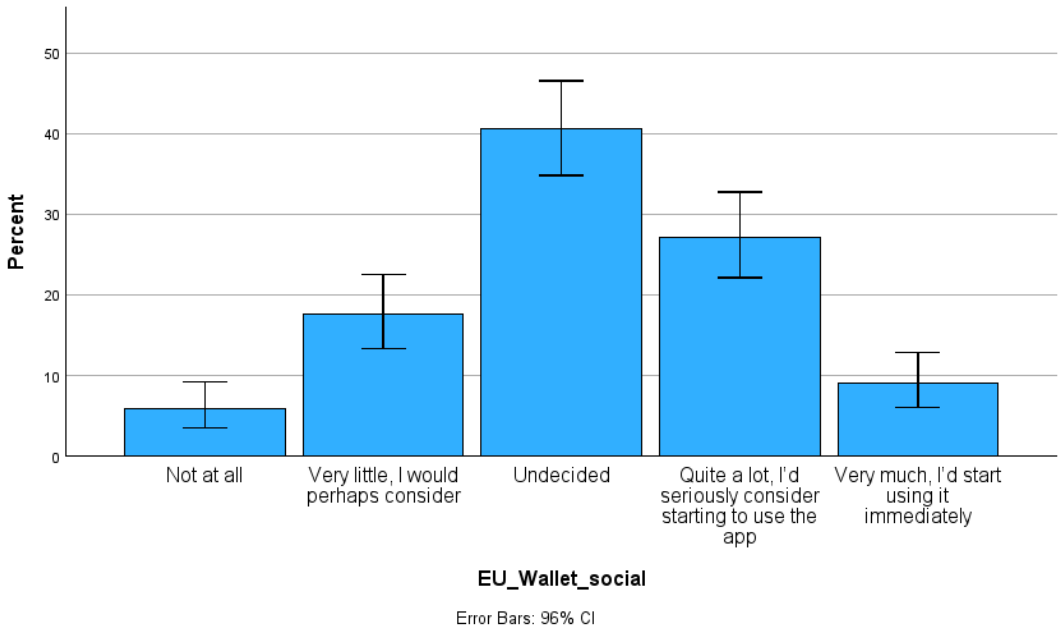

Figure 9. Respondents' Views on Likelihood of Adopting EU Wallet Due to Social Circle Usage (Source: author)

Regarding the respondents' belief in EU's technical abilities and resources to create and implement the EU Wallet framework, most responded "Undecided" (32.99%), followed by "Likely" (27.49%), "Unlikely" (20.62%), "Very likely" (11.34%) and "Very Unlikely" (7.56%). The two highest categories together formed 38.83% of the responses, while the two lowest categories formed 28.18% of the responses.

