

# **ANALYSIS OF THE OPERATING MODEL OF THE E-RECEIPT SERVICE**

**Final report**

January 2022

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## 1. Executive summary

This analysis focuses on analysing the e-receipt service, which is an integral part of real-time economy. Real-time economy (RTE) is a relatively new concept according to which today's paper-based interpersonal economic transactions and administrative procedures should be replaced by automatic digital data exchange. The initial concept was developed in Finland and the Nordic countries are currently pioneering the application of RTE principles.

Developing solutions that follow the real-time economy concept is seen as an opportunity to save time, money and human resources, thereby opening up opportunities for creating new economic value. Estonia is also considered one of the global leaders in implementing RTE solutions, together with Finland. In order to implement this concept, the Estonian Ministry of Economic Affairs and Communications has developed Real-Time Economy Vision (2020–2027), which lists the widespread use of e-receipts by 2025 as one of its strategic sub-objectives.

For the purposes of this analysis, an e-receipt is defined as a receipt created in a machine-readable format such as XML. This means that digital images and PDF receipts are not e-receipts. There are already several existing solutions developed in the Estonian private sector that allow viewing digital receipts (e.g., Rimi and Selver applications). The most universal solution on the market today is the mTasku mobile application developed by Telia, which enables the viewing of digital receipts of all vendors who have joined the solution and where the identification of clients is based on their loyalty cards.

Although e-receipts in machine-readable format may move within the aforementioned systems, there is no real capacity today to send e-receipts from one system to another. The only solution offering such functionality identified in this analysis is the PARGI.EE mobile app, which was also developed by Telia and uses some of the technical components of mTasku. As there is currently no standard describing the e-receipt dataset and no universal e-receipt operator, it is not possible to enable intersystem communication or develop any universal solutions in the field.

Technical problems can be, however, overcome and the interviewees claimed that the main obstacle to the widespread use of e-receipts is actually just the lack of interest in e-receipts among both legal and natural person clients. Vendors develop their services according to the wishes of their clients and they are just not seeing enough demand for e-receipt services in the market. Similarly, POS providers are also developing their systems according to the wishes of their clients, i.e., vendors, and are also failing to observe any interest in e-receipts among them.

The emergence of a demand for e-receipt service is, therefore, paramount. To achieve widespread adoption of e-receipts by 2025, the analysis proposes the following activities:

- ▶ Outreach activities aimed at accountants to create demand for e-receipts among entrepreneurs
- ▶ Outreach activities aimed at natural persons to create demand for e-receipts through raising environmental and financial awareness
- ▶ Agreeing on an operating model for e-receipts in order to be able to start building the supporting ecosystem
- ▶ Financial support from the state to carry out the development activities required for the creation of the e-receipt service:
  - POS developments
  - Development activities related to the creation of an e-receipt operator
  - Development of end-user e-receipt solutions

## 2. Introduction

Ernst ja Young Baltic AS (hereinafter EY) conducted a project entitled 'Analysis of the operating model of the e-receipt service' commissioned by the Ministry of Economic Affairs and Communications. The general purpose of analysis was to support the achievement of a sub-objective of the 'Real Time Economy Vision (2020–2027)', which foresees the widespread use of e-receipts by 2025.

Based on the above, the objectives of this analysis include:

- 1) providing an overview of the current situation, i.e. of the e-receipt solutions currently available in the market and the business models thereof, the future perspectives for the e-receipt, and the needs for support for the service to function;
- 2) making suggestions concerning the needs for support of the e-receipt service;
- 3) describing the functioning model of the e-receipt service and the related suggestions, incl. the action plan and schedule (i.e. the roadmap) required for bringing the e-receipt service to the market and achieving the critical mass.

The final result of the analysis provides an input for the development of national support measures designed for undertakings which will create the prerequisites for fast and efficient marketing of the e-services implementing e-receipts by private undertakings.

### 2.1 Methodology and activities

The study involved collecting primary and secondary data which provided direct inputs for responding to the questions posed by the contracting entity in the terms of reference and for describing a future solution and the needs for support. The following activities were carried out in the course of collecting the data:

- ▶ **Analysis of secondary data**, which involved accumulating publicly available data relevant in the context of the study (e.g. the documentation of Omniva's e-receipt, descriptions of the mTasku ecosystem of Telia, the Swedish e-receipt standard, etc. The data were synthesised and used as inputs in further data analysis processes, as well as for drawing final conclusions in the report. The process of collecting secondary data is selective, which enables specifying and complementing the research methods and data sources, if necessary.
- ▶ **Interviews with the parties to the e-receipt solution** in order to collect information about the current situation of using e-receipts and map the situation and the needs of e-receipts.  
Parallel to this study, EY also conducted a study entitled 'The use of e-invoicing in the public sector and business', which enables linking the interviews conducted and thereby expanding the sample of interviewees.
- ▶ **A survey and interviews with private persons** to determine the habits and attitudes of current and potential e-receipt service users. The information collected enabled analysing the user perspective of the e-receipt service, providing an input for introducing the current and potential cases of use and for describing the preferred solution.
- ▶ **Focus group interviews** which involved, within a purposefully compiled sample, representatives of the accounting undertakings of one foreign country (Lithuania) to obtain the opinions, positions, and attitudes of these groups concerning the goals specified by the contracting entity in the terms of reference. The focus group also provided an opportunity to examine the interactions of the members and the peculiarities of the communication patterns.

In order to collect further information, a limited questionnaire survey was conducted among commercial establishments.

The parties involved in collecting information are listed below (see Figure 1).

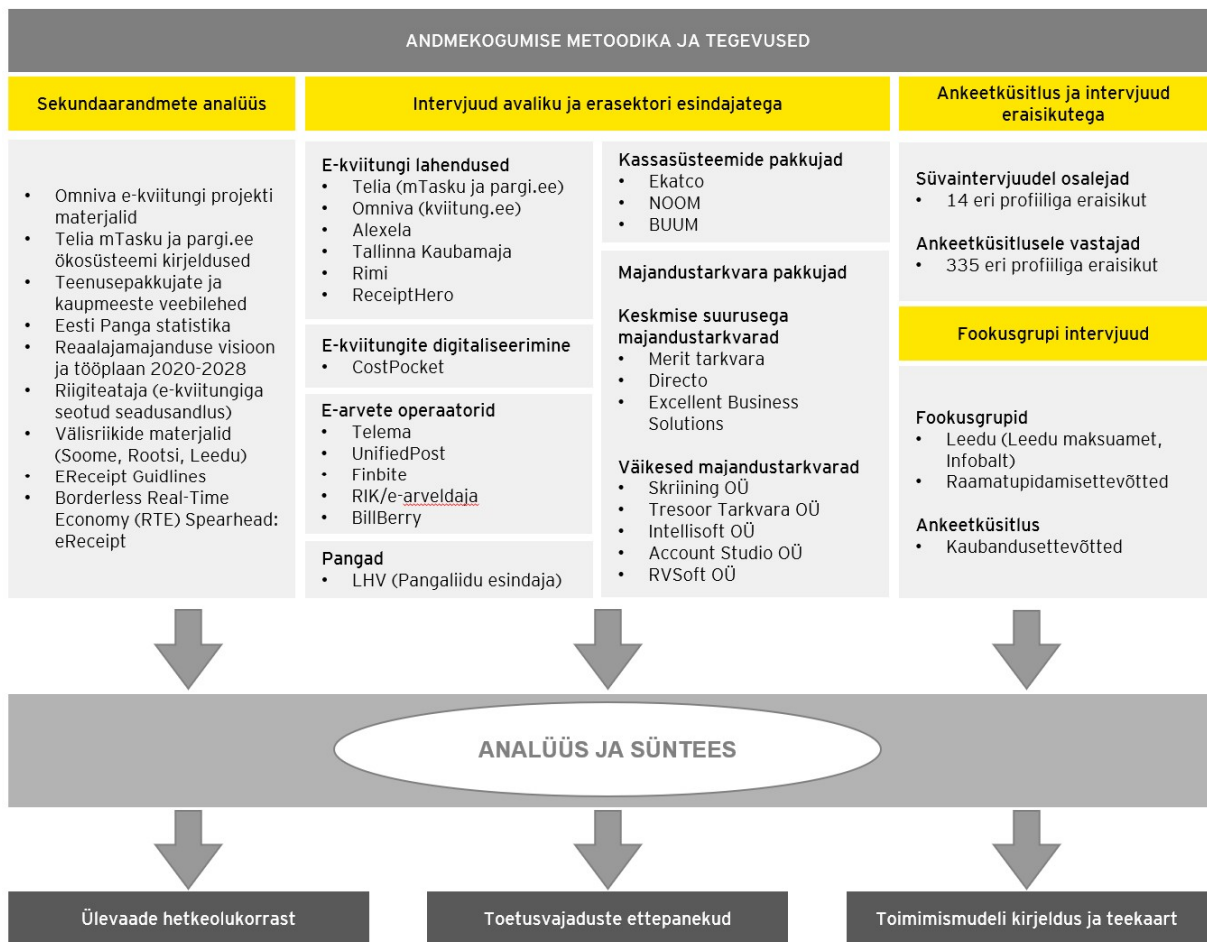


Figure 1. Analysis methodology

Data collection methodology and operations		
Secondary analysis	Interviews with representatives of public and private sectors	Survey and interviews with private individuals
<ul style="list-style-type: none"> <li>Materials of Omniva's e-receipt project</li> <li>Descriptions of the ecosystems of Telia's mTasku and pargi.ee</li> <li>Websites of service providers and traders</li> <li>Statistical data of the Bank of Estonia</li> <li>Real time economy vision and action plan 2020-2028</li> <li>Riigiteataja (e-receipt related reporting)</li> <li>Materials from foreign countries (Finland, Sweden, Lithuania)</li> <li>EReceipt Guidelines</li> <li>Borderless Real-Time Economy (RTE) Spearhead: eReceipt</li> </ul>	<p><b>E-receipt solutions:</b></p> <ul style="list-style-type: none"> <li>Telia (mTasku and pargi.ee)</li> <li>Omniva (kviitung.ee)</li> <li>Alexela</li> <li>Tallinna Kaubamaja</li> <li>Rimi</li> <li>ReceiptHero</li> </ul> <p><b>Digitalisation of e-receipts:</b></p> <ul style="list-style-type: none"> <li>CostPocket</li> </ul> <p><b>E-invoice operators</b></p> <ul style="list-style-type: none"> <li>Telema</li> <li>UnifiedPost</li> <li>Finbite</li> <li>RIK/e-arveldaja</li> <li>BillBerry</li> </ul> <p><b>Banks</b></p> <ul style="list-style-type: none"> <li>LHV (representative of the Estonian Banking Association)</li> </ul>	<p><b>Cash register system providers:</b></p> <ul style="list-style-type: none"> <li>Ektaco</li> <li>NOOM</li> <li>BUUM</li> </ul> <p><b>Business software providers:</b></p> <p><b>Medium-sized business software</b></p> <ul style="list-style-type: none"> <li>Merit tarkvara</li> <li>Directo</li> <li>Excellent Business Solutions</li> </ul> <p><b>Small business software</b></p> <ul style="list-style-type: none"> <li>Skriining OÜ</li> <li>Tresoor Tarkvara OÜ</li> <li>Intellisoft OÜ</li> <li>Account Studio OÜ</li> <li>RVSoft OÜ</li> </ul>
		<p><b>Participants in in-depth interviews</b></p> <ul style="list-style-type: none"> <li>14 private individuals of different profiles</li> </ul> <p><b>Respondents to the survey</b></p> <ul style="list-style-type: none"> <li>335 private individuals of different profiles</li> </ul> <p><b>Focus group interviews</b></p> <p><b>Focus groups</b></p> <ul style="list-style-type: none"> <li>Lithuania (Lithuanian tax authority, Infobalt)</li> </ul> <p><b>Survey</b></p> <ul style="list-style-type: none"> <li>Commercial enterprises</li> </ul>

Overview of the current situation	Analysis and synthesis Suggestions for the need for support	Description of the operating model and roadmap
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## 2.2 Definitions used

The table below provides an overview of the main definitions used in this report.

Table 1. Glossary of definitions

Definition	Explanation
Digital receipt	A receipt submitted as an electronic image, in the PDF format, or in another human readable digital format. Digital receipts are not machine-readable.
E-receipt	A receipt created in a structured, standardised, and machine-readable (i.e. XML) format which can also be displayed in a human readable format (e.g. PDF).
Machine-readable format	Machine-readable format is a file format, the structure of which makes it is easy for software applications to identify, recognise, and read specific data, including individual factual statements, and the internal structure thereof.
Real time economy	Real-time economy is a digital ecosystem in which the transactions between different parties occur in real time or with a minimum delay. This means the replacement of paper-based economic transactions and administrative operations with automatic data exchange in a digital, structured, machine-processable, and standardised format.
Purchase receipt	Upon immediate payment for the sale of goods or the provision of services, the trader shall provide the consumer with a document certifying the sale of the goods or the provision of the services in writing or with the consent of the consumer in a format which can be reproduced in writing and setting out at least: 1) the name or business name of the trader and the address of its place of business; 2) the date of sale of the goods or provision of the services; 3) the name and price of each of the goods or each service and the total amount paid. <sup>1</sup>
Payment receipt	The receipt sent to the system of the issuer of the payment card upon the execution of a payment, with the receipt including at least the following information: 1) the name of the recipient of the payment; 2) the amount paid.

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<sup>1</sup> <https://www.riigiteataja.ee/akt/131122016013?leiaKehtiv> (subsection 4 (4) (Consumer Protection Act, 2021))



### 3. Current situation of the e-receipt in Estonia

This chapter explains the meaning of an e-receipt, provides an overview of the e-receipt solutions currently available in the Estonian market, and highlights the obstacles preventing wider spread of e-receipts.

#### 3.1 Nature and role of the e-receipt

A receipt is a certificate issued against payment<sup>2</sup> the form of which is not uniformly defined. Currently, paper-based receipts are mainly used in trade, but the concept of an e-receipt has arisen in connection with the digitalisation of economy. The use of e-receipts is a novel concept worldwide and thus, there is no common understanding about the definition of an e-receipt.

The Ministry of Economic Affairs and Communications has defined e-receipt as a structured, standardised, and machine-readable document which includes payment information in addition to the details of the e-invoice, and thus, paper-based receipts, electronic images, or PDF files do not qualify as e-receipts. An e-receipt should move automatically and in real time through e-receipt operators from the seller's cash register system to the accounting system of a legal person or mobile application of a private individual. The Estonian public sector did not have a more specific vision of the model of functioning when conducting the analysis began.

The public usually treats any digital purchase certificate which is issued instead of a paper-based receipt and may be an electronic image or a PDF file as an e-receipt. Such receipts are not actually e-receipts, though. In order to avoid confusion, those receipts are referred to as digital receipts in this analysis. For example, Rimi's current solution enables displaying digital receipts or images of the receipts in the self-service system. The mTasku mobile phone application, which grew out of an earlier e-receipt project of Omniva, enables viewing and collecting digital receipts in the PDF format, but machine-readable e-receipts move within the system.

From a wider perspective, e-receipts are part of the real time economy (RTE) ecosystem in which transactions between different parties are completed with a minimum delay and paper-based economic transactions and administrative operations have been replaced by digital, structured, machine-readable, and standardised transactions.

Taking into use of e-receipts means faster automatic data exchange, which should reduce the delays in processes, save resources, and reduce transaction costs, while increasing the cost-efficiency of organisations and the competitiveness of undertakings, making decisions-making processes faster and more accurate, improve transparency and movement of goods, and stimulate economic and social innovations.

#### 3.2 E-receipt solutions in Estonia

The majority of the current solutions enable saving and sending e-receipts as electronic images or in the PDF format. Only the Pargi.ee application developed by Telia enables sending e-receipts directly to the accounting software in the XML format.

Even though the solutions which enable sending electronic images or files in the PDF format are not e-receipts, they are also important in providing an overview of the current situation. Below, we give an overview of several digital receipt and e-receipt solutions currently used in the market.

##### 3.2.1 The e-receipt solution of the Omniva invoice centre (now Finbite) – kviitung.ee

The history of e-receipts in Estonia dates back to 2008 when the idea of e-receipts was born at the Estonian Association of Information Technology and Telecommunications (ITL). The idea grew into the first e-receipt project when Omniva started analysing e-receipts in 2014. It was a work-intensive project which ended in 2016 and

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<sup>2</sup> Eesti õigekeelsussõnaraamat ÕS 2018

resulted in a software solution that was supposed to enable the buyer to view and manage all receipts in an online portal.

In the course of the project, an e-receipt standard coordinated with the stakeholders was developed, with the conceptual and technical description of the format of an e-receipt drawn up in the course of developing the standard. The description of the format included information about what the format should include (such as the issuer of the receipt, description of the product/service, the cost, etc.). The e-receipt standard developed was based on version 1.2 of the e-invoice standard, version 1.1 of the SEPA e-invoice, and somewhat also on the Finnish Finvoice standard.

The infrastructure and architectural model were also agreed on in the course of the project: the appearance of the receipt in the machine-readable format, the data contained in it, the method of transporting the data, and the related parties. Data exchange protocols were also created which determined how to build the interfaces between the parties.

The project involved creating interfaces with payment terminals, the central e-receipt portal (kviitung.ee), and a database. The technical solution developed was implemented in 4,400 points of sale, which means that the application was used in the service servers of the commercial platforms of stores.

After entry into a service contract with Omniva and training the personnel of the store operating the cash register, the solution developed foresaw opening a new e-receipt transmission channel in the Telia Splitter that would have enabled sending e-receipts to the e-receipt platform of Omniva.

The project did not prove successful, however, as traders were not interested in subscribing to the solution. Members of the project team highlighted poor marketing as one of the reasons for the failure of the project. The marketing campaign stated that the big data generated through the platform would be sold. Retail chains saw this creating risk for their businesses, which is why the critical mass of subscribers was not achieved. Alexela Oil AS was one of the few to implement the solution.

Omniva was mainly in charge for general management of the project, working on protecting the trademark, among other things, including examining the possibilities for patenting. Telia was tasked with steering the development of the project and creating a smooth data exchange interface between the e-receipt system and the m-wallet (now mTasku) to enable the customer to view all their m-payment receipts in one place.

### 3.2.2 Telia's solutions – mTasku and Pargi.ee

mTasku is a smartphone application developed by Telia which can hold the payment and loyal customer cards as well as the public transport card. The user of the application can pay for their transactions, use their loyal customer benefits, or validate their right to use public transport without using a card.

mTasku is a development of the e-receipt project of the Omniva invoice centre (now Finbite) described below. Telia also offers cash register interfaces as part of mTasku. Customers are authenticated at the cash register and the technical processing of the receipt is performed on the server side.

mTasku users have access to PDF digital receipts of the payments made via the application for two years after the date of each specific transaction. E-receipt and other payment transaction details are retained in the database of Telia for five years depending on the terms and conditions of data retention established for payment transactions by legislation.<sup>3</sup>

mTasku is used by more than 100,000 users, even though the application is currently (in 2021) not developed further or marketed. The reasons for the success of mTasku include the wide selection of functions, which helps to retain the users: bank card payments, loyal customer card benefits, the option to use gift cards, access to digital

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<sup>3</sup> Terms of use of mTasku

receipts, making donations, paying invoices via Telia's self-service environment, and paying in interfaced online stores.

Telia's mobile phone application Pargi.ee uses the transmission of e-receipts in a machine-readable format. The solution was created in cooperation with Unifiedpost (an e-invoice operator) and currently enables sending e-receipts to Estonia and Finland. Future plans have included enabling sending e-receipts to other European Union countries via the Peppol network, but there is no active development ongoing to create this possibility at this point.

The M-parking solution is available to all Pargi.ee mobile application users of Telia, Elisa, and Tele2. The user is not required to enter into a separate contract with the service provider for the digitalisation of the receipts saved in the PDF format or as digital images – the details of the undertaking (registry code, address) and the recipient of the e-receipt (first name, surname, personal identification code) can be filled in directly in the application. The undertaking which the e-receipt is sent to must be registered as a recipient of e-invoices in the Estonian register of the recipients of e-invoices (the e-receipt is sent through the current e-invoice operator network).

The application enables configuring automatic sending of e-receipts. In this case, the receipt is sent immediately after the payment is made without any interference by the user. Another option is to select the desired receipt from the archive of transactions and use the function of sending e-receipts manually.

Two state registers assist the customer in drawing up e-receipt delivery notes. In Estonia, this assistance is provided by the e-Business Register and in Finland by *Verkkolaskuosoiteisto*, which will request the registry code of the undertaking or the e-invoice address (*verkkolaskuosoite*) in the case of Finland, respectively. The service is free for the end user.<sup>4</sup>

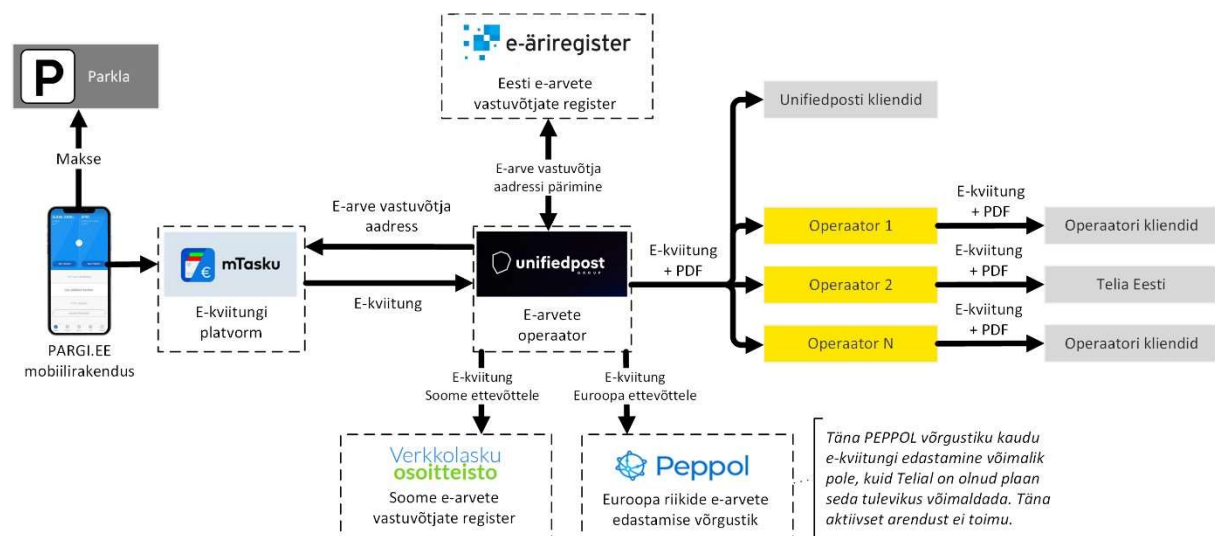


Figure 2. The operating model of the Pargi.ee mobile phone application for issuing e-receipts developed by Telia

- Parkla – Car park
- Makse – Payment
- e-Äriregister – e-Business Register
- Eesti e-arvete vastuvõtjate register – Estonian register of e-invoice recipients
- E-arve vastuvõtja aadressi pärimine – Inquiring the address of the e-invoice recipient
- E-arve vastuvõtja aadress – Address of the e-invoice recipient
- Unifidposti kliendid – Customers of Unifiedpost
- Pargi.ee mobiilirakendus – Pargi.ee mobile phone application
- E-kviitungi platvorm – E-receipt platform
- E-kviitung – E-receipt
- E-arve operaator – E-receipt operator

<sup>4</sup> Telia ja Unifiedpost\_Mobiilne E-kviitung\_esitlus 03.06.2021

Operaator 1 – Operator 1  
Operaatori kliendid – Operator's clients  
Telia Eesti – Telia Eesti  
E-kviitung Soome ettevõttele – E-receipt to a Finnish business  
E-kviitung Euroopa ettevõttele – E-receipt to a European business  
Soome e-arvete vastuvõtjate register – Finnish register of e-invoice recipients  
Euroopa riikide e-arvete edastamise võrgustik – The e-invoice transmission network of European countries  
Täna PEPPOL... – It is not possible to send e-receipts via the PEPPOL network today, but Telia has previously planned providing this opportunity. No active development is currently ongoing.