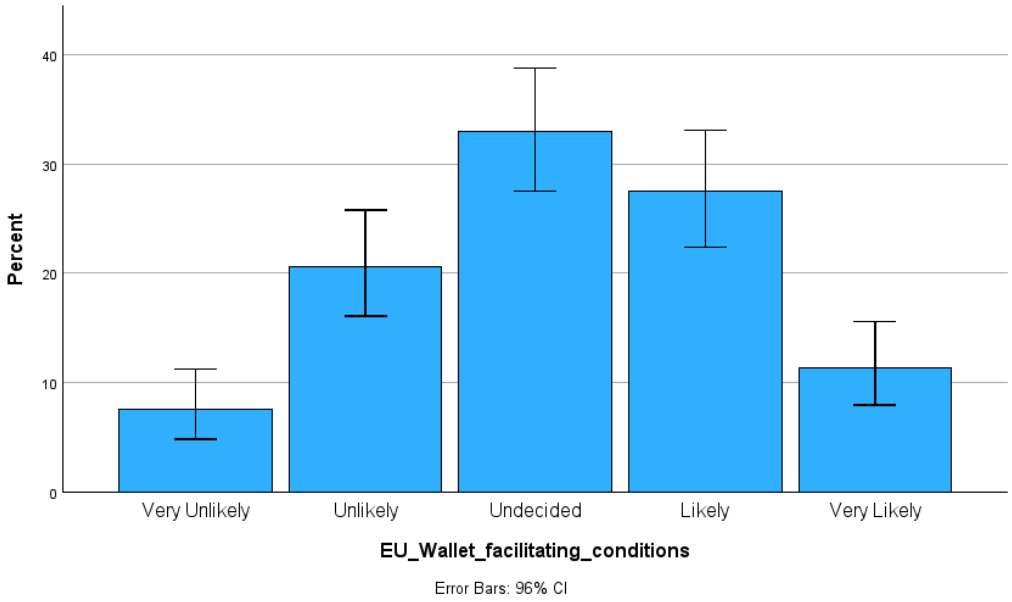

Figure 10. Responders' Opinion on the EU's Capacity for EU Wallet App Implementation (Source: author)

5.3.2 Interview Results

The interviewees agreed unanimously that the ability to hold digital documents would be one of the most motivating features for users to adopt the EU Wallet. The value was seen the most in facilitating easier travelling, as the user would be able to present their identification documents either digitally instead of traditional documents, or in parallel with them. Interviewees A, B and D also saw value in integrating the European Health Insurance Card (European Commission, n.d., f) into the EU Wallet. Four out of five interviewees (and especially the cybersecurity expert) mentioned secure online identification as another very important factor affecting EU Wallet adoption motivation. Additionally, interviewees A and B saw value in having easy access to one's education documents, which is in line with the European Commissions' vision for the app.

Some of the interviewees had opposing views regarding the consolidation of the EU Wallet with other similar wallets. Interviewee A saw this as beneficial, stating: "the most motivating [functionality] always is anything related to financial services and money." This sentiment was reflected in the opinions of Interviewees C and D, both of whom thought that having all identification documents, driver's licences, and bank cards in one place would be convenient for the user, and therefore attractive. However, while Interviewee E agreed on consolidating documents, they thought that adding an ability to make payments is not too critical, as it already functions well in the commercial market. Similarly to mGov, the concerns of duplicate services were also brought up in the conversations regarding the EU Wallet.

Regarding the outcomes that the end users would like to achieve via the EU Wallet, the experts had similar views to the desired outcomes of the mGov app – convenience. Here they highlighted the ability to seamlessly benefit from the services of another country (Interviewees A, B, E), as well as pointed towards a possible simplification of secure online identification (Interviewee C).

The likelihood of choosing the EU Wallet instead of traditional ways to achieve the same outcomes was seen to depend on the desired outcomes themselves and the levels of interoperability between different iterations of EU Wallets. The option to open a bank account with the help of the app was not seen as beneficial (Interviewees B, C), as experts felt that this event does not happen often enough to warrant implementing it into the EU Wallet.

The experts felt that social influence is potentially an important tool in the context of EU Wallet adoption, however, they also felt that we should be mindful about those who do not want to switch over to digital channels. As Interviewee E put it: “We should be careful not to influence people to the point where they feel that they don't have a choice anymore.” Strategies to leverage social connections to reach better adoption were not seen as important on a collective level in regard to the EU Wallet, as the deciding factor across all conversations was the app’s ability to add value.

Opportunities within implementing the EU Wallet include better control over the subject’s own data, according to Interviewee E, as the expert sees the app to be a step in the right direction. Interviewee C commented that the EU Wallet has potential to solve several problems that the EU citizens face, specifically when operating outside of their home country in another Member State. However, many experts pointed out that in order to truly be successful, the app needs to be implemented well enough across the Member States. The interviewers were confident in the EU’s technical abilities and resources to implement a common framework for the EU Wallets.

Some of the experts pointed out that a large challenge lies within the different levels of technical maturity between the Member States, and how this will most likely lead to unequal adoption across Europe. Interviewee E mentioned how more conservative Member States will want to overregulate the apps, which will result in slowed down innovation. Furthermore, according to Interviewee C, the services created by the EU tend to be bloated with disclaimers, announcements, and therefore heavy to use. The expert is expecting the EU Wallet to be built in the same way. Additionally, Interviewee D does not see a reason to build two overlapping apps and does not think the people will react to the duplicate features in a positive way, especially as the apps will be built using the taxpayers’ money. Interviewee B shares the sentiment of unnecessary duplicate features.

5.4 User Experience, Accessibility

When asked about which user experience (UX) and accessibility features should be prioritised in both mGov app and EU Wallet, the questionnaire responders’ top choice was “Simple and intuitive interface” (32.43%), followed by “Clear navigation” (25.45%), “Quick loading times” (21.76%), “Minimal user input, e.g. pre-filled forms” (13.74%) and “Accessibility features e.g. text resizing, high contrast modes” (6.62%).

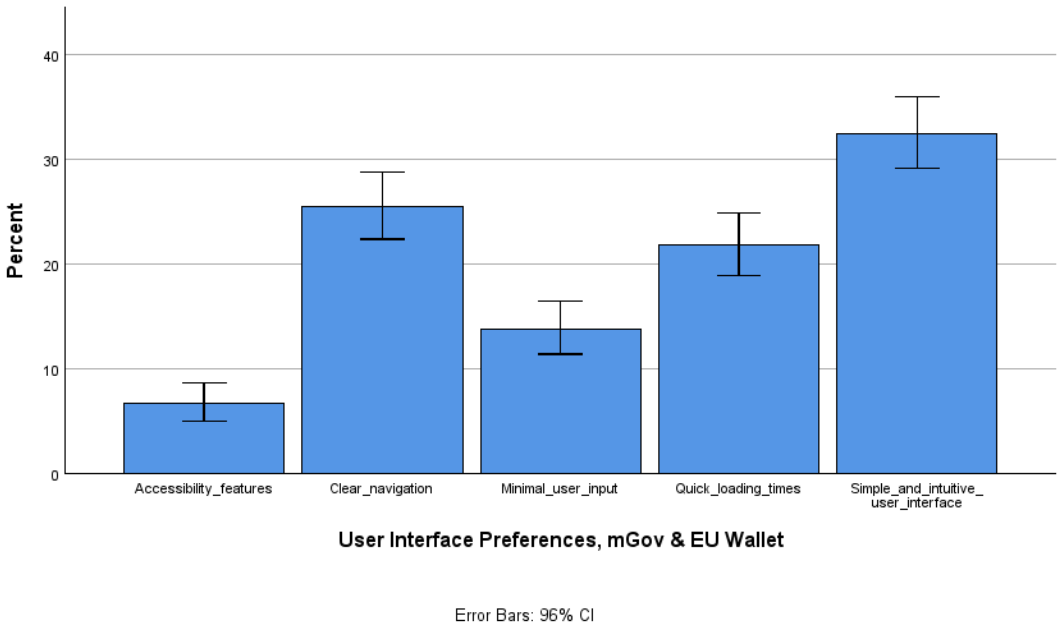

Figure 11. Responders' UX and Accessibility Preferences in MGov and EU Wallet (Source: author)

This question limited the respondents to choose from a maximum of three options, one of which was an option to add more desired UX functionalities. Through the "Other" option, several respondents stressed the importance of security, while some mentioned the importance of including enough language options.

The interviewed experts had several opinions on the appearance of the apps. They thought that both the mGov app and the EU Wallet should look professional, as they are a representation of the government. Interviewee B very clearly expressed that the usage of smileys and emojis is inappropriate in an app created by the government; and Interviewee D reminded that the apps are not in competition with Facebook, Google, or Amazon – and therefore should remain professional for that reason as well. Additionally, the experts expressed concern over the end users' understanding of the seriousness of dealing with their digital identity, therefore the apps should reflect that seriousness in their design. Many experts mentioned the problem of the digital divide and expressed the importance of designing the app with various technical skill levels in mind.