### 3.2.3 The e-receipt solution of Kaubamaja

In 2013, Tallinn Kaubamaja Grupp took into use an e-receipt solution which enables loyal customers to view and analyse the transactions completed in the self-service environment after using the Partnerkaart loyal customer card. The Partnerkaart e-receipt solution relieves loyal customers of the obligation to present a paper receipt in case of any issues with the goods. Loyal customers can conveniently search for the digital receipt in the self-service environment by the name of the product to solve an issue with a product. Excerpts from transactions and purchase receipts can be printed, if necessary, or saved in a device of the customer's choice in the PDF or Excel format. Customers can also create a separate archive folder for themselves in the self-service environment for collecting especially important purchase receipts to find them quicker, if necessary.<sup>5</sup>

In 2018, the Kaubamaja Group subscribed to the mTasku solution, which allows paying for purchases by using a mobile phone, making shopping even more convenient for the customer. Upon paying at a self-service payment terminal of the Kaubamaja Group, loyal customers receive the digital receipt automatically (with e-receipts moving in the system). If the loyal customer paying at a self-service payment terminal would also like to receive a paper receipt, they must make the respective solution by using the user interface of the self-service payment terminal. In the case of paying at a cash register with a customer attendant, though, paper receipts are printed even if not requested by the customer due to the outdated cash register system.

### 3.2.4 The e-receipt solution of Rimi

Rimi started using digital receipts in July 2021 to offer the customers an alternative to paper receipts. Rimi conducted a pilot project to start using digital receipts in the case of which the option to print a paper receipt was offered to the customer upon paying at a self-service payment terminal. The project revealed that up to 80% of the customers were prepared to forego printing paper receipts, indicating the preparedness for a digital solution.<sup>6</sup> Today (2021), this option is used by 75% of the customers using self-service payment terminals on a daily basis.

Customers can use the digital receipts of Rimi, having specified that they would like to stop using printed receipts and have them saved to their loyal customer cards instead in their 'Sinu Rimi' loyal customer programme profiles (in the mobile application or in the self-service environment on the website), which allows them to access their receipts via the digital channels offered by Rimi or have them sent to their e-mail mailboxes. Having foregone paper-based receipts, the customer retains the right to cancel this decision in the self-service environment or make a once-time decision to print a paper receipt at the self-service payment terminal. Those customers who do not have loyal customer cards can also decide not to print a paper receipt at the self-service payment terminal in the case of each purchase, but will not be able to access their receipts at a later date.

Rimi is planning to increase the number of digital receipt users and develop the current system. For example, the business is planning to create an option to export the receipts in the CSV or Excel formats to enable the customer to download the data and analyse their expenses made at Rimi. If this development was completed, machine-readable e-receipts of the digital receipts created would be available. Rimi is also planning to develop a function

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<sup>5</sup> <https://www.tkmgroup.ee/investor/tallinna-kaubamaja-kontsern-vottis-kasutusele-e-tseki>

<sup>6</sup> <https://www.rimi.ee/uudised/rimi-kutsub-eelistama-digitsekki>

of combining invoices and receipts in the self-service portal of Rimi to accumulate all expenses made at the physical store as well as on the online store platform under the customer's profile. A third future plan of Rimi is to realise the default transmission of digital receipts and only print the receipt if a respective selection is made, which is the opposite of the current situation in which the paper receipt is printed by default and the customer can choose to forego this. The fourth plan of Rimi involves offering digital receipts to regular customers, who are not included in the loyal customer programme. Even though there is not yet a good solution in Estonia for linking receipts to the ID card, which could be a potential solution, Rimi would, above all, like to develop a solution covering all Baltic states in which the same system would be used by all Rimi stores.

Rimi is not actively advertising the option to choose a digital receipt, which is illustrated by the fact that only 2% of the loyal customer base in the Baltic states ask Rimi to provide digital receipts today (three months after the implementation of the digital receipts). Rimi is not using any operator services for the transmission of digital receipts. The entire solution used today has been developed by the business itself. Thereat, the receipt data move between the system in a machine-readable form, i.e. as e-receipts.

### 3.3 Solutions for the digitalisation of receipts

In the accounting sector, the service of digitalising receipts has gained an important position in the handling of the paper receipts and invoices of undertakings, which is being provided by CostPocket and Envoice, among others. Their applications help to collect and digitalise receipts and invoices and send them directly to the accounting software. In the case of using the digitalisation service, the accountant (or another individual handling receipts) is not required to enter the data in the accounting software manually, but may take a photo of a paper receipt and the application will read the content of the receipt. In principle, paper receipts are converted into machine-readable e-receipts.

CostPocket and Envoice are both interfaced with the majority of the leading accounting software applications, making handling cost documents simple and convenient. The biggest and best-known solution in the field of digitalisation is CostPocket, which is used by the biggest accounting bureaus and several undertakings in Estonia.<sup>7</sup>

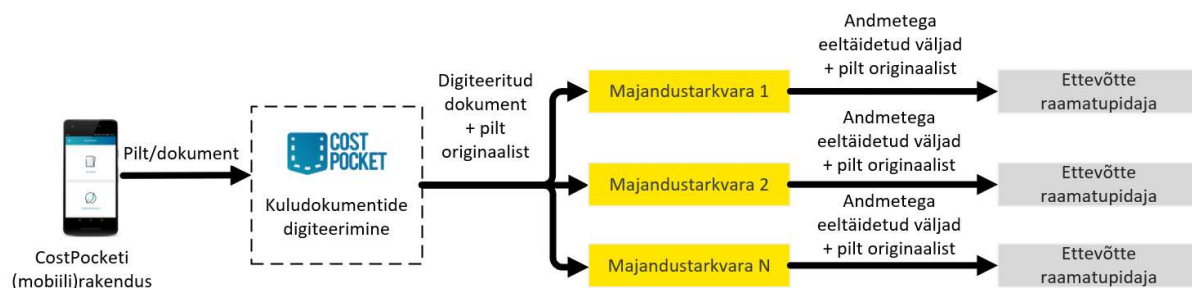


Figure 3. The operating model of the receipt digitalisation services based on the example of CostPocket

CostPocketi (mobiili)rakendus – CostPocket mobile phone app

Pilt/dokument – Image/document

Kuludokumentide digiteerimine – Digitalisation of expense documents

Digiteeritud dokument + pilt originaalist – Digitalised document + photo of the original

Majandustarkvara – Business software

Andmetega eeltäidetud väljad + pilt originaalist – Pre-filled data fields + photo of the original

Ettevõtte raamatupidaja – Accountant of the business

Figure 3 describes the operating model of the digitalisation solutions that involves converting a cost document (receipt or invoice) from the paper or PDF format to a machine-readable format and sending it to the accounting software application with a photo of the original document (receipt or invoice). For digitalisation, a photo must

<sup>7</sup> <https://costpocket.com/et/#>

be taken of the cost document by using the CostPocket mobile phone application or the document must be sent to a special e-mail address, which is followed by reading of the text on the image by optical character recognition and converting of the text to a machine-readable format. If some parts of the text cannot be automatically recognised or are read incorrectly, the user of the mobile application can complement or change the data. The accountant can also correct the data via the user interface of the accounting software.

CostPocket offers two services for the digitalisation of paper receipts: robot digitalisation and human digitalisation. In the case of robot digitalisation, the digitalisation is performed by a software application developed by CostPocket which converts the text on the paper receipt to a machine-readable format at the accuracy of at least 70% and sends the e-receipt and an image of the paper receipt directly to the accounting software. In the case of using the human digitalisation service, the e-receipt digitalised by the CostPocket software is checked by an employee of CostPocket before sending to the accounting software and any potential errors are fixed. The human digitalisation service is more expensive but also guarantees higher accuracy (approx. 99.5%). The file formats which can be digitalised with the help of CostPocket include PDF, JPG, TIF, DOC, PNG, XML, and HTML.

## 3.4 Obstacles preventing wider spread of e-receipts

E-receipts compliant with the definition of an e-receipt and in the case of which the receipt is created, transmitted, and used in a machine-readable format can be found in very limited cases (see also Figure 2 above). In most cases, the e-receipts used are only partly compliant with the definition of an e-receipt. In this sub-chapter, we discuss the different obstacles which have prevented wider use of e-receipts.

Those obstacles can be examined by the parties of the so-called e-receipt ecosystem; the parties include the consumers (buyers), traders (sellers), accounting software and cash register system providers, and other potential parties to the e-receipt system (e.g. operators, banks, etc.).

### 3.4.1 Obstacles experienced by the consumer

This sub-chapter summarises the results of a thorough user study conducted among the consumers, including providing an overview of the main factors which prevent taking into use e-receipts. The study involved in-depth interviews with fourteen private individuals of different profiles. In order to collect information more extensively, a questionnaire survey was also organised and responses were received from 335 people. **The results of the user study, including the personas and user paths developed on the basis of the results of the user study are described in detail in Annex 1.**

#### ***Majority of the consumers are not interested in receipts***

The interviews and the questionnaire revealed that majority of the people do not take receipts, never check receipts, and are not interested in receipts at all. If possible, they notify the customer attendant that they do not want the receipt, but if they receive a receipt from the customer attendant or if it is placed in the bag with the goods, they simply throw the receipt away. Many users do not understand why the trader prints the receipt even if the consumer does not want it and throws it away. In this context, the massive wasting of paper was highlighted.

There is a marginal number of people who always take the receipt, as they keep an eye on their expenses in detail (write them down) or wish to check that the trader has calculated the prices accurately.

Private individuals sometimes take receipts for splitting the bill or for submitting a cost document to the person in the name of whom the expense was made. This occurred rarely among the participants in the study, though.

#### ***Receipts are often taken for the purpose of returning goods***

Some consumers take receipts to be able to return or exchange the goods later, but many use bank statements for this purpose instead. Paper receipts are often taken for returning purposes, as the individual is not aware of

the option to return goods based on a bank statement, has an experience of the trader not accepting their bank statement, or finds searching for the transaction in their online bank more burdensome than keeping the receipt.

#### ***People are interested in receipts for warranty purposes***

Warranty is a service for which receipts are always taken. There are some who are aware that they can also use another evidence of the payment (a bank statement) to prove the right to the warranty, but warranty appears to be considered more important than a regular purchase (valid for two years) and the consumer feels more secure having taking the document and keeping it in a drawer. In the case of the warranty receipt, people also highlighted that the receipt can be used to check the serial number of the product, if necessary (e.g. for repair works after the warranty period).

#### ***Receipts are always taken for accounting purposes***

Receipts are always taken if the individual needs to prove their expenses to their employer or uses the card of the business/agency to make purchases. Thereat, it is not the person who makes the purchase but the accountant who requires the receipt.

#### ***General attitudes***

The majority of the people involved in the study have had contacts with e-receipts by now and are prepared to use e-receipts more extensively. The majority of them believes that the online bank is the most convenient place for viewing the e-receipts. The need for separating important receipts from unimportant ones was highlighted to prevent the reverse effect of paper receipts still being kept in the drawer in the case of warranty products even after taking into use of e-receipts, for example, to be able to separate the proof of this purchase transaction from the general mass of transactions. The disadvantages of paper receipts include the issues arising from their quick fading and the loss of the receipts.

From the perspective of private individuals, the main obstacle which prevents taking e-receipts into use is the lack of interest. Most people are not interested in receipts and only take receipts if they have been asked to do so by someone else or need the receipt (for returning, exchanging, warranty). The study revealed that if the trader held the information required for returning or changing goods or for the warranty, receipts would become worthless for most people.

From the perspective of business customers, taking the receipts is a burdensome obligation and people would actually like to forego taking and collecting the receipts and photographing or scanning them for sending to the accountant. This is, however, important and necessary for business, for example, from the perspective of financial management and for tax purposes. The e-receipt solutions to be developed in the future should make the operations which the users are required to perform much simpler.

### **3.4.2 Obstacles experienced by traders**

Below, we provide an overview of the factors which prevent taking into use of e-receipts from the perspective of traders. The information collected mainly originates from interviews conducted with the traders (representatives of Tallinna Kaubamaja and Rimi were interviewed) and from a limited questionnaire survey conducted among commercial enterprises. The information collected by interviewing other parties included in the ecosystem of e-receipts was also taken into consideration.

Traders clearly have a key role in achieving wide-spread use of e-receipt solutions. Thus, solving the obstacles experienced by them is one of the most important steps in taking e-receipts to the masses. The main current issue revealed by the analysis which prevents the spread of e-receipts is related to the lack of interest from the consumers. The activity of traders is based on the wishes of the consumers and traders have not yet noticed a significant need for e-receipts on the side of the consumers, which is why the switch to e-receipts has not yet occurred.

Larger retail chains have rather foregone using paper receipts in the name of green philosophies. Today, e-receipts are used at the undertakings with a wide loyal customer base and a large network of stores which tend to operate in several different trade segments. For example, Tallinna Kaubamaja Group, which meets all the conditions listed above (Partnerkaart, Selver, Kaubamaja, etc.), has one of the most successful e-receipt solutions.

In addition to the lack of interest from the consumers, the analysis also revealed a number of other factors due to which e-receipts have not been taken into use widely:

- ▶ Technical capability
- ▶ Data protection and privacy-related obstacles
- ▶ Obstacles arising from the current legislation
- ▶ Obstacles arising from the competition situation and analysis of price information

### ***Technical capability***

The interviews and the questionnaire survey both confirmed that the technical capability was a significant obstacle preventing the switch to e-receipts. The majority of the undertakings do not currently have solutions for electronic transmission of receipts.

Among other things, it appeared that a number of traders are using outdated cash register systems which do not include the option of foregoing printing the paper receipt even if the customer states that they do not want the receipt. If e-receipts were taken into use, many of the currently used systems would have to be developed. Thereat, the volume of the developments needed significantly depends on the future IT architecture choices. It also appeared that those traders who use ID cards to identify their loyal customers cannot subscribe to the mTasku solution, as it was not possible to create an official duplicate of the ID card into a mobile phone as an official national identity document when mTasku was developed (the solution would have called for an amendment of the legislation). A pilot project for taking the ID card into mobile phones (i.e. to the secure SIM card space) was launched in cooperation with the Estonian police, but the project was discontinued due to reasons arising from the state. According to a representative of mTasku, it is still possible to develop the option to use ID-cards today, but the ID-card transferred to mTasku would not be a so-called real ID-card that could be used for concluding an instalment contract, for example. The card would, in principle, still remain a loyal customer card. Thus, in the case of those traders who use ID-cards as loyal customer cards, the first currently available step for foregoing paper receipts is already prevented even if the accounting software provider of the undertaking is interfaced with mTasku.

In the e-receipt pilot project led by the Omniva invoice centre (see also sub-chapter 3.2.1), it remained unclear for the traders from the technical perspective which additional expenses the changing and configuration of the cash register systems, training of employees, and other related aspects would be accompanied with. It also remained unclear whether or not those extra expenses would be justified from the economic perspective.

### ***Data protection and privacy-related obstacles***

Implementation of e-receipts would also come with restrictions related to processing personal data, as personalised receipts would include data which enables identification of a private person. This creates an additional obligation for traders to pay attention to the personal data protection requirements pursuant to the provisions of the Personal Data Protection Act and the General Data Protection Regulation.

The issue of the permissibility of personal data would also arise if the receipts were retained by a third party, as in this case, the trader would be required to ensure that this is done properly from the legal perspective. As personalised e-receipt data can only be processed based on the consent of the data subject or the buyer (there are no legal grounds arising from contracts or the law in the case of receipts), the issue of asking the buyer's consent must be solved. Consent given by the consumer upon subscribing to a loyal customer programme or downloading an application that enables viewing e-receipts could provide a solution. The issue of giving consent



is discussed in further detail in the chapter on the potential operating model of an e-receipt solution (see sub-chapter 6.3).

#### ***Obstacles arising from current contracts and the law***

Based on the statistical data of the Bank of Estonia, the number of transactions completed with bank cards has been increasing consistently since 2017 (the increase amounted to approx. 10% per year, except in 2020 when there were COVID-19 restrictions).<sup>8</sup> The increase in the share of the transactions completed with bank cards is connected to one of the reasons for continuing to print paper receipts. On the one hand, traders are interested in keeping up with the development of the technology, on the other hand, however, there is still the requirement of the banks to the traders that the trader must be able to prove to the bank that a card payment has been made.<sup>9</sup> This is necessary for solving any errors which may be made in the course of making payments and the majority of the traders always print a paper receipt proving the card payment transaction for themselves for this purpose. Therefore, traders cannot completely forego using paper receipts, which also lowers their motivation for foregoing the paper receipts printed for the customers. An interview conducted with providers of cash register systems revealed that different providers use different solutions for satisfying this requirement. Some cash register system providers advise printing the paper receipts that prove card payment transactions, while others enable retaining the entire payment information digitally. Banks have not established clear requirements for the format of the document proving the transaction, which means that paper receipts could actually already be replaced by digital proof.

Foregoing the use of paper receipts is also indirectly hindered by a requirement of the Consumer Protection Act<sup>10</sup>, pursuant to which, upon payment for the sale of goods or provision of services which cost at least 20 euros, the trader shall always provide the consumer with a document certifying the sale of the goods or the provision of the services in writing or with the consent of the consumer in a format which can be reproduced in writing. Even though this does not directly restrict the use of e-receipts, the requirement has still motivated the continued printing of paper receipts.

#### ***Obstacles arising from the competition situation and analysis of price information***

An e-receipt pilot project conducted brought out the fear of the traders that taking into use of e-receipts would make comparing prices easier for the customer, which may in turn had a certain effect on their purchase behaviour. On the other hand, this statement is not of a significant importance in the current situation, as retail chains have online stores that already make the price formation transparent. A greater business risk arising from making machine-readable data accessible is seen to arise from making possible automatic analysis.

In the e-receipt pilot project, the attempt to take the e-receipt to the masses largely failed due to the caution of the traders. Traders were interested in the service but did not wish to issue their sales data massively in a machine-readable format. The traders also did not have an experience with the service due to the novelty of the e-receipts and they would have thus like to see a functioning service developed by a competitor and make sure that it was necessary before starting to use e-receipts.

#### ***General attitudes revealed by the questionnaire survey***

The questionnaire survey conducted among traders showed that those undertakings which are not using an e-receipt solution today also do not see any business advantages arising from starting to use such solution. Some traders would be prepared to take into use a technical solution which enables the use of e-receipts with support

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<sup>8</sup> <https://www.eestipank.ee/maksed-arveldused/eesti-maksekeskkond>

<sup>9</sup> <https://www.lhv.ee/et/maksete-kogumise-lepingu-tingimused> (LHV 'Terms and conditions of the payment collection contract', clause 6.1)

<sup>10</sup> <https://www.riigiteataja.ee/akt/TKS> (§ 4 (Consumer Protection Act, 2021))

from the state. The majority of the traders, incl. some of those who already have the capability of sending electronic receipts, do not believe that the customer should have the right to request an e-receipt.

Asked if they served customers without paper receipts, for example, based on a bank statement, 40% of the traders responded that they did not serve customers without receipts. The Consumer Protection and Technical Regulatory Authority believes, however, that as the Law of Obligations Act does not regulate how purchases must be proved, having made a purchase may be proved by using several different options, including based on a purchase receipt, invoice, bank statement, or another relevant document.<sup>11</sup> Thus, several traders and the Consumer Protection and Technical Regulatory Authority have different opinions on how purchases should be proved.

No clear preferences can be detected with respect to a transfer to the European e-receipt standard that will be ready in 2022. There are those who are against the transfer, those who support it, and those who are not aware of the existence of the e-receipt standard.

From the legal perspective, traders find that the use of e-receipts should not be made mandatory for traders. In their opinion, if the market is ready for e-receipts, they will be taken into use without help from the state. However, if the obligation to switch to e-receipts should arise, they do feel the need for support from the state.

When it comes to the format and the manner of providing the receipt, the traders find that issuing paper receipts should continue. As a potential alternative to paper receipts, they mostly see a solution in which the e-receipts are made available in the self-service environments of the traders. Making the e-receipts available in the online bank of the customer is supported in a somewhat lower extent. It is, however, important to highlight that none of the traders surveyed or interviewed supported the creation of a centralised online environment not associated with the traders, as traders see a risk to their business in sharing their data and collecting it in a centralised application. Thus, it should be stressed in the development of any e-receipt solution and also specified in the data usage agreement that the data of the traders may not be disclosed to third parties (or the conditions under which they may be disclosed).

Technical capability and data protection and privacy-related issues are highlighted most as the general problems preventing the transfer to e-receipt solutions.

### 3.4.3 Obstacles experienced by providers of accounting software and cash register systems

The main obstacle from the perspective of the providers of accounting software and cash register system that was identified in the course of the analysis was the lack of interest from traders. Cash register system providers mainly develop their products based on the needs of traders, who in turn operate based on the wishes of consumers. As there is currently no order from consumers or traders for the development or implementation of e-receipts, this functionality has not been developed further from the e-receipt pilot project conducted a while ago in cash register systems.

Below, we provide a detailed overview of the factors which prevent taking into use of an e-receipt from the perspective of accounting software and cash register system providers. The information originates from the interviews conducted with accounting software and cash register system providers (see the list of interviewees, Figure 1). It is important to stress that the providers of accounting software and cash register systems believe that they would be able to remove the obstacles and take e-receipts into use if there was interest from traders. On the other hand, that does not rule out the need for support from the state, as agreeing on a uniform standard, for example, would significantly simplify the process of implementation.

#### ***Economic motivation***

Several cash register system providers have built certain e-receipt transmission functions into their products, such as integration with mTasku or the earlier kviitung.ee solution, the systems are capable of sending e-receipts to e-

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<sup>11</sup> <https://ttja.ee/media/1121/download>

mail addresses or to a centralised system. All larger cash register system providers offer integration with the mTasku solution, but traders have not subscribed to the service due to the high monthly fee and the rather modest number of users of the application.

Cash register system providers have not been motivated to develop e-receipt transmission and reception solutions due to the current relatively low awareness and interest of the traders to start using e-receipts. The reason for this is the high development costs which exceed the estimated benefit. According to several cash register system and accounting software providers, the business models has been repeatedly expanded based on the wishes of clients to use additional services, but their clients have not had any such wishes in connection with e-receipts. Thus, cash register system providers do not have economic motivation for the development. The e-receipt business model remains weak for now and is not a profitable business for the providers of cash register systems.

### ***Lack of a standard***

Development of the e-receipt service has partly also been hindered by the lack of a standard. The e-receipt standard created within the framework of the early e-receipt pilot project was based on the e-invoice standard. This is no longer usable, as it does not represent all current needs.

However, traders and cash register system providers both believe that the e-receipt standard to be developed in the future should be based on the e-invoice standard, as an e-receipt is equivalent to an e-invoice from the perspective of economic content, with only payment details added. Existence of a standard is important to guarantee to the parties that the service developed meets the expectation, includes a certain data composition, and is a universal solution for the recipients of e-receipts. Otherwise, different parties would have to make additional expenses on development.

A European Union e-receipt standard is currently being developed based on the European Union e-invoice standard and the work should be completed by the beginning of 2023 (the CEN/TC 434 working group). The standard will potentially solve the problem described above. The EVS/TK 76 technical committee operating by the Estonian Centre for Standardisation and Accreditation, which was formed to express Estonia's opinions about any changes to the e-invoice standard (CEN/TC 434) and development of the ISO/TC 295 (Audit Data Services) standard, believes it would be reasonable to implement the EU e-invoice standard as the e-receipt standard, making as little changes as possible.

### ***Obstacles arising from identification and authentication***

One of the most complicated technical aspects of the e-receipt is the identification of the customer during a purchase transaction and associating the customer with the e-receipt. Three methods are currently used for this purpose and all of them have some shortcomings.

▶ **The first option is to identify the customer by registration of the loyal customer card of the store.** Identification by using a loyal customer card comes with the following shortcomings:

1. The customer may forget to bring their loyal customer card.
2. The loyal customer card may have expired.
3. The customer may not be a user of the loyal customer card of the store.

Based on the above, many customers may remain unidentified and not receive the e-receipts. The logic of the structure of the identification code of a loyal customer card is also different in the case of different store chains, which would create an unclear amount of extra work in creating a uniform solution for all traders.

▶ **Another option is to identify the buyer with the help of an ID-card or other similar means of identification.** In addition to a store chain's own loyal customer card, loyal customers can also be identified by using ID-cards, which are used by many traders as an alternative to the loyal customer card, but is not used as a

method of identification in the currently available e-receipt solutions. Having an ID-card is mandatory for all Estonian citizens, which is an important advantage of the card compared to identification by using a loyal customer card. On the other hand, loyal customer cards form an important part of the brand for many traders, which is why quite a few traders would not support eliminating those cards.

- ▶ **The third option is to identify the buyer based on the details of their bank card (such as card number, expiry date).** This solution has not been realised in Estonia yet, but is successfully used in Finland (ReceiptHero). The main shortcoming of the solution is that it cannot be used in the case of cash transactions.

It is appropriate to view the identification of the customer in the case of a cash transaction as a separate problem. In the case of a cash transaction, the customer can also be identified by registering the loyal customer card, but the customer may also pay without presenting the card. In this case, the e-receipt could be e-mailed to the customer, which would require the customer to loudly articulate their e-mail address in the queue at the cash register. This solution would be time-consuming and would come with privacy risks and a high likelihood of errors. On the other hand, the customer may wish to remain anonymous or may not require the receipt at all due to a lower total amount of the payment transaction or other preferences of the customer.

### ***Architectural obstacles***

In order to achieve wide-spread use of e-receipts, it is important to store the receipts in a location where undertakings and private individuals can both handle their e-receipts.

In the afore-mentioned e-receipt pilot project, a central website was created with a database for storing e-receipts where they could be viewed by users. The platform enabled monitoring expenses by expense groups, searching for a specific receipt by using keywords, and sharing and downloading the receipts. As highlighted above, however, the solution created was not accepted by the users (traders and consumers) and the platform was eventually closed.

Cash register system providers suggested several potential options for the centralised storage of e-receipts in the future in the course of the interviews.

- ▶ **One of the options is to deposit the e-receipts in the eesti.ee environment.** This could be solved similarly to the @eesti.ee e-mail address (which all Estonian citizens have) through which the person could direct their e-receipts to a certain environment in the future, just like the e-mails sent to the @eesti.ee e-mail mailbox can be redirected to some other personal e-mail address. Another related solution suggested involved depositing and making available all e-receipts on the eesti.ee platform. Such national solution raises the question of whether the state should provide and fund this so-called 'convenience service' and what would be the legal basis of the data which enable identification of an individual (receipts).
- ▶ **Another option would be to create a central database that enables depositing e-receipts.** In the course of the interviews, an option was suggested where the e-receipts would be stored in a central database but made available to the user in the online bank, which would send a request to the central database to display the details of a specific receipt. On the other hand, this would give banks an opportunity to create a novel additional service, which the banks would be happy to realise according to a representative of the Estonian Banking Association. The service developed would display to the customer in the online bank detailed information about the transaction based on the e-receipt, in addition to the details of the recipient, explanation, and amount which are currently displayed. For the bank, it would mean the development of the current money journal feature that categorises expenses based on the recipients of the payments. The bank cannot create an ideal solution based on the currently available data: for example, in the case of buying electronics from a larger grocery store, the expense is currently classified under the food category and buying food from a fuel seller is classified under fuel.

Interviews with private persons revealed that they do not see any significant problems arising from e-receipts being displayed in the online bank (this would be the most preferred option based on the convenience of

use), but the solution would only be acceptable if the customers could be sure that their data cannot be processed by the bank. People are afraid that this would give access to excessive information to the bank and a possibility to offer services (e.g. loans) based on this information.

Private individuals may also actively use several different bank cards for different reasons. Thus, the customer would still not have a comprehensive overview of their e-receipts, as they may forget which bank card they used to make the purchase. The data should be exported from different channels to find a specific e-receipt or analyse one's personal expenses, but that would not be convenient from the perspective of the user.

- ▶ **Local storing of receipts in the customer's own device was suggested as a third option.** In the case of this solution, the customer would have to perform the operation of receiving the e-receipt upon paying at the cash register (e.g. by scanning a QR code or via the NFS protocol). On a positive note, the level of technical complexity of the solution would be low. An important obstacle, however, arises from the fact that the operation of making a payment would become more complicated, which would significantly hinder the implementation of a solution based on this architecture.

**Another architecture-related obstacle is that the receipts issued by commercial enterprises (retail chain, pharmacy, catering establishment, etc.) differ greatly by the structure.** For example, a pharmacy receipt may include four different discounts for the goods, which would create a link with the requirements of data protection and the requirements applicable to confidential information. The receipt issued upon purchasing medicinal products must, for example, specify the retail price of the medicinal product, the amount paid by the patient, the cost-sharing rate, the discount percentage, the amount, and the amount exceeding the reference price. Thus, the structures of the receipts arising from different regulations and business models pose an obstacle for the developers, as it is difficult to take them all into consideration.

The obstacles for the main parties (consumers, traders, providers of accounting software and cash register systems) are conclusively described in the table below (see Table 2), where the obstacles are presented in the groups of economic, technological, social, and awareness-based obstacles.

Table 2. Summary of the obstacles

Obstacle/party	Traders	Consumers	Accounting software and cash register systems
<b>Economic</b>	<ul style="list-style-type: none"> <li>▶ Lack of awareness of the accompanying additional costs</li> <li>▶ No direct impact in the form of lower expenses due to the obligation to retain the payment receipts printed for the bank</li> <li>▶ Fear of competition – easier to compare prices</li> <li>▶ The requirement to provide a receipt if the amount of the purchase exceeds 20 euros</li> <li>▶ Loyal customer information is a business secret</li> </ul>	No obstacles	<ul style="list-style-type: none"> <li>▶ Unjustified development costs from the economic perspective</li> <li>▶ Unjustified system administration costs from the economic perspective</li> <li>▶ Lack of a business model (no economic motivation for developing a solution)</li> </ul>
<b>Technological</b>	<ul style="list-style-type: none"> <li>▶ Multitude of information systems</li> <li>▶ Complexity of the business processes</li> <li>▶ Outdated cash register systems</li> <li>▶ No suitable method for identifying the buyer</li> </ul>	<ul style="list-style-type: none"> <li>▶ Lack of preparedness among the older population (digital capability)</li> <li>▶ Lack of a convenient location for making the receipts available</li> </ul>	Technological obstacles arising from the extent of the standard – identification, retention, data composition, etc.
<b>Social</b>	<ul style="list-style-type: none"> <li>▶ No proven experience that the customers of traders are interested in e-receipts</li> </ul>	<ul style="list-style-type: none"> <li>▶ The risks arising from having a third party retain the data</li> </ul>	No obstacles
<b>Awareness</b>	<ul style="list-style-type: none"> <li>▶ No awareness of the benefits</li> </ul>	<ul style="list-style-type: none"> <li>▶ No awareness of the existence of e-receipt solutions and the added values related to the solutions</li> <li>▶ No awareness of the negative impact of paper receipts on the nature</li> <li>▶ No awareness of the option to prove a purchase to the trader based on a bank statement or another suitable document</li> </ul>	<ul style="list-style-type: none"> <li>▶ No awareness of how to solve problems due to the lack of a standard</li> </ul>

## 4. Potential solutions

In this chapter, we take a look at potential solutions for increasing awareness of e-receipts, for reaching the critical mass in the use of the service by consumers, undertakings, and private individuals, and the economic benefits arising from taking into use e-receipts.

### 4.1 Solutions for increasing awareness

Even though, e-receipts are a relatively new phenomenon in commerce and economy, 60% of consumers have examined e-receipts in a trader's self-service environment (see Annex 1 'User survey on the implementation of the e-receipt'). On the other hand, consumers do not have an accurate understanding of the meaning of an e-receipt and e-mailed PDF receipts, which, strictly speaking, are not e-receipts, are also deemed e-receipts.

Using e-receipts may be examined together with the trader foregoing using paper receipts. Today, it can be stated that using receipts is mainly forgone to save paper based on environment-friendly thinking. This is the main reason for the traders as well as the consumers.

Thus, awareness of e-receipts and targeted increasing of the awareness may be viewed from different perspectives:

- ▶ the environmental protection aspect
- ▶ the economic saving aspect
- ▶ the user convenience aspect

From the perspective of the motivation for taking e-receipts into use, there is a 'vicious circle', in a sense, with the market not offering convenient solutions for using the e-receipt, on the one hand (except a few environments of larger traders), and the consumer not seeing much need for e-receipts, on the other hand, as they do not need a receipt as such at all in the case of most purchases. Thus, it is necessary to work with both sides, demand and supply, to accelerate the implementation of e-receipts.

The lacking awareness of the parties of the benefits arising from the implementation of e-receipts may also be deemed one of the reasons for the problems of the chain described above. The current situation could be changed for the better by increasing the awareness of the parties, which can be done by using the methods described below.

#### ***Increasing the awareness of private individuals***

The purchase receipts of private individuals are estimated to form 90–95% of all receipts issued, i.e. the majority of receipts are printed for private individuals. An analysis of the obstacles from the consumer's perspective (see also sub-chapter 3.4.1) revealed, however, that the interests in receipts is modest and they are usually quickly thrown away.

Meanwhile, Estonian people pay more and more attention to environmental protection. This is confirmed by the environmental awareness study commissioned by the Ministry of the Environment every two years<sup>12</sup>, according to which 81% of the respondents agree that Estonian people have become more considerate towards nature and care more about nature (in 2018, the same figure was 76%).

Based on the above, it may be concluded that increasing the awareness on e-receipts would mainly involve stressing the positive environmental impact of e-receipts, which can be done by increasing environmental awareness, for example. The communication should primarily be focussed on foregoing paper receipts, which many traders have already made possible. The purpose of this would be increasing the interest of the consumers in e-receipts

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<sup>12</sup> <https://envir.ee/kaasamine-keskkonnateadlikkus/keskkonnateadlikkus/uuringud>

and thereby pushing traders towards making foregoing paper receipts possible. Through traders, the need for the development would also reach cash register system providers.

In the case of private persons, the possibility to monitor one's (or one's household's) expenses better and more accurately with the aim of analysing and controlling the consumption habits could also be one of the scenarios for using e-receipts. For this purpose, we would advise the Ministry of Finance to consider introducing e-receipts within the framework of the activities in the field of increasing financial wisdom and financial literacy.

### ***Increasing the awareness of traders***

Traders indisputably play an important role in taking into use e-receipts, as they are the party that orders developments of cash register systems and can shape the purchase behaviour of the consumers. As the activity of traders is based on the needs of customers, the communication directed to them should stress the following two main motivating factors:

- ▶ the interests of private consumers in an option to refuse paper receipts arising from their wish to protect the environment;
- ▶ the interest of business customers in e-receipts to simplify their accounting.

We would also advise to introduce to traders other benefits arising from taking into use e-receipts as less important issues that are still worthy of mentioning:

- ▶ the money and time saved by foregoing using paper receipts (buying thermal paper, transportation, replacing thermal paper rolls, printing paper receipts, and other related activities would be eliminated from the business processes of traders);
- ▶ the importance of environment-friendliness and innovation in shaping the reputation of the business and its impact on the decisions of customers (for example, many customers already prefer those stores that offer self-service or self-service scanners).

It should also be stressed that traders can satisfy the requirement of the banks and payment card organisations to prove sales transactions by using an electronic archive and printing the so-called 'trader's receipt' is not essential. All traders are not aware of this fact.

One of the circumstances highlighted among the reasons of the failure of an early e-receipt pilot project was that traders did not have any experiences with the service due to its novelty and they would have like to see a functioning service developed by a competitor, for example, and be convinced of its necessity before starting to use e-receipts. An analysis of the obstacles experienced by traders (see also sub-chapter 3.4.2) revealed that this uncertainty is also present today. Therefore, we would advise to use functioning e-receipt solutions in the communication directed to traders today.

We advise cooperation with trade organisations (such as the Estonian Traders' Association) to increase the awareness of traders.

### ***Increasing the awareness of accountants***

The interviews and focus groups revealed that the accounting processes of undertakings would benefit most from e-receipts. The purchase receipts of legal persons form approximately 5–10% of all receipts issued, but this is the part of paper receipts which causes most issues for accountants and accounting service providers today. In the event of an employee of a business making a purchase in the name of the business, this person is a reporting person for the purposes of accounting. Reporting persons must submit paper receipts to their accountants, after which the accountant must enter the details of the paper receipt manually into the accounting software. Thus, this use comes with significant procedural complexity that could be eliminated by using e-receipts. There are various different digitalisation solutions (e.g. Costpocket, Envoice) widely used today, but digitalisations would not be necessary if e-receipts were used.



Based on the above, we would advise to primarily focus on increasing the awareness of accountants. By switching to e-receipts, accountants will gain the time that is currently spent on reviewing paper receipts, entering the data in the accounting software, and archiving the receipts. If the benefits are recognised by accountants, pressure is put on cash register and business system to develop e-receipt related functionalities. Accounting software applications alone cannot create an e-receipt solution, but they can create an order for the developers of cash register systems by developing a function for transmitting e-receipts. Thus, increasing the awareness of accountants would enable activating the chain reaction required for creating e-receipt solutions.

The awareness of accountants could be increased via organising information days and the Estonia Assembly of Accountants and the information channels designed for accountants (e.g. rup.ee, rmp.ee, raamatupidaja.ee, etc.) should be involved in the activities.

### ***Increasing technological awareness***

Developing a technological e-receipt solution is naturally the prerequisite for the extensive use of e-receipts. Based on the input collected from the parties to the e-receipt ecosystem in the course of this study, the lack of an e-receipt standard is one of the obstacles from the technological perspective (see also sub-chapter 3.4.3). In order to increase the awareness of cash register system developers, e-receipt solution developers, and the developers of other technical components which have some tasks in the e-receipt ecosystem, we also advise to analyse the usability of the EU e-invoice standard in the case of e-receipts. The e-invoice study conducted in parallel with this study examines in detail the implementation of the EU e-invoice standard and advises analysing the suitability of the standard for different specific uses, for example, an e-invoice payment order sent to the bank, a B2B invoice. The same could be done for e-receipts.

In addition to the lack of a standard, the confusion concerning identifying the consumer, the e-receipt transport channel, and saving and granting access to e-receipt also pose obstacles from the technological perspective. The potential operating models suggested in this analysis alleviate these issues.

### ***Increasing the awareness of students***

In order to increase the e-receipt related awareness, it is also important to increase the awareness of the future employees and entrepreneurs in the financial sector. For this purpose, we advise supporting the work of the real time economy digital laboratory of the Tallinn University of Technology, which should also focus on e-receipt related issues in addition to the current topics.

The main purpose of the digital laboratory is to create a digital environment that would include the current e-services and real time economy applications and that developers could complement with new solutions. As the applications used in the laboratory would be mutually integrated, it would enable demonstrating automatic data exchange between businesses and between businesses and the state. The environment to be created would enable highlighting which benefits and impacts would come from specific solutions to single real time economy applications and the real time economy environment as a whole. The digital laboratory would include accounting software applications, e-invoice software solutions (incl. e-invoice operators), e-receipt software solutions, e-procurement software solutions, and other related solutions. According to the vision of the creators of the digital laboratory, the laboratory can be used for the purposes of teaching, research as well as developing and testing new services, and can thus contribute significantly into increasing the awareness of e-receipts and implementation of e-receipts.

## **4.2 Solutions for reaching the critical mass**

One of the research questions of this analysis was how to reach the critical mass in the use of e-receipts. First, we should specify what is meant by critical mass and how to measure it. Does critical mass mean achieving a certain percentage of the private individuals or undertakings that use e-receipts or a certain volume of e-receipts?

As it is difficult to measure all of those indicators (this could be done by conducting consistent sample surveys, for example), we will focus on the general activities that would increase the implementation of e-receipts.

As wider implementation of e-receipts would inevitably mean expenses for traders or cash register system providers, the trade and service segments in which it would be reasonable to implement e-receipts should also be identified. The purchases made by consumers vary greatly from small purchases made in kiosks to buying expensive durable goods, such as household appliances. The levels of complexity and profitability of implementing e-receipts vary by segment. For example, it may be difficult to introduce the process and technology of identifying the buyer in the kiosks with a very high turnover of transactions, but inexpensive and unimportant purchases. The demand for receipts is also relatively low in such kiosks.

Thus, both the number of purchases, as well as the percentage of the daily expenses covered with e-receipts in the shopping cart should be taken into consideration in achieving the critical mass. From the perspective of the number of purchases and the percentage in the shopping cart, buying groceries is an important segment (mainly supermarkets and hypermarkets), followed by eating out, clothing, and petrol stations.

As new developments are usually approached based on the principle that the focus should be on the segments in which it is possible to achieve the maximum effect by making minimum efforts, the retail sector should probably be approached as such segment. It should also be kept in mind that technological implementation of e-receipts is related to developing business processes and to technological developments and larger retail chains are likely to have this capability. This has already become apparent based on the current practice, but the solutions developed are fractured.

Thus, we see the need of focussing on large retail segments to achieve the critical mass of e-receipts. Below, we provide an overview of the potential activities.

#### ***Foregoing printing paper receipts by default at cash registers***

The self-service cash registers of several retail chains are already configured so that paper receipts are only issued if requested by the customer. In most cases, traditional processes are used, however, in the case of which it is not possible to reject the paper receipt. Reaching the critical mass would be facilitated in a shift in the paradigm – paper receipts should only be issued if requested by the customer. Such shift would most likely help to accelerate the development of e-receipt solutions by the market participants.

Foregoing printing the receipts is considerably hindered by the fact that the current cash register systems simply do not offer this option. Supporting traders in the introduction of new cash register systems and supporting the developers of cash register systems in adding this function would also help reach the critical mass from this perspective.

#### ***Eliminating of the paper receipt printed by traders to prove transactions due to the requirements of banks***

Many traders retain paper receipts due to the contractual obligation placed on the traders by banks<sup>13</sup> to prove their purchase transactions. On the other hand, several cash register systems enable digital retention of the data which prove the transactions.

Forgoing printing paper receipts for the consumers should be accompanied by foregoing using the receipts printed by the traders as proof of transactions. In order to achieve this, we advise involving the Estonian Banking Association to review the requirements for the traders and to standardise and explain the requirements, if necessary.

#### ***Creating an intuitive solution***

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<sup>13</sup> <https://www.lhv.ee/et/maksete-kogumise-lepingu-tingimused> (LHV 'Terms and conditions of the payment collection contract', clause 6.1)

The user experience of the future e-receipt solution or solutions will determine the further use and popularity of the solutions. In order to stimulate transmission of e-receipt between the parties, the process must be as invisible as possible for the sender and the recipient. For example, using ID-cards for identifying buyers would probably be too burdensome.

For the consumer, an intuitive solution means that the consumer is required to perform as little additional operations as possible. E-receipts should be sent as automatically as possible, based on the principle of proactivity. For example, one of the potential solutions would involve using bank card details for authentication of buyers. For an accountant, a solution is intuitive if there is no more need for manual data entry. In the event of a poor user experience, the user will very likely stop using the e-receipt solution and continue using traditional paper receipts.

One of the outcomes of this analysis is the description of the potential operating models. In order to support the development of an intuitive solution, we would advise introducing the operating models suggested within the framework of this analysis to the parties to the e-receipt ecosystem. Thereat, the importance of user experience should be stressed under the positive and negative sides of different solutions.

### 4.3 Economic benefits from the implementation of e-receipts

The economic benefits arising from e-receipts should be examined from the perspective of the main parties, i.e. traders, private consumers, and business customers. With the majority of technological innovations, the economic aspect is primarily influenced by the time saved, as material values are becoming increasingly cheaper, while the value of time increases. From the perspective of traders, however, e-receipts also have an important effect on the expenses on the paper receipts printed.

#### ***Economic benefits from the perspective of undertakings***

Let us take a closer look at what could be the impact of e-receipts through saving the time which is required for using paper receipts. As private individuals do not, as a rule, enter their cost documents anywhere (except in rare cases), it is difficult to determine how much time they would save. In the case of commercial undertakings, a receipt is a cost document that must be registered in the accounting system; the registration also involves making entries into the accounting journals.

Thus, e-receipts are most beneficial for those undertakings that generate a lot of paper receipts submitted to the accountant as statement of expenditure in the course of their activities. The accountant processing statement of expenditure must receive cost documents, enter the data into the accounting software, and archive the documents, which are time-consuming operations.

Various different digitalisations are used for the automation of expense receipts today; these digitalisations enable taking photos of the receipts, digitalising the receipts by the service provider, and sending them to the accounting system as e-invoices. This process is not 100% error-free, but has become wide-spread.

However, a fully electronic e-receipt processing process in which receipts are born digital and which involves fewer manual operations would be more aligned with the principles of real time economy. Such e-receipts also include increasingly more detailed information (incl. product information) compared to the digitalisation solutions.

According to the study of the economic impact of real time economy conducted in 2019<sup>14</sup>, the economic benefit arising from taking into use e-receipts was estimated to amount to 58.17 million euros per year. This calculation is based on the assumption that approx. Fifty million receipts would become electronic and the cost of processing one receipt would decrease by 1.16 euros.

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<sup>14</sup> [https://www.mkm.ee/sites/default/files/reaalajamajanduse\\_majandusliku\\_moju\\_uuringu\\_lopparuanne.pdf](https://www.mkm.ee/sites/default/files/reaalajamajanduse_majandusliku_moju_uuringu_lopparuanne.pdf)

Based on the statistical data of the Bank of Estonia examined in the course of this study, approximately 360 million card payments are made at different places of purchase every year, and cash payments are added to this total. Keeping in mind that the share of cash payments in all purchases is estimated to be 30% (see the payment environment overview of the Bank of Estonia<sup>15</sup>), approximately 500 million purchase transactions are completed per year and these are presumably accompanied by issuing a purchase receipt. Assuming that the share of the purchases made by business customers remains within the range of 5–10%, 25–50 million receipts are issued to business undertakings. Replacing all receipts with e-receipts is not a realistic possibility, as the digital capability of different traders varies and it will take more time for smaller traders to transfer to e-receipts. In the calculations provided here, it is presumed that 20% of the receipts will become e-receipts within the next three years.