Regarding the elements of user experience and accessibility design, the interviewees mentioned the importance of following existing heuristics of usability (Interviewee A), making the design inclusive to people with lesser technical proficiency and special visual and physical requirements (Interviewee B, D, E), including features such as audio voiceover, larger and easier text.

6 Discussion

This chapter provides an analysis of the quantitative and qualitative data presented in the previous chapter, as well as reflects the findings against the research questions and the objectives of this thesis. Additionally, limitations and prospects for future research are presented and discussed.

The aim of this thesis was to shed light on Estonian working-age populations' attitudes and opinions towards two new types of mobile e-government service provision channels, an mGov app and the EU Wallet, which is reflected in RQ1.

RQ1 What are the attitudes of the Estonian working-age population towards a new e-government service provision channel (mGov app and EU Wallet).

First, the results show that the responders are familiar with mobile technology, as 99.3% reported owning a smartphone or a tablet. Additionally, they are experienced with mobile apps of a similar nature to the ones studied in this research. Out of the respondents, only 3.8% reported not using any of the eID apps available in Estonia and only 8.9% responded not using a mobile banking application in their daily life. Most popular eID app among the responders is Smart-ID. Regarding the reasons to use eIDs, majority of the respondents cited convenience as their top reason.

The findings show that from the perspective of the functionalities of an mGov app, the people are first and foremost expecting the app to have the ability to hold digital documents. This reflects the opinions of all interviewed e-governance specialists regarding the functionalities that would have the most effect on users' willingness to begin using the mGov app. Having access to own medical information is also deemed important by the questionnaire responders, as the options regarding pharmaceutical prescriptions and sick leave documents are the second and third most popular choices. This matches the opinions of the experts, as medical information also placed second in their hierarchy of functionalities.

Having access to dental information is not deemed as important as other medical information by the questionnaire respondents, evident by the choice placing fifth. Seeing information about one's vehicle and dependents is also not deemed as very important by the responders. Lastly, chatting with an AI powered assistant chat bot received the lowest

priority, with only 2.41% of people including it in their response to this question (Figure 3.).

Regarding the EU Wallet, the questionnaire respondents see the ability to open bank accounts as important as the ability to securely identify themselves online, with both options tying for first place. Making payments and holding digital documents are in a very close tie for the third and fourth places, showing that first of all, people deem financial functionalities important. This finding matches the sentiment of an e-governance expert, who stated that the most motivating functionalities are connected to money. Interestingly, holding digital documents in the EU Wallet is not seen as important as in the national mGov app, followed by the ability to see an overview of one's transactions, report alleged data protection violations, have interactivity between other wallets, and lastly, have an ability to log into platforms. Based on the functionality which placed last, it seems that people are not excited for yet another password to remember when logging into online platforms (Figure 7.).

In order to answer the first research question more comprehensively and deeply, a subquestion was employed.

SQ1 How do working-age individuals in Estonia perceive a new e-governance service provision channel (mGov and EU Wallet), in terms of performance expectancy, social influence, facilitating conditions and effort expectancy?

The findings show that in terms of performance expectancy, the vast majority (73.2%) of the questionnaire respondents think that using an mGov app would either likely or very likely bring them to the desired information faster than "traditional" methods (e.g. government websites), indicating a positive attitude towards using an mGov app. When responding to a similar question regarding the EU Wallet, little less than half (48.46%) report that they will likely or very likely use the app to reach the objectives it allows, and around a third are undecided (28.52%). It seems that the responders view the local mGov app in a much more positive light than the EU Wallet.

Regarding social influence, a large amount (41.24%) of the responders are undecided on whether their social circle's positive opinions on mGov would influence them to start using the app themselves, possibly indicating the desire to form independent opinions and draw their own conclusions. However, almost the same amount of the responders say

would be positively influenced, with 40.21% choosing the options "Quite a lot, I'd seriously consider starting to use the app" and "Very much, I'd start using it immediately." These same views are reflected in an identical question about the EU Wallet, with "Undecided" being the top choice (40.55%). Less respondents choose the top two choices (36.08%) than in the same question about an mGov app, and more respondents choose the bottom two choices of "Not at all" and "Very little, I would perhaps consider" in the EU Wallet question (23.03%), than the corresponding mGov question (18.55%). The results indicate that a large number of people do not see themselves influenced by the positive opinions of their social circles towards new service provision channels.

When asked about whether the respondents thought Estonia is ready to implement an mGov app, the majority (62.89%) of the people responded "Could be implemented in the near future" and "Could be implemented right away", with only a small part of the respondents choosing the two lowest options showing less confidence (9.27%). When asked the same question about the EU Wallet, the respondents are largely undecided (32.99%), with a much lower percentage of respondents choosing the top two choices (38.83%) than in the corresponding question regarding the mGov app. The bottom two choices reflecting lower confidence were chosen roughly three times more often in the question regarding the EU Wallet (28.18%), than in the corresponding question about the mGov app, also supporting a more positive opinion towards the latter.

The question regarding effort expectancy was asked about both the mGov app and the EU Wallet simultaneously. The most commonly chosen response is "Simple and intuitive interface" (32.43%), followed by "Clear navigation" (25.45%), "Quick loading times" (21.76%), "Minimal user input, e.g. pre-filled forms" (13.74%) and "Accessibility features e.g. text resizing, high contrast modes" (6.62%). The respondents clearly appreciate more streamlined and intuitive design.

The experts' opinions were studied through RQ2 and subsequent SQ2.

RQ2 What are the perceptions of e-governance experts' towards the adoption of a new e-government service provision channel (mGov and EU Wallet), such as an mGov app and the EU Wallet, by the Estonian working-age population.

The experts' opinions regarding the most attractive functionalities of an mGov app matched with the highest rated functionalities by the questionnaire responders. Both groups think that the ability to hold documents and the ability to see medical information are the most important functionality types in an mGov app. The experts provided further context, stating that the people will benefit further from being able to also see information about their children and dependants, e.g. medical test results, pharmaceutical prescriptions, appointment times. Both questionnaire respondents and experts suggested adding mobile voting to the list of mGov functionalities. One of the experts suggested adding the option to use a digital public transport card, supporting the view that the functionalities should be relevant to people's everyday lives.

Several experts viewed the upcoming mGov app as an extension of Estonia's state portal Eesti.ee. In some experts' opinion the app will replace the portal, whereas others think the app will complement it. Some experts expressed sceptical views regarding the necessity of the mGov app, referring to the usability of the state portal through mobile browsers, and the lack of societal problems it is going to solve.

Regarding the EU Wallet functionalities, the survey respondents see the most value in the planned financial functionalities of the app. This matches the view of one e-governance expert with nearly twenty years of professional experience, who expressed that money is the biggest motivator. The app's ability to hold digital documents is also seen as beneficial by both questionnaire responders and experts. Throughout the expert interviews the app is seen to bring the most value to those who travel frequently.

The likelihood of choosing either of the apps is seen by the experts to depend on the apps' ability to solve the end users' problems and bring value to their daily lives. Interestingly, the questionnaire respondents are quite positive regarding the usefulness of the apps, however the interviewed experts expressed much more sceptical views regarding this. Regarding leveraging social connections to improve app adoption, the experts express the importance of understanding the inner workings of a society where an mGov app or the EU Wallet is to be implemented. It was suggested to present the apps in a way that matches the country's technical readiness. According to the experts, the local mGov app is going to be easier to sell to the Estonian people, therefore the EU Wallet implementation needs to be even more carefully planned out.