Based on the study of the economic impact of real time economy, processing a receipt in accounting costs 1.16 euros. This amount may be compared to the cost of processing invoices in accounting. For example, in a thesis defended at the Tallinn University of Technology in 2020, the difference between the costs of processing a PDF invoice and an e-invoice was calculated to amount to 0.63 euros per invoice (in the favour of the e-invoice). The cost of processing an e-receipt compared to a paper receipt may differ even more than the cost of processing an e-invoice compared to a PDF invoice as, on the one hand, the level of complexity is greater in the case of invoices (more lines), but receipts are accompanied by a higher number of administrative processes, as the reporting person who made the purchase must be identified, the receipt must be obtained from them, and the circumstances of making the purchase must be determined, as there is often no purchase order on which the receipt would be based (unlike in the case of an invoice). In the calculations below, we rounded the saving from processing an e-receipt instead of a traditional receipt to one euro.

Implementation of e-receipts is accompanied by expenses on the development and maintenance of an e-receipt infrastructure; these expenses must be made by operators by using the fees collected from the customers. As e-receipts are similar to e-invoices by nature, the costs may be estimated based on the prices of e-invoice services. For example, in the case of cheaper solutions for taking into use e-invoices, the monthly fee is two euros.

In order to estimate the economic benefit, the number of undertakings that would start using e-receipts must also be assessed. It may be presumed that e-receipts will first be taken into use by those undertakings that have experience in using e-invoices. Currently, 10,800 undertakings have stated that they accept e-invoices in the commercial register. We assume that approx. 50% of the undertakings that accept e-invoices, i.e. approx. 5,000 undertakings, will start using e-receipts.

Conclusively, a sample calculation may be made based on the following assumptions:

- Undertakings complete 25–50 million purchase transactions per year.
- Within the next three years (2023–2025), 20% of receipts will become e-receipts.
- Processing one e-receipt costs one euro less than processing a traditional receipt.
- The monthly expenses of an undertaking which starts using e-receipts are two euros.
- In total, 50% of the undertakings using e-invoices in the purchasing process will start using e-receipts.

Under the circumstances described above, the economic benefit of partially transferring to e-receipts would amount to approx. 5–10 million euros per year, based on the calculation below:

- ▶ 25–50 million receipts × 20% × one euro = 5–10 million euros

Taking into use e-receipts is, however, also accompanied by expenses for the service providers; these expenses can be calculated as follows, based on the afore-mentioned assumptions:

- ▶ 5,000 undertakings × two euros per month × 12 months = 0.12 million euros

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<sup>15</sup> [Maksekeskkonna ülevaade 2018 \(eestipank.ee\)](https://www.eestipank.ee/et/teema/maksekeskkonna-ulevaade-2018)

Thus, under the conditions described above, the economic benefit would amount to approx. 4.88–9.88 million euros per year. If the number of the undertakings whose receipts were transferred to the e-channel doubled (40%), the positive impact would reach 10–20 million euros.

#### ***Economic benefits from the perspective of traders***

Another group of undertakings that would gain some economic benefits from taking into use e-receipts is the group of traders. The early e-receipt pilot project found that almost 400 million paper receipts were issued in Estonia every year. It takes 20 tons of paper to print the paper receipts, with 300 trees, 180 barrels of oil, and 1,440 tons of water used to produce the paper, on average. Based on the fact that an average 18-metre roll of thermal paper costs 0.62 euros and the average length of a printed receipt is 18 centimetres, 3.8 million rolls of thermal paper are used per year and traders spend 2.4 million euros on thermal paper alone.

In addition to saving on thermal paper, switching to e-receipts would also enable saving on transporting paper receipts to the store and printing the receipts, as well as on the working time saved as a result of the above. This would mean a significant saving for large retail chains that may only be somewhat reduced by the potential service fees payable for using the e-receipt solution.

Assuming that a full transfer to e-receipts in the next few years is unlikely and assuming conservatively that 20% of all receipts will become e-receipts, traders would save 0.48 million euros ( $2.4 \times 20\%$ ).

Thus, it may be concluded that the main positive impact gained would concern the accounting processes of business customers and the saving of traders on paper would be relatively low compared to this.

As in the case of many digitalisation processes, the saving would not manifest directly in the form of an increase in profits, as undertakings are generally not able to lower their labour costs in the accounting function by switching to e-receipts. The effect will rather manifest in the form of a decrease in the amount of work, which will allow the accountants to focus on other activities that create more value and alleviate the work-related stress at the end of accounting periods that arises from large amounts of receipts that must be entered into the system.

#### ***Economic benefits from the perspective of private persons***

The analysis did not identify any direct economic benefits arising from the implementation of e-receipts for the consumer.

#### ***Other impacts of switching to e-receipts***

In addition to the economic impacts quantified above, switching to e-receipts may also have other impacts from the perspective of real time economy, incl. primarily opportunities to use the data of e-receipts for analytical purposes. Wider implementation of e-receipts will generate significantly voluminous datasets that can be used in a number of interesting manners, but the opportunities and risks must both be taken into consideration in the case of using the datasets.

Opportunities:

- Switching to e-receipts will allow private individuals to better manage their own expenses and the expenses of their households and make more reasonable consumption decisions.
- The consolidated e-receipt dataset, which includes the receipt of a considerable share of the consumers, will enable solving several data mining tasks, for example, in the fields of purchase behaviour, price formation, consumption behaviour, etc.
- The e-receipt dataset will enable conducting analyses, draw conclusions, and generalise with a short temporal cycle in the fields of the macroeconomic situation, consumer confidence, and other indicators.

Risks

- As the source data of the receipts are personalised, lawfulness of the processing of personal data must be ensured in the case of analyses.
- As the receipt information includes information about the trader and detailed product and price information, the datasets can be used to perform different analyses, which may provide interesting information about traders and price information, but the information may be sensitive from the business perspective.

## 5. Analysis of the international practice

In cooperation with the contracting entity, the following reference countries were selected to provide an overview of e-receipt solutions: Finland, Sweden, and Lithuania.

The analysis of the international practice provides an overview of the following topics:

- ▶ A pilot project launched in Finland for a wider use of e-receipts in the daily life
- ▶ The standards used in Finland and Sweden
- ▶ The applications used in Finland and Sweden
- ▶ The architectural models (the triangular and square model) of the e-receipt used in foreign countries
- ▶ The plans of Lithuania for developing an e-receipt ecosystem

### 5.1 Finland

In Finland, the theme of e-receipts has been developed actively in cooperation of the private and public sector. In 2017, the Finnish network of technology undertakings (Teknologiateollisuus) launched the RTECO project for this purpose; the project involves cooperation between undertakings and state agencies for the development of RTE ecosystems. Switching to e-receipts is one of the sub-projects of this project. The Finnish tax authority deems e-receipt an important prerequisite for switching to automatic data-based turnover reporting.<sup>16</sup>

TALTIO is a project carried out in 2016–2017 that supported the digital transformation of business undertakings by creating a structured standard data model, defining the formats of invoice, receipt, and account statement information that would enable fully automatic entry of the above into accounting systems.

Finland is planning to achieve mass use of e-receipts by 2025. Piloting of e-receipts was launched in the autumn of 2019 on the initiative of the State Treasury. The aim of the piloting was to ensure the functioning and wide use of e-receipts in the daily life also outside of state agencies. In connection with the RTECO project, a target has been set to process 20% of the payments between businesses (B2B) in the structured format by 2023 and, if 80% of the payments being structured is achieved by 2025, to make using e-receipt a mandatory criterion for cooperating with the public sector.<sup>17</sup>

#### ***Joint project of Nordic countries – Nordic Smart Government***

At the level of the Nordic countries (Denmark, Sweden, Norway, Finland, and Iceland), the issue of e-receipts is worked on within the framework of the Nordic Smart Government (NSG) project. In Finland, the project is managed by the Finnish Patent and Registration Office in cooperation with the State Treasury and the tax authority. The purpose of NSG is to automatise the financial data exchange between Nordic businesses.<sup>18</sup>

In the document discussing the Nordic Smart Government e-receipt standardisation architecture<sup>19</sup>, for usage cases are discussed to describe the methods of transmitting e-receipts:

- ▶ **E-receipts in the delivery chain (B2B)** – e-receipts are not used in a significant extent in the delivery chain, as invoices are mainly used for this purpose and sent to the accounting department.

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<sup>16</sup> Real time economy vision and action plan for 2020–2027

<sup>17</sup> [https://www.valtiokonttori.fi/palvelut/julkishallinnon-palvelut/valtioon-konsernipalvelut/reaaliaikatalous/#ekuitti-eli-digi-taalinen-kuitti\\_ekuittia-pilotoidaan-valtiokonttorin-johdolla](https://www.valtiokonttori.fi/palvelut/julkishallinnon-palvelut/valtioon-konsernipalvelut/reaaliaikatalous/#ekuitti-eli-digi-taalinen-kuitti_ekuittia-pilotoidaan-valtiokonttorin-johdolla)

<sup>18</sup> <https://www.valtiokonttori.fi/en/uutinen/the-digitalisation-of-receipts-to-boost-the-move-to-real-time-economy/>

<sup>19</sup> [https://docs.google.com/document/d/1VSBZKuZuRUehEa3JbcfONtJ\\_H27DzUFUmAPTouGhdM/edit#](https://docs.google.com/document/d/1VSBZKuZuRUehEa3JbcfONtJ_H27DzUFUmAPTouGhdM/edit#)

- ▶ **E-receipts from retailers to consumers (B2C)** – in all Nordic countries, it is mandatory to present a certificate proving the purchase after completion of a purchase transaction, i.e. a receipt that specifies the amount of value added tax, the details of the point of sale, etc., depending on the regulations of the respective tax authority. Transmission of the receipts from traders to private consumers represents the largest volume in the exchange of receipts.
- ▶ **E-receipts from retailers to businesses (B2B)** – the receipts sent from retailers to businesses are treated as proof of business expenses. As the receipts must be included in statements of expenditure, this means large-scale manual processing in the case of which automatic processing would come with a significant time saving. Paper receipts may also easily fade or becoming illegible due to other reasons and this issue could also be solved by switching to e-receipts.
- ▶ **E-receipts from businesses to the public sector (B2G)** – the receipts transmitted from businesses to public sector agencies mark public sector expenditure, for example, the travel expenses of public servants, which are currently processed manually. Automation of the process and reducing the amount of manual work would result in saving for the public sector in the financial, as well as temporal perspective.

### **Standards used**

The Finvoice XML standard<sup>20</sup> is used in Finland for the transmission of e-receipts. The Finnish ReceiptHero<sup>21</sup> e-receipt application has adopted the Payment Card Industry Data Security<sup>22</sup> standard, which is designed for the organisations storing, processing, or using payment card data. It is mandatory to issue payment receipts to the buyers in Finland (legislation on the obligation to give a receipt, 658/2013)<sup>23</sup>, which may, however, be issued electronically. Thereat, e-receipts have been declared equivalent with paper receipts.<sup>24</sup>

### **Nordea Wallet**

Nordea bank has had a central role in the piloting of e-receipts, having developed the Nordea Wallet mobile phone application, which allows card owners to make purchases at the traders that are registered in the applications and have subscribed to the e-receipt service. The payment terminal of the trader recognises the card and delivers the e-receipt to the Nordea Wallet application of the card owner and/or into the Visma travel and expense management system.<sup>25, 26</sup> The application can be used by the customers of Nordea as well as by the customers of other banks.

The Nordea Wallet mobile phone solution can be used to pay with Google Pay in the Android operation system and, in a phone with an Apple operation system, the cards in the application can be integrated with Apple Wallet.<sup>27</sup> Nordea Wallet enables viewing all expenses made within a certain period of time or viewing the total amount of all purchases made on a specific day. If the trader has subscribed to the e-receipt service, a receipt icon is displayed next to the amount of the purchase in the application and, by clicking on the icon, the details of

<sup>20</sup> [https://teknologiateollisuus.fi/sites/default/files/file\\_attachments/2018\\_ekuitti\\_eng\\_sisus\\_vedos\\_6.pdf](https://teknologiateollisuus.fi/sites/default/files/file_attachments/2018_ekuitti_eng_sisus_vedos_6.pdf)

<sup>21</sup> <https://www.getrecepthero.com/>

<sup>22</sup> <https://www.getrecepthero.com/news/recepthero-is-now-pci-compliant/>

<sup>23</sup> [https://www.vero.fi/en/businesses-and-corporations/cooperation-and-services/tax-auditing-and-shadow-economy/kuitinantovelvollisuus-harmaan-talouden-torjunnassa/legislation\\_on\\_the\\_obligation\\_to\\_give\\_a/](https://www.vero.fi/en/businesses-and-corporations/cooperation-and-services/tax-auditing-and-shadow-economy/kuitinantovelvollisuus-harmaan-talouden-torjunnassa/legislation_on_the_obligation_to_give_a/)

<sup>24</sup> <https://drive.google.com/file/d/1C1OUqgCsc9Cyk0AHHuifado6WwJg-HN/view> (slide 16)

<sup>25</sup> <https://vkazprodwordpressstacc01.blob.core.windows.net/wordpress/uploads/2019/09/eKuitti-webinaari-29092020-Nordea.pdf>

<sup>26</sup> <https://www.visma.fi/vismanet-expense/>

<sup>27</sup> <https://www.nordea.fi/en/personal/our-services/online-mobile-services/nordea-wallet.html>



the purchase can be viewed, including the name of the product, the amount, the unit price, the total price, the discount amount, and the details of the receipt, such as the receipt number, the value added tax amount, the exempt amount, and the total amount of the receipt. In addition to Nordea Wallet, all e-receipts can also be viewed on the website of ReceiptHero.

**ReceiptHero**

The Nordea Wallet mobile phone application receives e-receipts with the help of the Finnish e-receipt platform ReceiptHero, which sends e-receipts automatically from the trader to the application used by the consumer. The transfer is based on the prerequisites of ReceiptHero being interfaced with the payment service provider processing the payments and ReceiptHero being integrated into the cash register system of the trader, the payment service, the application, or the online store. The operator service is solved with the help of an API service, which the trader must integrate.

Sending the receipts is based on a square model in which the sender and recipient of an e-receipt are not required to use the same service provider. This allows the parties to connect to one e-receipt service provider and collect their e-receipts in one application. In the case of the square model, the consumers/customers must be identified in a manner supported by all service provides for the e-receipt to reach the right customer.<sup>28</sup> In the case of ReceiptHero, payment card information is used as the identification method.<sup>29</sup> The square model is based on the principle of the trader being able to use the best-suited operator for them for sending and receiving e-receipts and the operators have mutual contracts for information exchange (see also Figure 4).

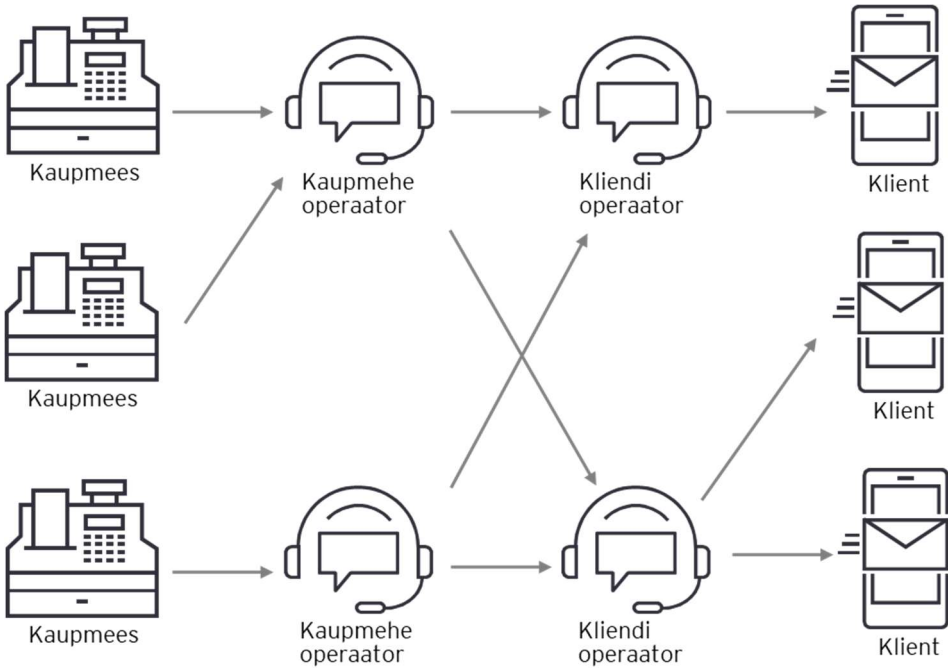


Figure 4. Square model

- Kaupmees – Trader
- Kaupmehe operaator – Trader's operator
- Kliendi operaator – Customer's operator
- Klient – Customer

<sup>28</sup> [https://cocoa.ethz.ch/downloads/2019/12/None\\_GS1-Sweden\\_Auto-ID-Labs\\_Digital-Receipt-White-Paper\\_v1.0.pdf](https://cocoa.ethz.ch/downloads/2019/12/None_GS1-Sweden_Auto-ID-Labs_Digital-Receipt-White-Paper_v1.0.pdf)

<sup>29</sup> [https://cocoa.ethz.ch/downloads/2019/11/None\\_Digital-Receipts-Study-A4\\_v12.pdf](https://cocoa.ethz.ch/downloads/2019/11/None_Digital-Receipts-Study-A4_v12.pdf)

To bring an example from real life, ReceiptHero is cooperating with the Finnish travel and expense management system Visma, for example, based on which the e-receipts are retained in the Maventa e-invoice operator software application owned by Visma. Maventa can be used for sending e-receipts to the accounting platforms of Visma.<sup>30</sup>

In addition to transferring e-receipts, ReceiptHero also enables storing the receipts on their website – the user must simply create an account and provide their payment card details. When making a payment to a trader interfaced with ReceiptHero, the e-receipt can be sent to one's e-mail address or to the database of ReceiptHero. E-receipts can also be automatically sent to the accounting department, for which the ReceiptHero account must first be activated on the eTasku mobile phone application.<sup>31</sup>

ReceiptHero is partners with Verifone, which enables linking e-receipts to one's payment card and sending receipts to the consumer's most preferred channel. ReceiptHero can also be integrated into the mobile phone application of the bank.<sup>32</sup>

ReceiptHero also has partnerships with MasterCard and Visa, allowing ReceiptHero to provide their services outside of Finland, incl. allowing the traders operating in foreign countries to send e-receipts to private and business customers.

Subscribing to ReceiptHero is free for traders and no additional fee is charged for the mediation of e-receipts. Separate additional fees may be payable for marketing services and the terms and conditions of such services are specified in the contracts concluded with the traders.<sup>33</sup>

### ***Experience of wider use***

Receipts can currently be viewed in Finland **in a central solution** (the website and mobile application of the service provider), as well as in the **mobile phone application of Nordea bank**, which is solved by using the **square model**. The solution developed is easily accessible for users and offers a wide selection of stores. In general, Finland is a pioneer in the field of e-receipts on the international level, having drawn up the **e-receipt concept and explanatory guidelines**<sup>34</sup>, which are known and have been approved internationally. The Finnish e-receipt operator ReceiptHero has proven itself as a successful operator, having efficiently introduced its service at many points of sale and entered into cooperation contracts which improve the service. For example, they cooperate with Visa and Mastercard to enable cross-border e-receipt transfers in the future.

## 5.2 Sweden

Below, we introduce the standards and solutions used in Sweden and provide an overview of the usage cases specified in the Swedish e-receipt standard.

### ***Standards used***

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<sup>30</sup> <https://www.getreceipthero.com/news/receipthero-visma-partnership-for-smoothest-expense-reporting/>

<sup>31</sup> <https://www.getreceipthero.com/>

<sup>32</sup> <https://www.getreceipthero.com/news/verifone-partners-with-receipthero/>

<sup>33</sup> <https://www.getreceipthero.com/terms-and-conditions-for-merchants/>

<sup>34</sup> [https://teknologiateollisuus.fi/sites/default/files/file\\_attachments/2018\\_ekuitti\\_eng\\_sisus\\_vedos\\_6.pdf](https://teknologiateollisuus.fi/sites/default/files/file_attachments/2018_ekuitti_eng_sisus_vedos_6.pdf)

In 2018, the Digital Receipt Standard (SDRS)<sup>35</sup> was developed in Sweden by the Swedish tax authority and the Swedish Trade Association, which is based on the ARTS-DR-SE standard using XML<sup>36</sup>. The XML scheme developed supports all mandatory fields pursuant to the rules of the Swedish tax authority, as well as optional fields for traders, incl. for unique information, such as warranties and links. The standard only refers to the formats of communicating the receipt data, not to storage or access solutions. SDRS is based on the ARTS-DR-SE scheme, which has been complemented with the e-receipt extensions established by the Swedish tax law. The G1 Digital Link Standard has also been integrated in the standard and can be used to send information about the object/service purchased to the consumer in the event of the trader recalling a product. E-receipts, similarly to paper receipts, are source documents used in accounting.

### ***E-receipt solutions***

**Kivra** is the most extensively used e-receipt mobile phone application in Sweden which is also used for storing documents, among other things (letters, invoices, e-receipts, contracts, etc.). More than a billion e-receipts are sent annually via Kivra. This is supported by the fact that Kivra is partners with ICA, the largest Swedish retail business. Kivra uses the triangular model in its service, in which the digital receipt is sent to the owner by loyal customer card-based identification. E-receipts reach Kivra via integration with Findity.<sup>37</sup>

**Findity** is an e-receipt operator operating in Sweden, which sends the e-receipt automatically to the application used by the consumer when a payment is made. For the transfer to take place, the trader must have interfaced Findity with their cash register system via the API service.<sup>38</sup>

Findity has integrated their service for receiving e-receipts with **Validoo**. Validoo provides a service that helps ensure high-quality management and retention of data. Validoo stores in Findity the product information received from the GS1 standard.<sup>39, 40</sup>

Findity is integrated with the **BlueAccess** mobile payment terminal, which enables paying to traders by using mobile phone payments, is faster than a traditional card payment, and where the e-receipt is immediately sent to the consumer's mobile phone. To obtain the e-receipt, the consumer must touch a BlueAccess payment terminal with their inactive phone and confirm the amount, after which they will receive the e-receipt. The e-receipt is retained forever and can be obtained from the phone, as well as online through the e-receipt cloud service of Findity.<sup>41</sup>

The afore-mentioned Kivra solution is based on the triangular model.<sup>42</sup> This means that the customer is identified based on their loyal customer card via one specific operator (see also Figure 5). The triangular model makes it easier to solve the issues related to the EU General Data Protection Regulation (GDPR), as the consumer has already given their consent for processing their personal data in the case of using a loyal customer card. Three stakeholders are required for the triangular model: the consumer, the retailer, and the e-receipt solution provider (operator service, e.g. Kivra). The triangular model tends to be inconvenient for the consumer, as it depends of

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<sup>35</sup> <https://github.com/SwedishPaymentAndECRGroup/digital-receipt-standard>

<sup>36</sup> [https://github.com/SwedishPaymentAndECRGroup/digital-receipt-standard/blob/master/ArtsDR200WithSwedishExtensions/resources/docs/ARTS\\_DR200\\_with\\_Swedish\\_extension.md](https://github.com/SwedishPaymentAndECRGroup/digital-receipt-standard/blob/master/ArtsDR200WithSwedishExtensions/resources/docs/ARTS_DR200_with_Swedish_extension.md)

<sup>37</sup> [https://cocoa.ethz.ch/downloads/2019/11/None\\_Digital-Receipts-Study-A4\\_v12.pdf](https://cocoa.ethz.ch/downloads/2019/11/None_Digital-Receipts-Study-A4_v12.pdf)

<sup>38</sup> <https://findity.com/2020/09/22/simplifying-expense-management-with-digital-receipts/>

<sup>39</sup> <https://gs1.se/en/standards-and-services/validoo/>

<sup>40</sup> <https://gs1.se/en/support/what-is-validoo/>

<sup>41</sup> <https://thepappers.com/mobile-payments/findity-blueaccess-unveil-mobile-payment-solution-in-store--764359>

<sup>42</sup> [https://www.autoidlabs.ch/wp-content/uploads/2019/11/Digital-Receipts-Study-Summary-A4\\_v6.pdf](https://www.autoidlabs.ch/wp-content/uploads/2019/11/Digital-Receipts-Study-Summary-A4_v6.pdf)

which e-receipt solution provider is used by the retailer. Thus, the consumer may have to access their e-receipts by using different applications.