According to the experts, the technical readiness is sufficient at both the EU level and Estonia's level to create and implement the apps. In their words, the technical skills or resources are not a hindrance in most EU Member States, however the problem lies with the different needs of the countries and the difficulty of larger interoperability.

SQ2 How should the adoption of a new e-government service provision channel (mGov app or EU wallet) be designed to achieve adoption within the working-age population of Estonia.

Every single interviewed expert stressed the importance of designing both apps to truly bring value to the end users, stating that otherwise the adoption will not be successful. The experts are concerned about possible duplicate functionalities between the apps and app fatigue, further lowering the chances of large-scale adoption.

The likelihood of users adopting any of the apps is seen to solely depend on the value the app provides. Both the interviewees and the questionnaire responders saw convenience to be the main motivator. Additionally, the desire for a proactive element in the services the apps provide is seen in both the experts' opinions, as well as in the questionnaire respondents' opinions, further supporting the need for convenience.

The topic of digital inclusivity is present throughout nearly all of the expert interviews. The experts stressed the importance of creating an app that would be accessible to a wide variety of users with different technical backgrounds. The right app is seen by the experts to be designed in a serious way that represents the government, with a strong attention to user-friendliness, accessibility, intuitive service design and relevancy.

6.1 Limitations

A limitation of this research is the high number of surveyed people with higher education (bachelor's, master's, and PhD or higher). Within this research 71.1% of respondents reported having a higher education, while only 41.2% of Estonian working-age population had a higher education in 2021 (Statistikaamet, n.d., e). This is due to the specifics of the personal and professional networks available to the author. Although the amount of questionnaire respondents exceeded the needed amount for primary data collection, the results are not as generalizable towards the entire Estonian working-age population, as they could be.

Due to the state of m-governance of Estonia and the lack of mGov apps and the EU Wallet, this research is purely hypothetical. Additionally, as the concept of both of the apps is still quite new, it is possible that some respondents were not at all aware of the apps prior to this research.

6.2 Recommendations for future research

Once implemented, future research could look into the relationship of national mGov apps to the iterations of the EU Wallet of each country, and how the two could work in tandem to suit the users' needs. It is clear that not all of the Member States will have an mGov app implemented before the EU Wallet (if at all), however in that case the EU Wallet's place in the country's e-government ecosystem could be investigated.

Future research could look into the technical aspects of integrating the existing national mGov apps with the EU Wallet, which could be a difficult operation. Furthermore, there is a possibility that some Member States will discontinue existing mGov app(s), especially if the same functionalities will be provided through a mandatory EU Wallet. Additionally, future research could look into the societal impacts of mGov apps, focusing on their possible effect on lessening the digital divide. As mentioned above, the needs of demographics with less technical proficiency warrant special attention.

Lastly, the author would like to highlight that Wirtz *et al.*, (2021) identified a research gap in provider-oriented research, suggesting researching m-government from the perspective of mobile services providers.

7 Conclusion

This thesis has been an effort to study the opinions and attitudes of Estonian working-age population towards two new mobile channels of e-government service provision: an mGov app and the EU Wallet. Estonia has been chosen as the location to conduct the research, as the country is currently in a unique position of not yet having either app implemented. As Estonia is a country with high e-government maturity, the successful implementation of both an mGov app and the EU Wallet is important not only from the perspective of enriching the country's e-government service portfolio, but also because of Estonia's role of a model in the area of e-governance.

The results of the study show that the Estonian working-age population find the most value in being able to see digital documents, having access to pharmaceutical prescriptions and other medical information, as well as electronic wallet functionalities. The results also show that the responders had a more positive attitude towards Estonia's own planned mGov app than the upcoming EU Wallet. More people reported feeling they would be able to reach desired outcomes through the mGov app, than the EU Wallet. The trust regarding Estonia's technical resources to implement an mGov app was also higher than towards the EU's. Many respondents reported being positively influenced by their social circles' positive opinions about the apps, whereas others reported the opposite, showing different attitudes and ways of thinking in Estonian society. Regarding accessibility features the top three choices were simple and intuitive interface, clear navigation, and quick loading times, according to the questionnaire responses.