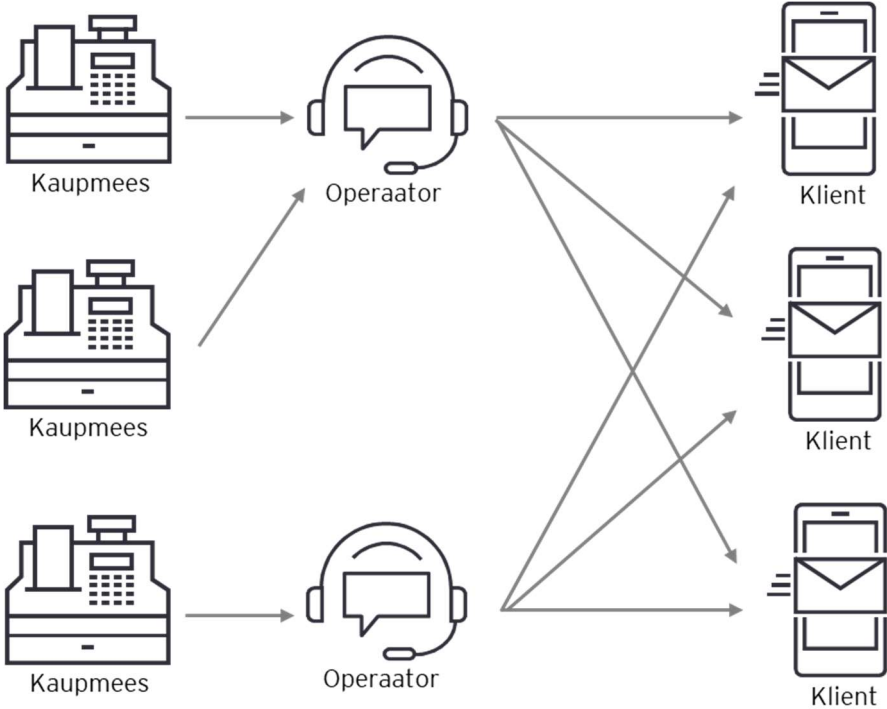


Figure 5. The triangular model

Kaupmees – Trader  
 Operaator – Operator  
 Klient – Customer

**Experience of wider use**

Sweden has developed an **in-depth standard** for wider use of the e-receipt service which supports the development of e-receipt solutions. The standard contains numerous data fields established by the Swedish tax authority or added to the standard based on the wishes of traders. The Swedish e-receipt standard also contains the **G1 standard**, which can be used to notify the users of recalling any products and which therefore provides added value to the users. The most-used e-receipt **application** is Kiva, which **offers several other services in addition to e-receipts**. This ensures the wider use of e-receipts in parallel with using other services. The interfacing with cash register systems is organised via **API** and the **triangular model** is used (the Kivra application). Using the triangular model, however, means that the users must often use different applications to view the receipts issued by different traders.

**5.3 Lithuania**

There is currently no central e-receipt standard or ecosystem in Lithuania. Pursuant to the law, it is permitted to issue an e-receipt instead of a paper receipt, but the required form or structure thereof have not been specified. The existing solutions are similar to those currently offered in Estonia, with PDF files or images often also interpreted as e-receipts.

For example, as in Estonia, the Maxima mobile application and Rimi self-service environment solution can be used as alternatives to paper receipts in Lithuania. Those solutions enable saving a digital receipt if the customer has expressed their wish to forego printing the receipt in the self-service payment terminal or under their loyal customer profile settings.

In 2018, the Lithuanian tax inspectorate initiated a project for the development and introduction of a smart, electronic cash register system, which is one part of the seven-part smart tax authority project programme. The outputs of the projects include the following:

- ▶ replacing paper receipts with e-receipts,
- ▶ reducing the administrative load of businesses,
- ▶ saving time and money spent on operating activities,
- ▶ reducing the share of shadow economy,
- ▶ supporting the FinTech ecosystem,
- ▶ launching a real time economy ecosystem at the state level.<sup>43</sup>

In the interviews conducted with representatives of the Lithuanian tax authority, the interviewees highlighted that there were no agreed activities for the development of an e-receipt ecosystem, but the development of an e-receipt standard had begun. In the future, they are planning to use e-receipts based on the square model. For data exchange, they would like to implement the Lithuanian own E-delivery solution (similar to the X-Road solution in Estonia). They would prefer not to use Peppol.

They intend to use distributed identifiers to ensure the anonymity of the consumer, in which the person in charge for central storage of the data retains different data that enable identifying individuals and decides with whom and to what extent to share the data. For example, when implementing such a solution, the loyal customer card and bank card of the user, as well as their personal identification code, may be retained for identification purposes. The developer of the application designed for the customer could use their preferred option of the identification options offered.

Lithuania is planning to amend the Cash Register System Act in the future. Two potential solutions have been discussed, but no decisions have yet been made. One of the following options may be chosen:

1. Transmission of receipts at agreed intervals – physical data are moved to the Lithuanian tax authority in an encrypted format on a one-off basis. The data are collected locally and sent to the tax authority together at the end of the day. An aggregated report is generated by the tax authority. This would be a good solution for large retail chains in the case of losing the Internet connection, in which case they would not be able to issue receipts to the customers.
2. Real time transmission of receipts – in this case, the receipt would be sent to the tax authority immediately after issuing. Based on current plans, the service would be provided by the tax authority. If this solution is chosen, the development will probably take place in 2022.

One of the ideas which has been brought up in Lithuania is authentication of receipts via the tax authority. All receipts would be equipped with a digital stamp by the tax authority confirming the authenticity thereof before reaching the customer. This idea can be realised if the solution enabling real time transmission of receipts is chosen.

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<sup>43</sup> <https://imas.vmi.lt/isaf/dynamicPage/aboutleka>

## 5.4 Models used in taxation

Different countries have taken different approaches to the collection and monitoring of the data of economic transactions by the state. Some countries are practising more stringent transmission and monitoring of economic transactions by the state. Such practices are referred to as the fiscal or CTC model (continuous transaction control) in the case of which economic transactions are accumulated and monitored continuously. Other countries have chosen a more liberal option and do not require real time transmission of economic transactions to state institutions.

The fiscal model is used in Lithuania, for example. In this model, the details of all payments are sent to a national database immediately after the payment is made and the tax liability of businesses is checked based on this information. In an interview with the Estonian Tax and Customs Board (EMTA), it was mentioned that the model has been considered but implementing the model was not deemed to bring significant gains, as the countries using the fiscal model are still conducting follow-up inspections and the possibilities offered by real time transmission are largely not used. The EMTA also operates based on the principle of keeping the amount of the data collected as low as possible.

The liberal model is based on the assumption that the provision of e-receipt services depends on the needs of the market and the market can be steered at the state level by implementing support measures. In the case of the liberal model, receipt data are not collected by the tax authority and the fulfilling of the tax obligations of businesses is checked based on reports submitted, on the basis of the past data provided in the reports. The liberal model is used in Nordic countries, for example, in Finland.

## 6. Description operating models

This chapter examines the potential operating models of the e-receipt service, presents the general architectural overview of a potential solution, describes the process of the best e-receipt service based on the information found by conducting an analysis, highlights the potential usage cases from the perspectives of a private individual and a business / reporting party, and maps the general functional and non-functional requirements.

The material accumulated in the chapter was compiled by analysing and synthesising the material collected by interviewing the related parties, analysing documents and conducting a user survey, as well as by using the professional knowledge of the project team (see also Figure 1).

### 6.1 Potential operating models

The practice of issuing e-receipts instead of paper receipts is novel worldwide, which is why there is not yet any clearly shaped best practices. Therefore, the potential e-receipt solution providers and other related parties also do not have a common understanding of how the e-receipt solution should function today, which in turn hinders the transition to e-receipts.

One of the targets of this analysis was to analyse the potential operating models of an e-receipt service. An overview of the potential operating models and identifying the best solution provides an input for determining the need for support from the government, which would help stimulate the current market and accelerate the switch to e-receipts.

Based on the research questions of the analysis, the following topics were focussed on in analysing the operating models (see Figure 6).



Figure 6. Topics of the analysis of operating models

Identification of the buyer	Transportation of the e-receipt	Storage of the e-receipt	Access to the e-receipt
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The potential operating models, incl. the current issues, technical alternatives, the main strength, and risks are specified in the table below (see Table 3). The table is followed by an analysis of an operating model, which involves analysing the alternatives suggested and the best solution is proposed based on the information found by this analysis.

Table 3. Potential operating models

	Identification of the buyer	Transporting the e-receipt	Retaining the e-receipt	Access to the e-receipt
<b>Issue</b>	Various different loyal customer cards or ID-cards are used in Estonia for identifying consumers today. Thus, different indicators are used in the customer relationship management systems of traders which makes the development of a technical solution complicated.	The parties do not have a common understanding or a consensus as regards to the operating model. Current solutions are not universal, i.e. they have been designed for one specific application.	The e-receipts are retained in the systems of the service providers (e.g. mTasku) or traders (e.g. Rimi) and the data compositions thereof are different.	E-receipts are spread around in different environments today. For example, when making purchases in different retail chains, the receipts can be obtained via different solutions.
<b>Technical alternatives</b>	<p>Identification options:</p> <ul style="list-style-type: none"> <li>▶ Bank card</li> <li>▶ ID-card</li> <li>▶ Loyal customer card</li> <li>▶ Telephone number</li> <li>▶ Special QR code</li> </ul>	<p>Transmission of the e-receipt to the storing party</p> <ul style="list-style-type: none"> <li>▶ Directly from the cash register system to the smart device of the consumer by using a wireless data transmission protocol (e.g. NFC, Bluetooth).</li> <li>▶ Via the data exchange which is activated by scanning the QR code displayed on the screen on the cash register system by using the smart device of the consumer</li> <li>▶ From the cash register system to the own self-service environment of the trader</li> <li>▶ From the cash-register system automatically to the storing party via an operator service (similarly to e-invoices)</li> </ul>	<ul style="list-style-type: none"> <li>▶ In the systems of the operator service providers</li> <li>▶ In a centralised environment</li> <li>▶ In the of the trader system / cash register system</li> <li>▶ Locally in the consumer's device</li> <li>▶ In the database of a bank</li> </ul>	<ul style="list-style-type: none"> <li>▶ Mobile application</li> <li>▶ Website</li> <li>▶ Online bank</li> <li>▶ Accounting software (in the case of legal persons)</li> </ul>
<b>The user's activities</b>	The consumer can identify themselves upon paying for goods and services by using means of identification.	In the case of a wireless data transmission protocol (NFC, Bluetooth) and a QR code based solution, the user must receive the e-receipt by using their smart device. In the case of other alternatives, the consumer's consent is required.	For storing e-receipts locally in the consumer's device, the consumer must retain their device or create a user account with the service provider to retain the receipts in a database. Other technical alternatives do not require any operations on the side of the consumer.	The main usage cases include viewing e-receipts, cost analyses, proving warranties, transmitting expenditure reports, and searching e-receipts.
<b>Risks</b>	<ul style="list-style-type: none"> <li>▶ Payment operations will become more complicated for the consumer, which is why there is tepid interest in the new solution</li> <li>▶ Technological complexity due to the multitude of identification options</li> </ul>	<ul style="list-style-type: none"> <li>▶ Data leaks</li> <li>▶ Poor user experience and therefore tepid interest in the new solution</li> <li>▶ Too high service fee set by the service provider and therefore tepid interest in the new solution</li> </ul>	<ul style="list-style-type: none"> <li>▶ Data leaks</li> <li>▶ Privacy-related fears and therefore tepid interest in the new solution</li> </ul>	<ul style="list-style-type: none"> <li>▶ Privacy-related fears and therefore tepid interest in the new solution</li> <li>▶ Low user convenience</li> </ul>



	Identification of the buyer	Transporting the e-receipt	Retaining the e-receipt	Access to the e-receipt
	<ul style="list-style-type: none"> <li>▶ In the case of the operator on the side of the seller, the need for interfacing with several payment mediators for bank card-based identification of the buyer.</li> </ul>		<ul style="list-style-type: none"> <li>▶ Too high service fee set by the service provider and therefore tepid interest in the new solution</li> </ul>	

### ***Identification of the buyer***

Buyers are currently mainly identified by using loyal customer cards and the customer relationship management systems supporting the use thereof which use different identifiers for the identification (such as a CMR system-specific customer code, personal identification code, etc.). The main issue with this solution arises from the fact that the parties do not currently have a common understanding of the best identifier for the e-receipt solution. Development of a universal e-receipt solution by observing the current loyal customer card-based approach is, however, technologically complicated due to the different identifiers used.

For e-receipts to reach a wider circle of users, the payment and receiving the e-receipt must be as customary and simple as possible for the consumer, thus, the process of making a payment should not include further operations for identifying the user. Keeping in mind the above, implementation of an identification solution which calls for additional action by the user via their telephone number, a special QR code, or in another manner would not be a good solution.

Based on this analysis, the best solution would be identifying the customer based on their bank card details (such as card number, expiry date). This is the user-friendliest opinion among the solutions identified and the fact that the Finnish e-receipt service provider ReceiptHero is already successfully using a similar solution also speaks in its favour. While bank card details would be sufficient for identification in the case of private customers, registry codes would also be required in the case of business consumers.

The downside of the bank card-based identification solution is that it would only allow receiving e-receipts for card payments. Alternatively, an ID-card based identification solution could be used in parallel with the bank card data-based solution described above. In this case, those consumers who wish to pay in cash would also be able to obtain an e-receipt. Providing an alternative solution is very important, as 48% of all payments made in Estonia today are cash payments<sup>44</sup>. The ID-card based solution is also supported by the fact that many traders already allow using ID-cards as their loyal customer cards, thus, no extra operations would be added to the payment process for the customer in certain cases.

We would, however, advise to primarily focus on developing a bank card-based identification solution, as 47% of payments are card payments and Estonian people especially prefer using their bank cards to pay for more expensive purchases (5% of payments is classified in the 'Other' category in a study of the payment habits of the consumers in the euro area).<sup>45</sup> The user study conducted within the framework of this analysis revealed that consumers tend to take receipts in the case of purchasing more expensive products or products which come with a warranty.

### ***Transporting the e-receipt***

The solutions enabling transporting of e-receipts is currently designed based on specific applications in Estonia (Pargi.ee and mTasku) or the transporting occurs within the of the trader own system (e.g. Rimi). There is no universal e-receipt operator service in the market yet. There is, however, a functioning solution in which the process of sending e-receipts to businesses is executed by using e-invoice operators (in the Pargi.ee mobile phone application).

From the technological perspective, e-receipt transportation can be solved by using various different methods (see also the technical alternatives, Table 3), but the optimum solution should be based on the following:

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<sup>44</sup> <https://www.eestipank.ee/press/sularahakasutus-euroaal-endiselt-sage-pandeemia-suurendas-kontaktivabu-makseid-09122020>

<sup>45</sup> <https://www.eestipank.ee/press/sularahakasutus-euroaal-endiselt-sage-pandeemia-suurendas-kontaktivabu-makseid-09122020>

- a) user experience (adding any operations from the user's perspective should again be avoided, e.g. receiving e-receipts via NFC or Bluetooth or by scanning a QR code with a smart device and thereby initiating the process of transportation and receipt);
- b) the existing infrastructure (the current e-invoice operator network functioning in Estonia);
- c) solutions which have proven successful in other countries.

Analysing the international practice shows that e-receipt operator service providers (ReceiptHero and Findity) have appeared in the markets of those countries which are innovative in the field of RTE – Finland and Sweden. Based on the above, an operator service ensuring a convenient solution which is at least partly based on the existing e-invoice (or similar) infrastructure would probably be the best technological solution for transporting e-receipts.

Further efficiency can be provided by transmitting e-receipts by using the e-invoice standard which would also enable to reduce the level of technological complexity arising from the lack of an e-receipt data transmission standard. On the other hand, it would not be reasonable to develop a new, separate e-receipt standard, as the datasets contained in e-invoices and e-receipts are largely overlapping. The European Union is also developing an e-receipt standard based on the EU e-invoice standard which will probably be ready by 2023 and will help solve the current issue arising from the lack of standards.

### ***Retention of e-receipts***

E-receipts are currently retained in the system of an e-receipt solution provider (mTasku is provided by Telia) or in the traders' own systems. Designing the future solution, a universal solution would be required. Below, we analyse the different alternatives for developing such solution.

First option would be storing e-receipts in the of the trader own system. The majority of traders do not have the capability or willingness to maintain information systems which would enable retaining e-receipts, though. Cash register system providers may be capable of providing this service to traders, but this would also not make the e-receipts accessible for the end consumer, as the e-receipts would still be located in different information systems (of the cash register system providers).

Another option identified in the analysis was retaining e-receipts in the database of a bank, which may, however, have a negative impact on taking the service into use, as people do not want the bank to have an overview of their purchase behaviour, according to a user survey. Even if the bank did not have the right to use e-receipt data for analysing the purchase behaviour of their customers, there would still be negative attitudes towards this solution which would hinder the implementation of the solution. Furthermore, this solution would not cover cash payments.

A third option would be local retention of e-receipts in the individual's smart device, which would alleviate the privacy risk but would come with the risk of the consumer losing their receipts in the case of device being reset, destroyed, replaced, etc. The issue of how to deliver the e-receipt into the consumer's smart device would also require solving. As highlighted above, the solutions which are based on a wireless protocol (NFC, Bluetooth) or scanning QR codes would make the payment process too complicated for the user. In the case of using an operator service for transporting e-receipts into the smart device of the consumer, the receipts should be retained by the operator service provider from the perspective of convenience. Storing the data in the operator service provider's system would also theoretically ensure the possibility to view and use the e-receipts in different channels (for example, in the online bank or in a smartphone application which enables performing cost analyses).

Taking into consideration the analysis above and keeping in mind that this analysis suggests the e-receipt operator service as the best solution for transporting e-receipts, tasking the operator with the retention of the e-receipts would be reasonable from the business as well as technological perspective. It is likely that there will first be one e-receipt operator service provider (centralised environment based on the triangular model), with other operators potentially added later (formation of the square model, see also sub-chapter 6.5). This best practice is also

supported by the analysis of the international practice. The analysis did not identify any significant shortcomings of the retaining of e-receipts in the operator service provider's system.

### **Access to receipts**

Based on our user survey (see Annex 1), the most preferred solution from the perspective of private individuals would be the option to view one's receipts in the online bank. On the other hand, this would require preventing the bank from getting an overview of the purchase behaviour of individuals in order to alleviate the consumers' privacy-related fears and thereby facilitate taking into use of the new solution.

The best solution for businesses would involve the e-receipts, like e-invoices, being sent directly to the business software used by them by using e-invoice operators.

Even though the online bank is the most preferred channel among the users, the choice should be left to the developers of the solutions. Making the e-receipt data accessible via operator services may give rise to new usage cases, for example, innovative mobile phone application and other solutions could be developed for analysing the shopping cart of individuals or the medicinal products administered by them.

## **6.2 The most preferred technological solution**

Based on the analysis above, the following technological solution would be most preferred:

- ▶ Identification of the buyer
  - In the case of a card payment, the buyer is identified in the system of the e-receipt operator service provider based on their bank card details (card number, expiry date). The buyer is linked with a specific e-receipt in the system of the e-receipt operator.
  - In the case of cash payments, the buyer is identified with the help of their ID-card (personal identification code).
  - In the case of legal persons, the registry code of the legal person is also required.
- ▶ Transporting the e-receipt
  - The e-receipt would be transported via the e-receipt operator.
- ▶ Retaining the e-receipt
  - The e-receipt operator would also be tasked with retaining the e-receipts.
- ▶ Access to the e-receipt
  - The e-receipt could be accessed via different solutions interfaced with the e-receipt operator, such as:
    - the online bank,
    - a special mobile phone application,
    - the of the trader application,
    - business software,
    - another software application using the e-receipt operator service.

The technological solution is explained in detail below (see Figure 7).

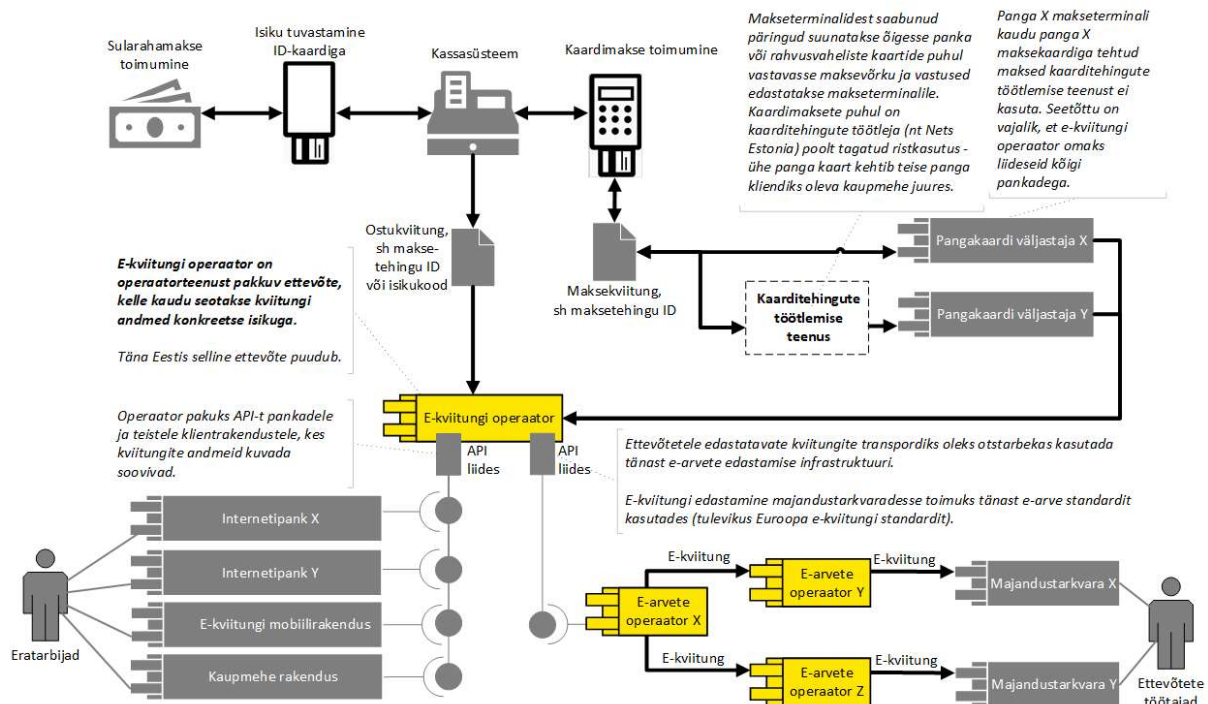


Figure 7. The potential technological solution of the e-receipt service

Sularahamakse toimumine – Cash payment

Isiku tuvastamine ID-kaardiga – Identification of the payer by ID-card

Kassasüsteem – Cash register system

Kaardimakse toimumine – Card payment process

Makseterminalidest saabunud... – The requests received from payment terminals are directed to the required banks or, in the case of international cards, to appropriate payment networks and the responses are sent to the payment terminal. In the case of card payments, the processor of the payment (e.g. Nets Estonia) ensures cross-use – a card issued by one bank is also valid for payment at a trader which is a client of another bank.

Panga X makseterminali... – The payments made by a card issued by bank X via a payment terminal of bank X do not use the card transaction processing service. Thus, the e-receipt operator must have interfaces with all banks.

E-kviitungi operaator on... – An e-receipt operator is a company providing an operator service through which receipt data are linked to a specific individual.

Täna Eestis.. – There are currently no such operators in Estonia.

Operaator pakuks... – The operator would provide an API to banks and other client applications that wish to display receipt data.

Ostukviitung, sh maksetehingu ID või isikukood – Purchase receipt, incl. payment transaction ID or personal identification code

Maksekviitung, sh maksetehingu ID – Payment receipt, incl. payment transaction ID

Kaarditehingute töötlemise teenus – Card transaction processing service

Pangakaardi väljastaja X – Bank card issuer X

E-kviitungi operaator – E-receipt operator

API liides – API interface

Ettevõtetele edastatavate... – It would be reasonable to use the current e-invoice transmission infrastructure for transporting receipts to businesses.

E-kviitungi edastamine... – The current e-invoice standard (the European e-receipt standard in the future) would be used for sending e-receipts to business software.

Eratarbijad – Private consumers

Internetipank X – Online bank X

E-kviitungi mobiilirakendus – E-receipt mobile phone application

Kaupmehes rakendus – Trader's application

E-kviitung – E-receipt

E-arvete operaator – E-invoice operator

Majandustarkvara – Business software

Ettevõtete töötajad – Employees of the company

The service is activated when a business or private consumer makes a card payment. Even today, this is accompanied by creating a so-called payment receipt (containing the identifier of the payment transaction) which is

sent to the system of the issuer of the bank card. In many cases, the information may reach the system of the issuer of the bank card through a card transaction processing service (this service is provided by Nets Estonia, for example). The card transaction processing service ensures that a card issued by one bank card issuer is also valid for paying at the place of business of a trader who is a client of another bank. The card transaction processing service is not used if the bank which issued the payment terminal to the trader is the same bank which issued the bank card to the consumer.

If the business of private consumer wishes to pay in cash, the suggested operating model will offer an alternative option for receiving the e-receipt which involves identification of the consumer by using an ID-card.

Irrespective of the payment method chosen, the purchase receipt (incl. the ID of the payment transaction or the personal identification code of the individual identified based on their ID-card, depending on the method of payment) is sent by the cash register system to the operator.

The details of the payment receipt and purchase receipt are available from cash register system and the system of the issuer of the bank card, respectively. The e-receipt operator must link those two datasets for identification of the individual who is the owner of the e-receipt issued.

On the other hand, the e-receipt operator must also provide an application programming interface (API) for the customer applications which make the e-receipts accessible for the private consumer. Such client applications may include online banks, different mobile phone applications which enable e-receipt related operations, the trader's own applications, or other solutions using e-receipt data.

In order to satisfy the needs of business customers, the e-receipt operator should have an API with an e-invoice operator via whom e-receipts could be routed directly in the business software of the legal person which made the purchase (similarly to the solution currently used in the Pargi.ee mobile phone application). **In the event of the e-receipt operator service being provided by one of the currently operating e-invoice operators, the e-invoice operator performing the role of the e-receipt operator would not need to interface with any other e-receipt operators, but the routing could occur by using the current infrastructure.**

The processes based on the operating model described above are described in detail in the process description chapter below.

## 6.3 Process descriptions

The chapter on process descriptions presents the process models which are based on the afore-mentioned most preferred technological solution. The process schemes describe the activity flows of the **private customer** and **business customer** which include the parties involved in the process: **the e-receipt operator, the trader, the cash register system, the system of the financial institution** (issuer of the bank card, card transaction processing service provider), and the **business software**.

### ***Transition to the e-receipt service***

In the case of a card payment, an e-receipt is issued if the individual has provided their bank card details (such as card number and expiry date) in the channel created by the e-receipt operator for this purpose and given their consent to the operator for processing the e-receipt data related to them (the consent is only required in the case of private individuals). By retaining the bank card data, the operator undertakes the obligation to ensure the security of the bank card data based on the requirements of the card organisation.

The solution for using the e-receipt service provided by an e-receipt operator or the channel for entering bank card details can be executed in a number of ways. For example, a website or mobile phone application can be used as the e-receipt operator's channel. Assuming that the operator enables different client applications to display the e-receipts (not only in the mobile phone application developed by the operator, for example), it would be reasonable for the e-receipt operator to also provide an API for interfacing with the e-receipt service which would allow all users of the client application to subscribe to the e-receipt service directly in the client application,

but would not come with an obligation for the client application to comply with the requirements of the card organisation, as the e-receipt operator would remain in charge for the retention of the card data. From the technical perspective, this is somewhat similar to the payment solutions used in online stores, such as Stripe.<sup>46</sup> For example, in an online store using Stripe, credit card details are entered into the solutions provided by Stripe and the online store is therefore not responsible for retaining the card data. A simpler solution from the technical perspective would be re-directing the user from the client application to the website of the e-receipt operator where they could subscribe to the e-receipt service.

The most invisible solution for a private individual could be organised through the loyal customer programme of the trader. Customers are already asked to give various different consents upon subscribing to the loyal customer programmes of traders today (for example consent for receiving offers). In the case of switching to e-receipts, asking an additional consent should be added to the solution of subscription to a loyal customer programme, by which a private customer would confirm that they consent with their e-receipts being sent to the e-receipt operator. Those customers who have already subscribed to the loyalty programme could be involved by notifying them of changes to the terms and conditions of subscribing to the loyal customer programme. That would allow asking the consent of the customers for the implementation of the e-receipt solution.

If a user starts using a mobile phone application which enables viewing e-receipts and performing other operations (or some other software application which enables viewing e-receipts), they will also gain access to all of their previous e-receipts, i.e. to all e-receipts which have been generated since the user expressed their wish to receive e-receipts via a channel created by the e-receipt operator for this purpose or the loyalty programme of the trader.

Assuming that there are almost 400 million receipts issued in Estonia per year<sup>47</sup> and the estimated storage space required for one e-receipt is 3 kilobytes, approximately 1.2 terabytes of storage space per year would be required for retaining all e-receipts generated in Estonia. Thus, the storage space required for saving the history of e-receipts is not an issue. Yet, it would be reasonable to retain the e-receipts in the future solution for a certain period of time (in the case of mTasku, for example, e-receipts are retained for five years), after which they would be deleted.

The contract concluded between e-receipt operator and traders should also specify the conditions of sharing the details of the traders with third parties. This is important, as the business risk arising from the price information of traders becoming machine-readable is one of the reasons for the failure of an e-receipt pilot project in the past.

### ***Issuing of e-receipts to private persons***

The process of issuing an e-receipt (see also Figure 8) begins when the prerequisites described above have been satisfied, a private individual has finished shopping and goes to the cash register where they must choose their preferred payment method. In the event of a card payment, a request is sent from the payment terminal to the system of the financial institution, which is responded to by confirmation of the payment by the system in the case of a positive scenario. The request sent to the system of the financial institution is accompanied by the ID of the payment transaction, which is later used by the e-receipt operator to identify the private individual and link the purchase and payment receipts into an e-receipt.

Once the card payment has been successfully completed, the cash register system automatically draws up a purchase receipt and sends the e-receipt to the operator. The e-receipt operator accepts the purchase receipt, which is followed by requesting the payment receipt from the system of the financial institution based on the payment transaction ID included in the purchase receipt. The system of the financial institution sends the payment receipt

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<sup>46</sup> <https://stripe.com/en-ee>

<sup>47</sup> [https://www.omniva.ee/index.php?article\\_id=653&page=580&action=article&](https://www.omniva.ee/index.php?article_id=653&page=580&action=article&)

to the e-receipt operator and the payment and purchase receipts are linked. The e-receipt generated as a result of the linking is saved in the database of the e-receipt operator.

In the case of an alternative flow, the private individual makes a cash payment. In this case, for obtaining an e-receipt, the individual must be identified with the help of their ID-card before making the payment (the same operation is currently performed by the traders who use ID-cards as loyal customer cards), as a result of which the personal identification code of the private individual is sent to the cash register system. The trader accepts the cash payment and the cash register system draws up a purchase receipt, which is sent to the e-receipt operator. The e-receipt operator accepts the purchase receipt and saves it in their database.

If the private individual wishes to use their e-receipts, they must start using an e-receipt solution. Any client application of the e-receipt operator (e.g. online bank, special mobile phone application) who wishes to use e-receipts for providing their service may be used as the e-receipt solution. In the event of starting to use an e-receipt solution, the customer must submit their bank card details for using the receipts generated as a result of card payments, and those details are used to request the related e-receipts from the operator. In order to view the e-receipts generated as a result of cash transactions, the customer must use one of the authentication methods to identify themselves (e.g. ID-card, Smart-ID, etc.) and the e-receipts are requested from the e-receipt operator based on their personal identification code. Issuing the e-receipt to the client application closes the process of issuing the e-receipt.

Private individuals can use their e-receipts via an e-receipt solution. Thereat, based on the user survey conducted within the framework of this analysis, the main uses cases include viewing e-receipts, cost analysis, proving warranties, searching for e-receipts, and submitting expenditure reports (we will explain the process of presenting an e-receipt within the sub-process of submitting an expenditure report in detail below, see also Figure 9).



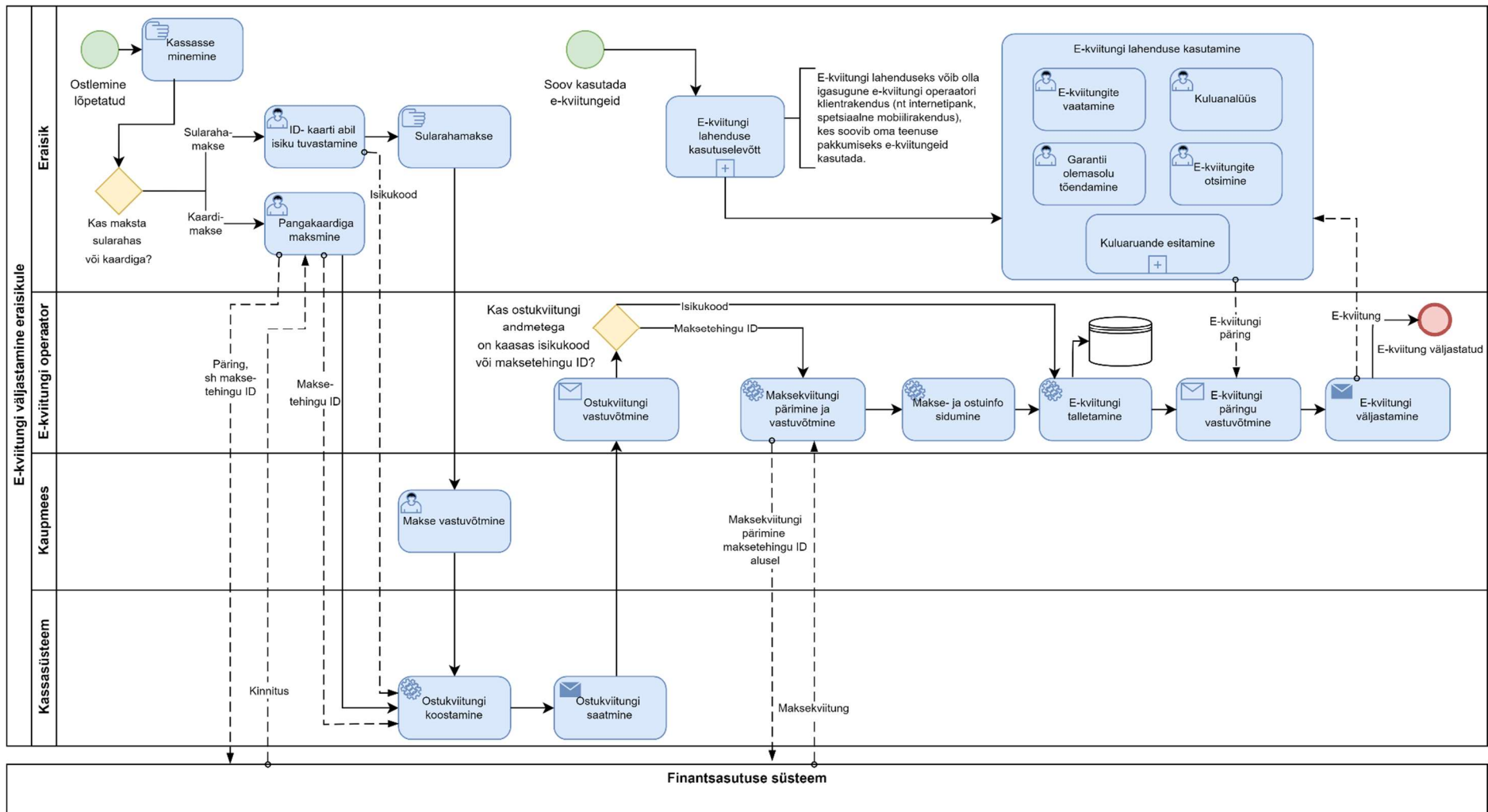


Figure 8. Issuing of e-receipts to private persons

E-kviitungi väljastamine erasisikule – Issuing an e-receipt to a private individual  
 Erasisik – Private individual

Ostlemine lõppenud – Shopping finished  
Kassasse minemine – Goes to the cash register  
Sularahamakse – Cash payment  
ID-kaardi abil isiku tuvastamine – Identification by ID-card  
Kas maksta sularahas või kaardiga – Cash or card payment?  
Kaardimakse – Card payment  
Pangakaardiga maksmine – Payment by a bank card  
Isikukood – Personal identification code  
Soov kasutada e-kviitungeid – Wish to use e-receipts  
E-kviitungi lahenduse kasutuselevõtt – Subscription to an e-receipt solution  
E-kviitungi lahenduseks võib olla.. – Any customer application of an e-receipt operator (e.g. online bank, special mobile phone application) which wishes to use e-receipts for providing its service may serve as an e-receipt solution  
E-kviitungi lahenduse kasutamine – Using the e-receipt solution  
E-kviitungite vaatamine – Viewing e-receipts  
Kuluanalüüs – Expenditure analysis  
Garantii olemasolu tõendamine – Proving a warranty  
E-kviitungite otsimine – Searching e-receipts  
Kuluaruande esitamine – Submitting an expenditure statement  
E-kviitungi operaator – E-receipt operator  
Päring, sh maksetehingu ID – Request, incl. payment transaction ID  
Maksetehingu ID – Payment transaction ID  
Kas ostutehingu andmetega on kaasas isikukood või maksetehingu ID – Is the purchase transaction information accompanied by a personal identification code of payment transaction ID  
Ostukviitungi vastuvõtmine – Receipt of the purchase receipt  
Maksetehingu pärimine ja vastu võtmine – Requesting and receipt of the payment receipt  
Makse- ja ostuinfo sidumine – Linking of the payment and purchase information  
E-kviitungi talletamine – Saving of the e-receipt  
E-kviitungi paring – E-receipt request  
E-kviitungi päringu vastuvõtmine – Accepting the e-receipt request  
E-kviitungi väljastamine – Issuing the e-receipt  
E-kviitung väljastatud – E-receipt issued  
Kaupmees – Trader  
Makse vastuvõtmine – Receipt of the payment  
Maksekiitungi pärimine maksetehingu ID alusel – Requesting of the payment receipt based on the payment transaction ID  
Kassasüsteem – Cash register system  
Kinnitus – Confirmation  
Ostukviitungi koostamine – Generation of the purchase receipt  
Ostukviitungi saatmine – Sending the purchase receipt  
Maksekiitung – Payment receipt  
Finantsasutuse süsteem – System of the financial institution

### Submission of an e-receipt to a business by a reporting private person

One of primary usage cases of using an e-receipt solution is the submission of an expenditure report by a private person who is in the role of a reporting person in this case (see Figure 9). The need to submit an e-receipt to a business arises if a private person has used their own resources to make a purchase in the name of the business and would like the business to compensate this expense.

If the need to submit an e-receipt has arisen, the reporting person must find the e-receipt which they would like to submit an expense report about by using an e-receipt solution (such as a special mobile phone application). The e-receipt is requested from the e-receipt operator as described above.

Once the required e-receipt has been found, the individual must enter in the e-receipt solution (e.g. a mobile phone application) the details of the business (at least the register code) to which the e-receipt must be sent. Then, the reporting person can send the e-receipt to the legal person who requested the receipt from the solution used by them (e.g. a mobile phone application). The e-receipt is sent via the e-receipt operator to an e-invoice operator, who will automatically route (via other e-invoice operators, if necessary) the e-receipt to the business software of the business that is the addressee of the e-receipt. Thereat, the address of the recipient of the e-invoice is requested from the e-Business Register based on the registry code of the business entered by the user. The process ends once the e-receipt has been accepted by the business software of the business.

A similar solution has already been successfully executed in the Pargi.ee mobile phone application of Telia. The difference compared to the solution described is that the Pargi.ee solution is not using an e-receipt operator, but the e-receipt is generated by Telia's own system.

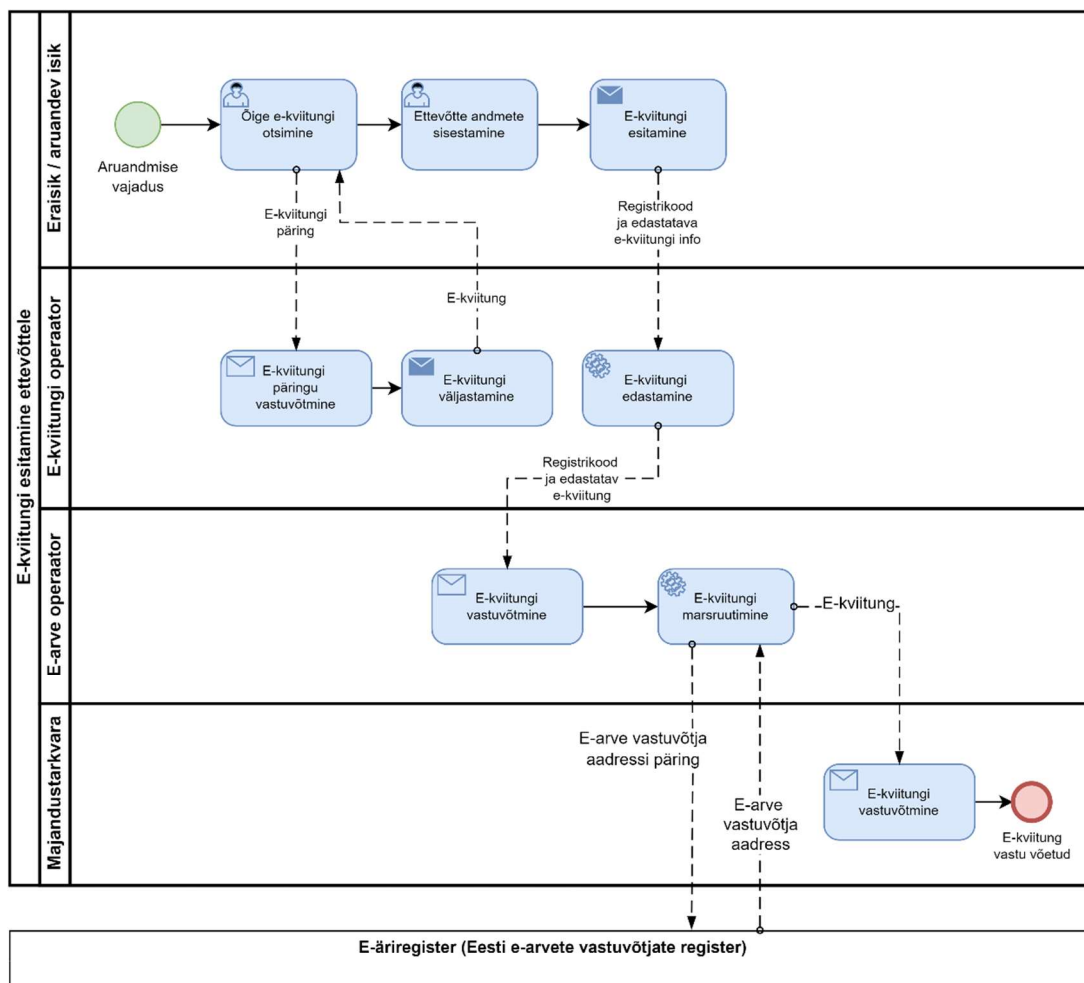


Figure 9. Submission of an e-receipt to a business by a reporting private person

E-kviitungi estamine ettevõtetele – Submission of an e-receipt to a business  
Eraisik / aruandev isik – Private individual / reporting person  
Aruandmise vajadus – Reporting obligation  
Õige e-kviitungi otsimine – Finding the right e-receipt  
E-kviitungi paring – E-receipt request  
Ettevõtte andmete esitamine – Entering the company's details  
E-kviitungi esitamine – Submission of the e-receipt  
Registrikood ja edastatava e-kviitungi info – Registry code and the details of the e-receipt sent  
E-kviitungi operator – E-receipt operator  
E-kviitungi päringu ja vastuvõtmine – Receiving an e-receipt request  
E-kviitungi väljastamine – Issuing the e-receipt  
E-kviitungi edastamine – Sending the e-receipt  
Registrikood ja edastatav e-kviitung – Registry code and the e-receipt sent  
E-arve operator – E-invoice operator  
E-kviitungi vastuvõtmine – Receiving the e-receipt  
E-kviitungi marsruutimine – Routing of the e-receipt  
Majadustarkvara – Business software  
E-arve avstuvõtja aadressi paring – Inquiry of the address of the i-invoice recipient  
E-arve aadress – Address of the e-invoice recipient  
E-kviitungi vastuvõtmine – Receipt of the e-receipt  
E-kviitung vastu võetud – E-receipt received  
E-äriregister – E-Business Register (Estonian register of e-invoice recipients)

### ***Issuing an e-receipt to a legal person***

Below, we examine the process of issuing e-receipts to a legal person. Similarly, with the process of issuing an e-receipt to a private customer described above, a business customer must also register in a channel created by an e-receipt operator for this purpose (e.g. on a website), incl. provide the register code of the legal person in addition to the bank card details based on which they will be receiving e-receipts.

The process of issuing an e-receipt to a legal person (see Figure 10) begins when the employee of the business has finished shopping and goes to the cash register, where they must choose the method of payment. In the case of a card payment, a purchase receipt is generated in the cash register system. In the case of a cash payment, the registry code of the legal person must also be provided (e.g. by entering it in the user interface of a self-service payment terminal); this will later be used to send the e-receipt to the business software application of the right business. According to the representatives of cash register systems, the process of compiling an e-receipt compliant with the e-invoice standard can be executed based on the data currently available in cash register systems. An e-receipt generated compliant with the e-invoice standard is forwarded to an e-receipt operator.

If the employee made a card payment, a process of requesting the payment receipt from the system of the financial institution that issued the card is conducted in the system of the e-receipt operator, followed by linking the data of the purchase receipt and payment receipt (as in the process of issuing an e-receipt to a private customer described above). After linking the payment receipt and purchase receipt, the e-receipt is linked to the register code of the legal person for routing the e-receipt into the business software of the business that is the addressee of the receipt.