The experts' opinions mirrored the questionnaire results in many ways. Regarding top functionalities, the experts also saw the apps' ability to hold digital documents and perform financial operations as some of the most important ones. The experts explicitly stressed that the apps must be designed in a way that provides the most value for the end users, as well as considers users with varying technical abilities. Social influence was seen to be a potentially useful tool for aiding the adoption of the new e-government service provision channels. The trust regarding both Estonia's and EU's technical abilities to implement the apps was high, however doubts regarding unequal adoption were also present.

Regardless of the limitations, this research has successfully provided insight into the opinions of Estonian working-age population regarding the upcoming e-government service provision channels mGov and the EU Wallet from the perspectives of performance expectancy, social influence, effort expectancy, facilitating conditions and expected functionalities. As this new era of e-government is steadily evolving, opportunities for secure, fast, and streamlined service delivery, as well as pan-European integration are waiting to be seized.

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Appendix 1 – Questionnaire Questions

Nr	Question	Answer options
1	Please select your age.	18-24 25-34 35-49 50-64 65-74
2	Please select your gender.	Female Male Other/Prefer not to say
3	Please select the highest degree of schooling you have completed.	Less than a high school diploma High School graduate or equivalent Bachelor's degree Master’s degree PhD or higher Trade/Technical/Vocational school
4	Have you responded to this questionnaire through Pollfish.com? or Have you responded to this questionnaire through Google Forms?	Yes No
5	Do you own a smartphone or a tablet?	Yes No
6	Please select which of the following electronic identification solutions do you use the most on your smartphone or tablet, if any.	Smart-ID Mobile-ID RIA DigiDoc I do not use any of the options
7	Do you use a mobile banking application in your everyday life?	Yes No
8	Please choose one or several reasons for using electronic identification apps and mobile banking applications.	It is convenient to me It is required by my place of work and/or educational institution My social circle requires me to have it (for example sending money requests between friends) I do not use either type of apps Other, what:
9	Estonia is planning to implement a mobile app that will allow Estonian residents to access government services (generally	Hold digital documents See information about my children/dependents

	referred to as "mGov app" in this research). Which functionalities would the Estonian mGov app need to have for you to consider using it?	See my pharmaceutical prescriptions See my sick leave documents See my dental information See information about my vehicle See my traffic insurance information Chat with an AI-powered assistant chat bot Other, what:
10	Based on the functionalities of Estonia's planned mGov app presented in the previous question, how likely do you think that using this app will enhance your speed of finding needed information within these topics? Please contrast with the speed of finding information through regular ways (e.g. Eesti.ee, Estonian Transport Administration).	1-5 scale, where: 1 = Very Unlikely 2= Unlikely 3 = Undecided 4 = Likely 5 = Very Likely
11	Similarly, the EU is planning to develop an app, which would allow EU residents to access several EU-level services (EU Wallet). Which of the following functionalities should the EU Wallet have in order for you to consider using it?	Securely identify myself online Open bank accounts Make payments See an overview of my transactions Hold digital documents Have an ability to log into platforms, such as Amazon, Facebook Possibility to report alleged violations of data protection Allow interaction between other wallets Other, what:
12	Based on the functionalities of EU's planned EU Wallet presented in the previous question, how likely are you to choose it over other existing methods or tools for performing similar tasks?	1-5 scale, where: 1 = Very Unlikely 2= Unlikely 3 = Undecided 4 = Likely 5 = Very Likely
13	In your opinion, which of the following characteristics should be prioritised in the mGov app and/or EU Wallet? Please choose up to 3 options.	Simple and intuitive user interface Quick loading times Clear navigation Accessibility features (e.g. text resizing, high contrast modes)