Routing the e-receipt is conducted by an e-invoice operator by using the current network of e-invoice operators (the e-receipt is sent in compliance with the e-invoice standard). The address of the recipient of the e-invoice is requested by the e-invoice operator from the e-Business Register by using the registry code of the legal person that is the addressee of the e-receipt. The business software of the legal person that is the addressee of the e-receipt accepts the e-receipt sent by routing. Accepting the e-receipt completes the process.

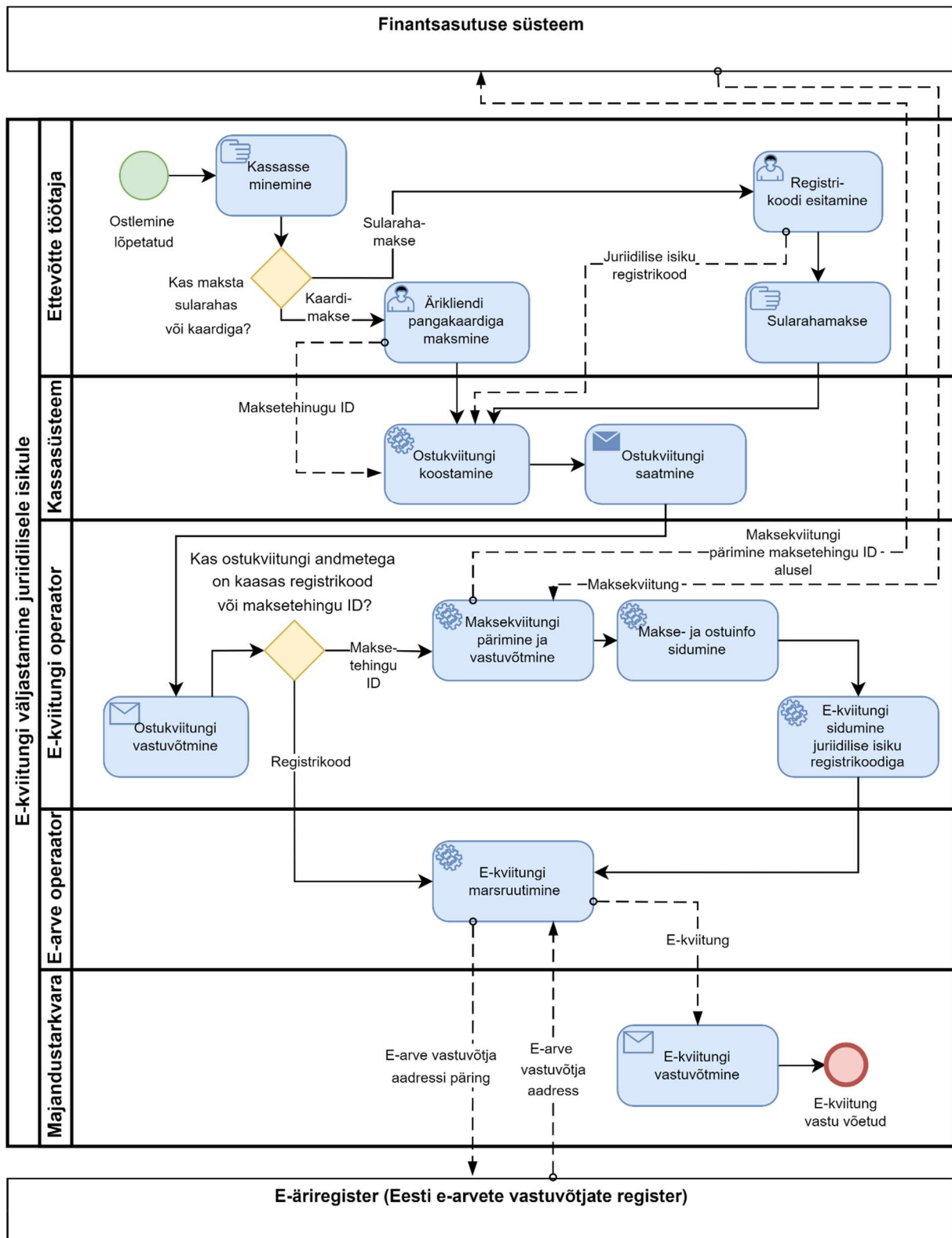


Figure 10. Issuing an e-receipt to a legal person

- Finantsasutuse süsteem – System of the financial institution
- Ettevõtte töötaja – Employee of the business
- Ostlemine lõpetatud – Shopping finished
- Kassasse minemine – Goes to the cash register
- Kas maksta sularahas või kaardiga – Cash or card payment?
- Kaardimakse – Card payment
- Sularahamakse – Cash payment

Ärikliendi pangakaardiga maksimine – Paying with the business customer's bank card  
Juriidilise isiku registrikood – Registry code of the legal person  
Registrikoodi esitamine – Providing the registry code  
Sularahamakse – Cash payment  
Kassasüsteem – Cash register system  
Maksetehingu ID – Payment transaction ID  
Ostukviitungi koostamine – Drawing up of the purchase receipt  
Ostukviitungi saatmine – Sending of the purchase receipt  
E-kviitungi operator – E-receipt operator  
Kas ostukviitungi andmetega... – Are the purchase receipt details accompanied by a registry code or payment transaction ID?  
Maksekviitungi pärimine maksetehingu ID alusel – Requesting the payment receipt based on the payment transaction ID  
Maksetehingu ID – Payment transaction ID  
Maksekviitungi pärimine ja vastuvõtmine – Requesting and receiving payment information  
Makse- ja ostuinfo sidumine – Linking of payment and purchase information  
Ostukviitungi vastuvõtmine – Receipt of the payment receipt  
Registrikood – Registry code  
E-kviitungi sidumine juriidilise isiku registrikoodiga – Linking of the e-receipt with the registry code of the legal person  
E-arve operator – E-invoice operator  
E-kviitungi marsruutimine – Routing of the e-receipt  
E-kviitung – e-receipt  
Majandustarkvara – Business software  
E-arve vastuvõtja aadressi paring – Requesting the address of the e-invoice recipient  
E-arve vastuvõtja aadress – Address of the e-invoice recipient  
E-kviitungi vastuvõtmine – Receipt of the e-receipt  
E-kviitung vastu võetud – E-receipt received  
E-äriregister – E-Business Register (Estonian register of e-invoice recipients)

## 6.4 Functional and non-functional requirements

This chapter describes the general functional and non-functional requirements. The functional requirements describe what a software application is required to do. Under the non-functional requirements, the requirements for how the software application must fulfil the functions required for offering e-receipts are discussed.

The requirements are also grouped by the main usage cases identified in the analysis (see also Figure 11).

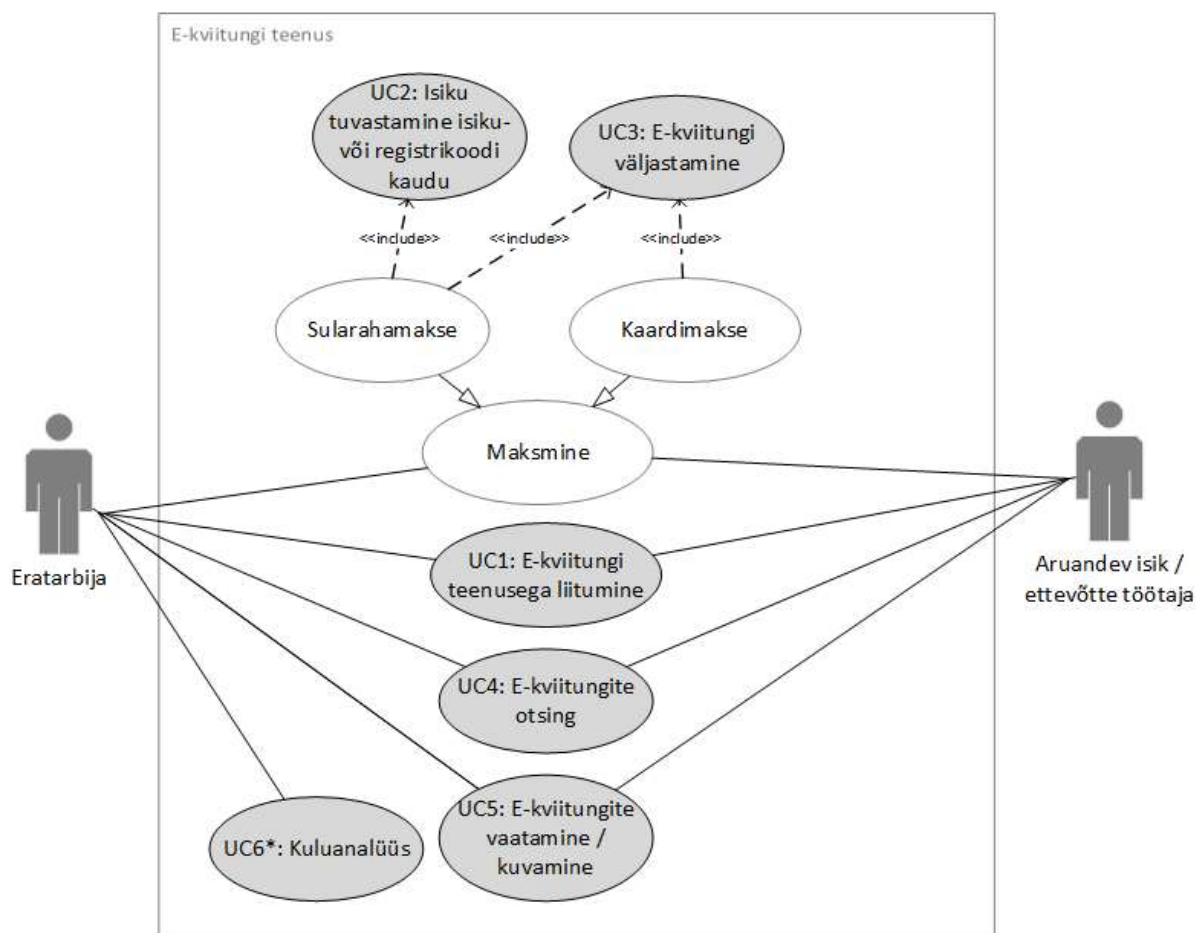


Figure 11. The main usage cases of the e-receipt service

Eratarbija – Private consumer

E-kviitungi teenus – E-receipt service

UC2:... – UC2: Identification by the personal identification code or registry code

Sularahamakse – Cash payment

UC3: – UC3: Issuing the e-receipt

Sularahamakse – Cash payment

Kaardimakse – Card payment

Maksmine – Payment

UC1: – UC1: Subscription to an e-receipt service

Aruandev isik / ettevõtte töötaja – Reporting person / employee of the business

UC4: – UC4: Searching e-receipts

UC5: Viewing/displaying e-receipts

UC6\*: Expenditure analysis

Six main usage cases can be differentiated from the perspective of the user (private consumer or a reporting person / employee of an undertaking):

- ▶ Subscribing to the e-receipt service (UC1)
- ▶ Identification of the person based on the personal identification code or registry code (UC2)

- ▶ Issuing of the e-receipt (UC3)
- ▶ Search of e-receipts (UC4)
- ▶ Viewing/displaying an e-receipt (UC5)
- ▶ Cost analysis (UC6\*)

\* *Cost analysis is a so-called convenience service, developing this service could support wider use of e-receipts, but it is not a vital functionality.*

Below, we list the general functional (see Table 4) and non-functional (see Table 5) requirements of a **comprehensive e-receipt service**. In the case of functional requirements, the 'Code' column specifies the connection with a specific usage case by indicating the indicator of the usage case (UC1–UC6).

Table 4. Functional requirements

Code	Functional requirements
F1-UC1	Natural as well as legal persons must be able to subscribe to the e-receipt service.
F2-UC1	The e-receipt must ask the consent of an identified natural person user for using their personal data.
F3-UC1	The e-receipt service must enable natural persons to link their bank cards to the e-receipt service through the bank card details (card number, expiry date).
F4-UC1	The e-invoice service must enable a representative of a legal person to link the bank card of the business customer to the e-receipt service through the bank card details (card number, expiry date) and the details which enable identification of the undertaking (registry code of the legal person).
F5-UC2	The e-receipt service must enable identifying private individuals based on their ID-cards or personal identification codes and identifying legal persons based on their registry codes upon making cash payments.
F6-UC3	The e-receipt service must transfer the purchase receipt from the cash register system to the e-receipt operator upon completion of a cash payment and identification of the person.
F7-UC3	The e-receipt service must send the purchase receipt automatically from the cash register system to the e-receipt operator upon a card payment with a bank card of a registered private individual.
F8-UC3	The e-receipt service must enable transferring the purchase receipt to the accounting software of the legal person upon a card payment with a bank card of a registered private individual.
F9-UC3	The e-receipt service must transfer the e-receipt automatically to the accounting software of the business customer upon a payment with a bank card of a registered undertaking (i.e. a business customer).
F10-UC3	The e-receipt service must link purchase receipts and payment receipts to generate e-receipts accessible for the owners of the e-receipts.
F11-UC3	The e-receipt service must make the e-receipts saved in the database of the e-receipt operator available to the client applications via the application programming interface (API).
F12-UC3	An e-receipt must at least include 1) the name and business name of the trader and the address of the place of business, 2) the date of selling the goods or providing the service, 3) the names and prices of each item of goods or each service and the amount paid. <sup>48</sup>
F13-UC4	The e-receipt service must enable searching of e-receipts through the client application.
F14-UC5	The e-receipt service must enable viewing the e-receipt (the data) through the client application, including proving the validity of a warranty.
F15-UC6*	The e-receipt service must enable making expense analyses through the client application by grouping the products and services consumed specified in the e-receipts.

In the case of non-functional requirements, good practice and quality standards should be kept in mind. Thereat, it is important to ensure that the service is not discriminating, i.e. it must be accessible for as wide circle of users as possible.

Table 5. Non-functional requirements

<sup>48</sup> <https://www.riigiteataja.ee/akt/131122016013?leiaKehtiv> (subsection 4 (4) (Consumer Protection Act, 2021))



Code	Non-functional requirements
MF1	The e-receipt service must be based on the best quality practices, for example, the ISO/IEC 25010 <sup>49</sup> quality standard, which is widely used in software development.
MF2	The e-receipt service must be assessable for individuals with special needs based on the WCAG 2.0 <sup>50</sup> web content accessibility guidelines.
MF3	The e-receipt services must be accessible for the users of all widely used operation systems (Android, iOS, Windows, Mac OS) <sup>51</sup> .
MF4	The e-receipt service must be usable in Estonian.

## 6.5 Transition from the triangular model to the square model

The technological solution described above (chapter 6.2) and the process descriptions (chapter 6.3) are presented based on the triangular model (see also Figure 5) in the case of which the cash register system provider and the developer of the solution designed for the consumer must use the same e-receipt operator service provider. As there are currently no e-receipt operators in Estonia, the e-receipt solution will likelier be developed based on the triangular model. This is also confirmed by the Finnish experience where the process began by developing a triangular model-based solution, but good process is being made towards implementing the square model.

Taking into consideration the principles of free market economy and the best practices in the e-receipt sector<sup>52</sup>, development of a triangular model based e-receipt service should be followed by transition to the square model (see also Figure 4 and Figure 12). This means that more e-receipt operators should enter the market, whereas the number of the operators would not be limited. This would enable traders / cash register system providers to choose which e-receipt operator service provider they prefer to use. For the end user, the e-receipts would remain available from one channel preferred by them, for which the e-receipt operators must conclude contracts for mutual exchange of e-receipts and other related data.

The following drawing illustrates one of the potential technological systems which is based on the square model (see Figure 12). In the case of this example, two e-receipt operators are involved in providing the e-receipt service. E-receipt operator X has interfaces with cash register systems and banks and is linking purchase receipts and payment receipts. The e-receipt operator X is also interfaced with the e-receipt operator Y, which is not interfaced to cash register systems and banks, but offers API interfaces used to make e-receipts accessible for various client applications (e.g. online banks).

<sup>49</sup> <https://iso25000.com/index.php/en/iso-25000-standards/iso-25010>

<sup>50</sup> <https://www.w3.org/Translations/WCAG20-et/>

<sup>51</sup> <https://gs.statcounter.com/os-market-share/all/estonia>

<sup>52</sup> [https://teknologiateollisuus.fi/sites/default/files/file\\_attachments/2018\\_ekuitti\\_eng\\_sisus\\_vedos\\_6.pdf](https://teknologiateollisuus.fi/sites/default/files/file_attachments/2018_ekuitti_eng_sisus_vedos_6.pdf)

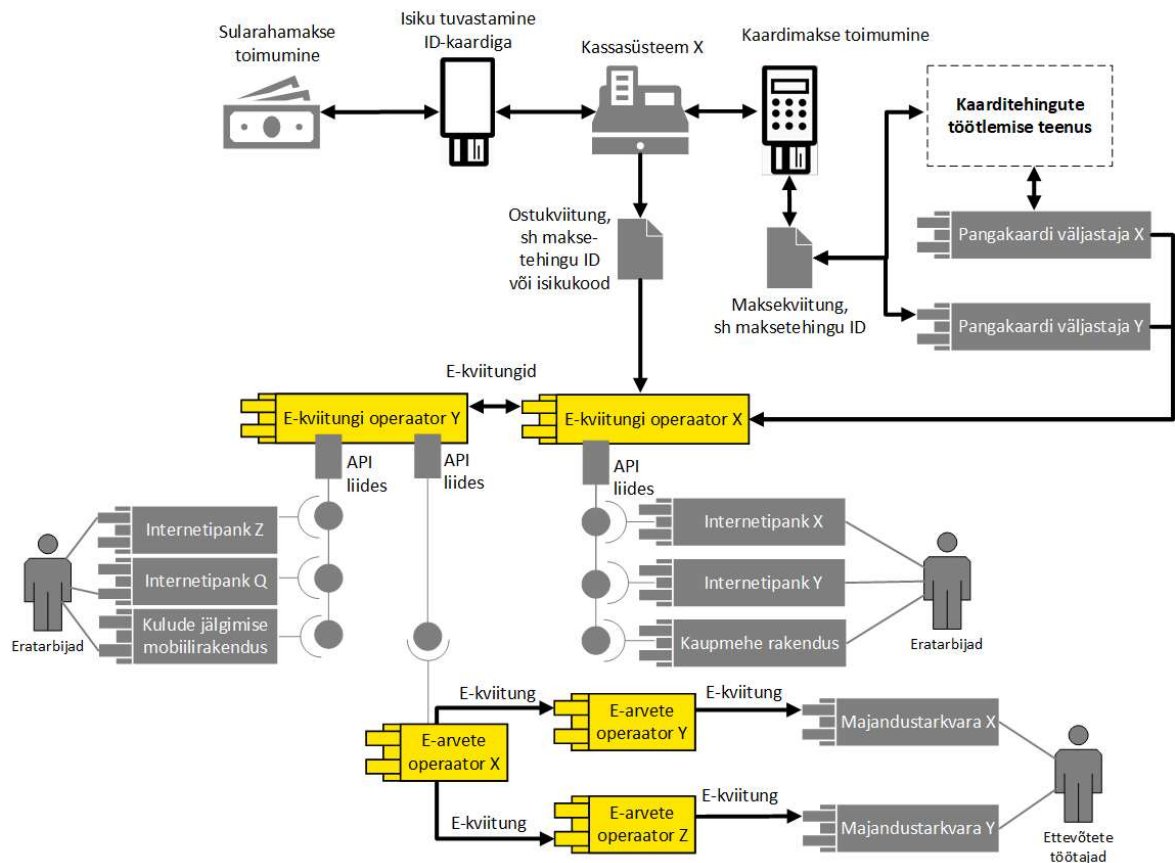


Figure 12. A potential technical solution based on the principle of the square model

Sularahamakse toimumine – Cash payment

Isiku tuvastamine ID-kaardiga – Identification of the payer by ID-card

Kassasüsteem – Cash register system

Kaardimakse toimumine – Card payment process

Ostukviitung, sh maksetehingu ID või isikukood – Purchase receipt, incl. payment transaction ID or personal identification code

Maksekviiitung, sh maksetehingu ID – Payment receipt, incl. payment transaction ID

Kaarditehingute töötlemise teenus – Card transaction processing service

Pangakaardi väljastaja X – Bank card issuer X

E-kviitungi operaator – E-receipt operator

API liides – API interface

Ettevõtetele edastatavate... – It would be reasonable to use the current e-invoice transmission infrastructure for transporting receipts to businesses.

Eratarbijad – Private consumers

Internetipank X – Online bank X

Kulude jälgimise mobiilirakendus – Mobile phone app for cost monitoring

Kaupmehe rakendus – Trader's application

E-kviitung – E-receipt

E-arvete operaator – E-invoice operator

Majandustarkvara – Business software

Ettevõtte töötajad – Employees of the company

## 7. Suggestions for the need for support

At the time of compiling this study, there were several digital receipt and e-receipt solutions and mobile phone applications offered by larger store chains in use in Estonia that issue to the user purchase certificates in the form of PDF files or send e-receipts in the form of e-invoices to the business software of businesses. In addition to the existing digital receipt solutions, several traders enable the consumer to choose the option of foregoing printing the paper receipt, in which case no purchase certificate is issued to the customer. Keeping in mind the existing solutions and the number of receipts issued per year (400 million), the existing solutions have failed to reach a sufficiently wide circle of users to generate significant benefits from environmental and economic perspectives.

In this sub-chapter, we examine the potential intervention logics to achieve a wider use of e-receipts.

### 7.1 General need for support

The study involved conducting interviews and focus groups with different parties related to receipts to determine their attitudes towards receipts. For example, information was collected from representatives of the larger shopping chains that are already using certain digital receipt solutions, as well as from cash register system providers and operators. The information collected allows concluding that the limited spread of e-receipts does not arise from specific technological obstacles, but is caused by the lack of central service providers in the current market situation. By the parties concerned, the situation may be described as follows:

- Large store chains (e.g. Kaubamaja Grupp, Rimi, Maxima) have developed digital receipt solutions due to their considerable size and market shares, but those solutions are linked to their loyalty programmes and are thus not universal. From the perspective of consumers, it would be more convenient to have all receipts accessible in one place and not having to use different environments to manage one's purchase receipts. It is therefore important to facilitate the development of centralised receipt management solutions.
- Some cash register system developers have equipped their systems with the functionality of sending e-receipts in the past, but have not developed those functionalities, which are therefore not compliant with the future e-receipt standard.
- When it comes to business systems, it is important to ensure accepting e-receipts (in the case of businesses) to simplify accounting processes. Accepting e-invoices is mostly possible today, but this option is not used by all businesses. Development of the infrastructure of e-receipts could also increase the interest of business systems in fully electronic data exchange.
- E-invoice operators have not currently observed a demand for e-receipt exchange and roaming among their clients in the market. One of the reasons for this has been the lack of preparedness from the market participants to pay for such service.

Next to the parties related to providing e-receipts, it is also important to highlight the main target groups of e-receipts:

- Private individuals who receive the majority of receipts, but are not especially motivated to use receipts and primarily use receipts in the case of more expensive purchases to prove their warranty.
- Businesses and the reporting persons making purchases in the name of businesses who need the receipts to reach the accounting system of the business for further financial operations. Thus, in the case of businesses, we are mainly talking about accountants and the accounting service providers providing services to businesses.

Below, we examine the potential possibilities for support for enlivening the current e-receipt market by the parties involved in issuing receipts and the target groups.

### 7.1.1 Support needs of cash register system providers

For cash register system providers, the main obstacle so far has been a lack of interest from traders, as cash register systems are developed based on the needs of traders. Even though one of the obstacles is lacking interest from traders, cash register system providers are also influenced by the lack of an e-receipt standard, as it is not possible to develop a data exchange solution that would efficiently cover the entire market without such standard.