		Minimal user input (e.g. pre-filled forms) Other, what:
14	Imagine your social circle routinely uses and endorses Estonia's mGov app. Please select from 1-5 how much their opinion would affect your choice to start using the app yourself.	1-5 scale, where: 1 = Not at all 2 = Very little, I would perhaps consider 3 = Undecided 4 = Quite a lot, I'd seriously consider starting to use the app 5 = Very much, I'd start using it immediately
15	Imagine your social circle routinely uses and endorses EU's EU Wallet. Please select from 1-5 how much their opinion would affect your choice to start using the app yourself.	1-5 scale, where: 1 = Not at all 2 = Very little, I would perhaps consider 3 = Somewhat, I would read more about it 4 = Quite a lot, I'd seriously consider starting to use the app 5 = Very much, I'd start using it immediately
16	Based on your knowledge and experience of using Estonia's e-services, please choose how confident you are that there are necessary technical resources to implement an mGov app.	1-5 scale, where: 1 = Not at all ready 2 = Somewhat ready 3 = Undecided 4 = Could be implemented in the near future 5 = Could be implemented right away
17	Based on your knowledge about Europe's digital readiness, please choose how confident you are that there are necessary technical resources to implement the EU Wallet.	1-5 scale, where: 1 = Not at all ready 2 = Somewhat ready 3 = Undecided 4 = Could be implemented in the near future 5 = Could be implemented right away

Appendix 2 – Interview Questions for e-Governance Experts

1. The European Commission has provided examples of possible EU Wallet functionalities:

- secure online identification
- opening bank accounts
- making payments
- seeing an overview of one's transactions
- holding digital documents
- an ability to log into platforms, such as Amazon, Facebook
- Possibility to report alleged violations of data protection
- Interaction between other wallets
- possibly others as well.

Which ones do you think would have the most impact on users' willingness to start using the app?

2. Estonia is planning to implement an mGov app. Which functionalities do you think the app should have, in order to maximise users' willingness to start using the app?

Some examples:

- holding digital documents
- seeing information about one's children/dependents
- seeing pharmaceutical prescriptions
- seeing sick leave documents
- seeing dental information
- seeing information about one's vehicle
- seeing vehicle insurance information
- possibility to chat with an AI-powered chatbot

3. In your opinion, what outcomes or goals do you think users will expect to achieve by using an app like the mGov app?

4. In your opinion, how likely will people choose to achieve these outcomes or goals via the mGov app, instead of any traditional methods? Traditional meaning existing e-Government services.

5. In your opinion, what outcomes or goals do you think users will expect to achieve by using the EU Wallet app?

6. In your opinion, how likely will people choose to achieve these outcomes or goals via the EU Wallet, instead of traditional methods? Traditional meaning using existing systems.

7. In your opinion, what are the key factors that contribute to individuals' perceptions of how easy it is to begin using a new channel of e-Government service provision, such as mGov app and EU Wallet?

8. From your perspective, what aspects of the apps' design or interface do you think should be prioritised in order to positively influence people's perception of the apps' ease of use (in both mGov and EU Wallet)?

9. In your opinion, how important is social influence (e.g. support from others, social norms) on technology adoption, especially in the case of an app that is provided by the government or EU?

10. In your opinion, what strategies could be effective in leveraging social networks or communities to encourage adoption of the mGov app among the working-age population of Estonia?

11. In your opinion, what strategies could be effective in leveraging social networks or communities to encourage adoption of the EU Wallet among the working-age population of Estonia?

12. In your opinion, what are the challenges and opportunities related to the implementation of an mGov app in Estonia, considering factors such as digital readiness and available technical resources?

13. How confident are you that Estonia has the technical resources to implement an mGov app?

14. In your opinion, what are the challenges and opportunities related to the implementation of the EU Wallet in Europe, considering factors such as digital readiness and available technical resources?

15. How confident are you that the EU has the technical resources to implement the EU Wallet?

Transcripts are available upon request.

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