Different cash register systems are often specialised on different trade and service sectors. For example, in the food trade, the majority of the consumers are private individuals, while hardware stores have proportionally more business customers. The study revealed that the need for e-receipts is higher on the side of business customers, as such receipts enable simplifying accounting processes.

As businesses are presumed to be more interested in e-receipts, the transition to e-receipts should be accelerated in this segment. One options for this would be to support cash register system providers in the integration of their solutions with the current e-invoice operators that could potentially be interested in e-receipts. As the EU as well as Estonia are planning to start using the EU e-receipt standard in the near future, the support would be allocated for EU standard-based developments in cash register systems and for interfacing with operator services.

The issue of authenticating the user must also be solved in the cash register systems and a functionality must be added for entering the addressees of e-receipts. Identifying based on the bank card or ID-card are among the potential solutions, for example.

### 7.1.2 Support needs of businesses (traders)

Traders generally operate based on the needs of their customers, i.e. buyers, and as the interest among private individuals is currently low and the percentage of business among the potential use of the receipts is relatively small, there has been no need for introducing e-receipts. Only a few larger grocery store chains have done this within the framework of their loyalty programmes. Larger traders mostly also have the capability of issuing an e-invoice if requested by a customer.

Traders generally use standard (so-called 'out-of-the-box solution') or specifically developed cash register systems. Thus, increasing the e-receipt related capability of the cash register systems used by traders should be supported in different ways. In the case of out-of-the-box solutions, the support should mainly focus on the developer of the cash register system for the functionalities developed in their products reaching as many traders as possible. In the case of the cash register systems specifically developed by traders, though, there is no product developer as such, as the trader should be supported to allow them to develop the e-receipt capacity of their cash register systems.

### 7.1.3 Support needs of operators

Today, e-receipt operator services are being provided by the e-invoice operator Unifiedpost in cooperation with the telecommunication service provider Telia, mediating the receipts of PARGI.EE and mTasku. The remaining trader-focussed solutions are functioning separately without using operating services.

In the interviews and focus group discussions conducted in the course of the study, operators stressed that their current lack of interest in e-receipts did not arise from financial or technological obstacles, but primarily from the low interests of the market participants closer to the consumer, such as traders and cash register system providers, to use e-receipts.

Considering the fact that the e-invoice and e-receipt operator services are similar by nature and the e-invoice operator market is already functioning, the study did not identify the need of operators for support in the process of receiving and sending e-receipts. A once-only (or short-term) support cannot be the solution in the case of a business model, which is not sustainable in a longer perspective.

As of the options considered in the potential future e-receipt operating model would be identifying buyers by bank cards, processing of card details by the operator in compliance with the requirements of banks and card organisations may prove necessary. As ensuring compliance with the afore-mentioned security requirements may be expensive, involving implementing various different security measures, it would be reasonable to support this process of ensuring compliance.

#### 7.1.4 Support needs of accountants and accounting service providers

The share of the receipts of the purchases made by businesses is relatively small in the entire volume of receipts, but as it is necessary to record those receipts in the accounting as expense documents, as significant workload arises for accountants in connection with those receipts. In the case of private individuals, the details of the receipts are usually not entered anywhere (except a few individuals who are keeping precise records of their expenses), which lowers the benefits arising from using e-receipts in this respect.

Thus, e-receipts are beneficial for the accountants of businesses, but even more for the accounting service providers for whom a significant amount of their work is related to the entry of expense documents (incl. receipts). Thus, introducing the possibilities for the automatic processing of e-receipts which already exist today to accountants and accounting service providers should be considered to expand the use of e-receipts. We also advise supporting accountants in cooperating with cash system and business software producers to enable them to introduce their needs and thereby create opportunities for developing the e-receipt infrastructure. It would be reasonable to gather and represent the interests of the accounting sector in cooperation with the Estonian Assembly of Accountants.

By creating the need among accountants for e-receipts while offering support to cash register system producers for technological developments, the prerequisites for developing the e-receipt ecosystem are created. Providers of operator services should also be involved and it would be reasonable to do this via an e-invoice working group operating by the ITL, for example.

For introduction of RTE-related technologies, we advise cooperating with the real time economy digital laboratory of TalTech, for example. Cooperation with the digital laboratory would help increase the awareness of the future employees of the digital sector, as well as businesses in the field of e-receipts and thereby support achieving a wide transition to e-receipts.

#### 7.1.5 E-receipt solution product developers

There are currently no separate active e-receipt solution product developers in Estonia today. This role is partly fulfilled by large trade chains which have developed those solutions for themselves. In addition, the telecommunication business Telia in cooperation with the e-invoice operator Unifiedpost is developing an e-receipt solution for the mTasku and PARGI.ee solutions, for example.

As the solutions developed by traders should be integrated into one single e-receipt infrastructure in the future, a situation in which the e-receipt product developer develops e-receipt functionalities based on the needs of the end users in cooperation of an operator service provider or while also serving as an operator service provider would be preferred.

We would advise providing product development support to facilitate the development of e-receipt solutions, which could be used to develop a prototype of an e-receipt solution or a finished product. The support for product development would be intended for developing the different technological components of the e-receipt ecosystem, incl. for providing e-receipt operator services, for secure retention of e-receipts, for granting access to e-receipts via different channels, for the development of an end user application (incl. mobile phone solution) for managing e-receipts, and for the development of innovative services providing new added value based on e-receipts.

The activities supported should cover all stages of product development of a digital solution, incl. analysis and design of the solution and creating, testing and developing a prototype. The project should be conducted in the cooperation of the developer of the digital service, traders, and operator service providers to ensure the functioning of the comprehensive solution.

#### 7.1.6 Private persons

A user survey conducted within the framework of this study revealed that there is little interest among private individuals in e-receipts today and that even in the case of durable goods the right to file claims and to a warranty can be proved by a bank statement of the card transaction.

One currently relatively little acknowledged area could be highlighted, though, which is the financial awareness and literacy of private individuals. In a relatively positive economic situation, which was prevalent during conducting the study, private individuals often do not pay much attention to their consumption habits; if the situation changes, however (incl. due to inflation, especially a steep increase in energy prices), a need may arise for significantly more careful monitoring of the expenses of the individual and the household. Therefore, measures should be implemented to improve the financial awareness of private individuals.

The suggestions concerning the need for support are accumulated in the table below (see Table 6).

Table 6. The support needs of the parties to the e-receipt ecosystem

Target group	Support needs	Proposal
<b>Cash register system developers</b>	<ul style="list-style-type: none"> <li>▶ The need for an e-receipt standard (in development at the EU level)</li> <li>▶ The need for interfacing cash register systems with operator services</li> <li>▶ The need for raising awareness (possibilities for creating interfaces with operators, foregoing printing paper receipts)</li> <li>▶ Support for developing solutions for identifying buyers</li> </ul>	<ul style="list-style-type: none"> <li>▶ Supporting the activities (development) for transitioning to the standard which depends on the number of working hours required and the pricing policy</li> <li>▶ Cash register system development support for implementing the standard, interfacing with an operator, developing an identification solution</li> </ul>
<b>Businesses (traders)</b>	<ul style="list-style-type: none"> <li>▶ The need for legal clarity in connection with printing purchase receipts due to the obligation to prove the transactions to banks</li> <li>▶ The need for knowledge on the possibilities for proving purchases which are acceptable for the Consumer Protection and Technical Regulatory Authority</li> </ul>	<ul style="list-style-type: none"> <li>▶ Awareness raising activities for clarifying the aspect of data protection</li> <li>▶ Analysis of the Consumer Protection Act as regards to the mandatory nature of issuing purchase receipts and publishing the outcomes</li> <li>▶ Awareness raising activities in cooperation with the Consumer Protection and Technical Regulatory Authority to clarify the possibilities for proving purchases (in addition to paper receipts)</li> </ul>
<b>E-receipt and e-invoice operators</b>	<ul style="list-style-type: none"> <li>▶ Support for compliance with the security requirements for processing bank card details based on the requirements of the card organisation</li> </ul>	<ul style="list-style-type: none"> <li>▶ Support for compliance with bank card security requirements</li> <li>▶ Creating an e-receipt product development measure</li> </ul>
<b>Accountants and accounting service providers</b>	<ul style="list-style-type: none"> <li>▶ The need to raise awareness (the knowledge related to taking into use e-receipts)</li> <li>▶ The need to increase the IT literacy of accountants (online trainings, seminars, standardised instructions) to alleviate the fear of the processes becoming complicated</li> </ul>	<ul style="list-style-type: none"> <li>▶ Awareness raising activities, trainings, and instructions for the transition to e-receipts through representative organisations, professional associations, or other initiatives</li> <li>▶ Awareness raising activities on the benefits and sustainability of e-receipts in cooperation with professional associations (Estonian Assembly of Accountants, Estonian Traders' Association).</li> <li>▶ Supporting the activities of the digital laboratory of the Tallinn University of Technology in raising the awareness of the students (as future entrepreneurs, financial sector employees, and also consumers)</li> <li>▶ Online trainings, seminars, and instructions to improve the IT literacy of accountants</li> </ul>
<b>Private individual (private customer)</b>	<ul style="list-style-type: none"> <li>▶ The need for increasing awareness on e-receipts, incl. for understanding the added value offered by e-receipts</li> </ul>	<ul style="list-style-type: none"> <li>▶ Awareness raising activities to increase financial awareness, incl. explaining the added value generated by e-receipts</li> <li>▶ Awareness raising activities on the nature-friendliness of e-receipts</li> </ul>
<b>E-receipt solution product developers</b>	<ul style="list-style-type: none"> <li>▶ The need for financial support for the design, prototyping, and development of e-receipt solutions</li> </ul>	<ul style="list-style-type: none"> <li>▶ Creating an e-receipt product development measure</li> </ul>

## 8. Roadmap

The development of a convenient service which is the prerequisite for the spread of e-receipts depends on many different parties, their mutual cooperation, and several other factors. The formation of a well-functioning e-receipt ecosystem cannot be (i.e. by the state) steered centrally, as all parties are private businesses that operate based on the business-related motivating factors.

It is, however, possible to draw up a plan of activities supporting the implementation of e-receipts described above, which would presumably facilitate the development of an e-receipt ecosystem and the achievement of a wide use of e-receipts.

Below, we provide an overview of those activities from the temporal perspective.

- **Completion of the EU e-receipt standard**

The process of developing the European Union e-receipt standard is currently ongoing and should be completed by the beginning of 2023. The e-receipt standard is based on the existing European Union e-invoice standard and it should serve as a prerequisite for the development of e-receipts.

- **Agreeing of the e-receipt operating model by the parties**

In order to create a harmonised and interoperable e-receipt ecosystem, the parties must agree on the operating model and cooperation. In order to achieve this, traders, cash register system providers, and operators should be brought together to discuss how to create the system of e-receipt data exchange in mutual cooperation and whether or not there is any motivation to do this from the economical perspective, taking into consideration the potential national support mechanisms. This cooperation format could be initiated by the real time economy function of the Ministry of Economic Affairs and Communications, involving the e-invoice and e-receipt working group of the ITL.

- **Development of cash register systems**

Development of cash register systems can hopefully begin already in the final phase of the completion of the standard, as it will probably be possible to get acquainted with the preliminary versions of the standard before its final completion. The prerequisite for this, however, is an agreement between the parties on the operating model.

- **Preparation of operators for compliance with the security requirements of card organisations**

If ensuing compliance with the security requirements may take 6–12 months, this activity should be launched as soon as possible, advisably in 2022 after the parties have agreed on the business model.

- **Interfacing of operators with cash register systems and payment mediators (banks, etc.)**

The development of the interfacing of the operators can start after the development of cash register systems has begun. The interfacing is estimated to take approx. 6–9 months.

- **E-receipt solution product development**

Presuming that cash register systems have the capacity of transmitting e-receipts to operators, operators can themselves or in cooperation with e-receipt solution providers develop solutions for the end user.

The product development of simpler solutions from the technical perspective (e.g. based on the loyalty programme of the trader) can begin a bit earlier (see the period marked with green in Figure 13). The development of the solutions using the e-receipts generated based on bank card details suggested in this analysis can begin when the interfacing of the operators is largely finished (see the yellow period in Figure 13) and no more architectural changes are made.

- **Awareness raising activities for accountants**

It would be reasonable to connect the awareness raising activities for accountants with the e-invoicing related awareness raising discussed in the analysis of e-invoicing, and these activities can occur in parallel with other activities.



- Awareness raising activities for private individuals**

The awareness raising activities for private individuals can already be launched now, as there are already solutions for increasing the financial literacy of private individuals available in the market.

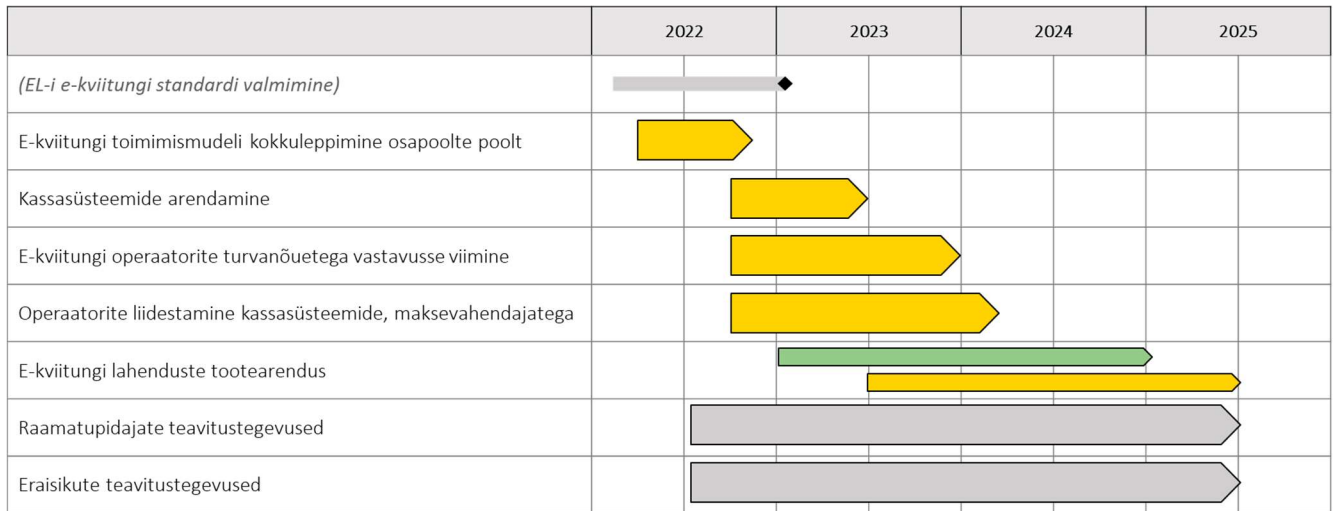


Figure 13. Roadmap

(Completion of the EU e-receipt standard)
Agreeing on the e-receipt operating model by the parties
Development of cash register systems
Ensuring the compliance of e-receipt operators with security requirements
Interfacing of operators with cash register systems, payment mediators
Product development of e-receipt solutions
Awareness raising activities for accountants
Awareness raising activities for private individuals

## 9. Conclusions

Below, we discuss the main conclusions of the report and the connections between the conclusions and the questions posed in the technical specifications (TS) of the public procurement.

### ***Current e-receipt solutions in the market***

- The e-receipt solutions currently used in the Estonian market have mainly been developed by retail chains and enable those buyers who have been identified through the loyalty programme of the specific store or petrol station chain to access their receipts in addition to various different purchase operations (e.g. Rimi, Maxima). There is also the mTasku solution in the market which allows linking the loyal customer cards of different trade undertakings and the payment cards of banks with an end user mobile phone application, and using the application for authentication services, making purchases or payments, and, in the case of using any of the loyal customer cards added to the application, also viewing the digital receipts of the purchases made within two years after making a specific purchase.
- At the time of conducting the study in the autumn of 2021, the majority of trade enterprises were not involved in active e-receipt related development, as the interest of consumers in e-receipts was deemed low.
- The ReceiptHero solution commonly used in Finland could be highlighted of international experiences, which offers solutions to consumers in cooperation with card organisations and banks.
- Even though the volume of the e-receipts related to the purchases made by business is significantly lower compared to the purchases made by private individuals, the need for e-receipts tends to be high in the business sector, as receipts have the role of an expenditure document for accounting purposes and electronic processing thereof provides savings in the accounting processes.
- All solutions used in Estonia today are functioning based on the triangular model.

### ***Obstacles preventing wider spread (TS 4.1.2.2.2)***

- The transition to e-receipts depends on cooperation between different parties, primarily the trader, cash register system provider, operator service provider, and e-receipt end user solution provider (certain parties may also overlap). While several e-receipt solutions are already functioning today, there are three main obstacles to a wider spread:
  - The low interest of consumers in e-receipts – e-receipts are mainly interesting for accounting service providers and accountants who, however, cover a small part of receipts (under 10% based on estimations). The need for proving warranties and for detailed analysis of household expenses that motivate private individuals to use receipts are not sufficient for a wider spread of receipts.
  - The lack of active cooperation between the parties to the e-receipt ecosystem (traders, cash register system providers, operators) in the field of e-receipts, which is in turn caused by the modest interest in receipts.
  - The lack of a suitable e-receipt data standard that would enable drawing up, sending, retaining, and issuing e-receipts based on a uniform protocol.

### ***Potential solutions for increasing awareness and reaching the critical mass (TS 4.1.2.2.3)***

- The user survey conducted within the framework of this study allows highlighting that almost a third of all buyers never take the receipt unless they believe that they might wish to return the goods and almost one fifth of all buyers always take the receipt. The main reason for foregoing using paper receipts is the aspect of protecting the environment. Keeping in mind the different motivating factors for businesses and private consumers, we would advise considering the following steps to increase the awareness in the field of e-receipts:

- Introducing to private individuals the possibilities and benefits of e-receipts within the framework to awareness raising activities. Thereat, consumers and traders alike should be familiarised with the position of the Consumer Protection and Technical Regulatory Authority, according to which purchases can be proven in a number of different manners, incl. by presenting the purchase receipt, invoice, bank statement, or another appropriate document.<sup>53</sup>
- Supporting the activities of the digital laboratory of the Tallinn University of Technology in raising the awareness of the students (as future entrepreneurs, financial sector employees, and also consumers).
- Within the framework of the awareness raising activities designed for traders, explaining the different advantages of the receipts compared to paper receipts and promoting the possibility of complying with the requirement of banks and card organisations of retaining the so-called ‘trader’s receipts’ electronically, not in the paper format.
- In the case of accountants, introducing through the umbrella organisation, the Estonian Assembly of Accountants, the benefits arising from using e-receipts which are similar to those of e-invoices.
- Paying attention to the motivation of all parties to the e-receipt ecosystem and supporting them, if necessary, involving traders, cash register system providers, operator service providers, and end consumers. Different awareness raising and supporting activities are discussed in chapters 4 and 7 of the report.

#### ***Economic gains of the transition to e-receipts (TS 4.1.2.2.5, TS 4.3.1.9)***

- The economic gains of switching to e-receipts can be calculated based on different assumptions. Keeping in mind that the economic gain mainly arises from the handling of expenditure receipts in the accounting function of businesses, and the conservative assumption used in the study of approx. 20% of all receipts of businesses becoming e-receipts within the next few years, the estimated gain amounts to approx. 2.2 million euros per year.

#### ***Need for support for a wider use of e-receipts (TS 4.2)***

- The study identified six target groups in the case of which we advise using different supporting activities or support payments. We advise supporting cash register system developers and those traders who are developing their own cash register systems to enable them to align their cash register system with the EU e-receipt standard to be completed by 2023 and to develop the capability for transmitting e-receipts in compliance with this standard.
- Depending on the solutions developed by marker participants, a need may arise for supporting operator service providers in the implementation of information security measures if the solution used for identifying the buyer is based on bank card details and the operator will be processing bank card details.
- We would advise providing product development support for the product developers of e-receipt end user solutions for designing, prototyping, and developing innovative solutions.

#### ***E-receipt operating model (TS 4.3)***

- The e-receipt ecosystem operating model is one of the potential solutions suggested based on the information known during conducting the study, but the model prove somewhat different in practice, as different models may arise when technology developed and new possibilities and business models arise. The model suggested divides the value chain of e-receipts into four stages: identifying the buyer, sending the receipt, retaining the receipt, and granting access. The logic of the model involves using different solutions for identifying the buyer (incl. bank card, ID-card, loyal customer card), sending e-receipts via the e-invoice operator network or the e-receipt operator network to be developed, storing e-receipts securely and in

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<sup>53</sup> <https://ttja.ee/media/1121/download>

compliance with personal data protection regulation, and granting access to receipts via different Internet and mobile phone channels.

- We would advise to first implement a triangular model-based operating model. Taking into consideration the principles of free market economy and the best practices in the e-receipt sector<sup>54</sup>, the development of a triangular model-based e-receipt service should be followed by transition to the square mode.
- One of the important prerequisites in developing the operating model is the completion of the EU e-receipt standard and implementation of the standard by market participants, as this will create the conditions required for data exchange based on common rules.
- The best solution for identifying recipients of e-receipts would be identifying the buyer based on their bank card details. Keeping in mind that consumers are more interested in receipts when making more expensive purchases and card payments are preferred for making expensive purchases, a solution based on bank card details should be developed first. In the case of cash payments, the ID-card is the best method for authentication, based on the analysis. Linking issuing e-receipts with the loyalty programmes of traders would also promote the transition to e-receipts.
- The main business processes of the e-receipt service include issuing e-receipts to private persons (see also Figure 8. Issuing of e-receipts to private persons Figure 8), submitting e-receipts to businesses by reporting private individuals (see also Figure 9), and issuing e-receipts to legal persons (see also Figure 10). In all of those processes, the functioning of the e-receipt service is made possible by the existence of an e-receipt operator. In the case of legal persons, using the current network of e-invoice operators would offer additional efficiency.
- From the perspective of a user, the main usage cases are subscribing to an e-receipt service / starting to use a solution, searching e-receipts, viewing e-receipts, and proving warranties. The e-receipt based expenditure analysis function may also be highlighted as a significant convenience service. The functions designed for users would be developed by the product developers of e-receipt solutions, who should use an e-receipt operator service to offer the functions related to e-receipts.
- The contract concluded between e-receipt operator and traders should also specify the conditions of sharing the details of the traders with third parties. This is important, as the business risk arising from the price information of traders becoming machine-readable is one of the reasons for the failure of an e-receipt pilot project in the past.

#### ***The timeline required to achieve the introduction of the e-receipt service (roadmap) (TS 4.3.1.10)***

- For the introduction of the e-receipt service, cooperation must be launched with the parties related to e-receipt solutions to find a viable e-receipt business model and introduce to the parties the potential support available from the state. There are no direct obstacles preventing the preparatory activities and launching negotiations with the parties.
- As the development of e-receipt solutions should be based on the EU e-receipt standard, which will be ready at the beginning of 2023 according to plans, it would be reasonable to start planning the developments in the second half of 2022 when the preliminary versions of the standard are presumably already available.
- The preparations of operators for interfacing with cash register systems and payment mediators (for the identification of buyers based on card details), as well as for compliance with the security requirements required for processing card details can also be launched in parallel. Development of solutions for the e-receipt end user may partially begin before the data exchange based on the central EU e-receipt standard and functioning via the operator's network is developed, with the development of central solutions with operator circulation being realistic in 2024.

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<sup>54</sup> [https://teknologiateollisuus.fi/sites/default/files/file\\_attachments/2018\\_ekuitti\\_eng\\_sisus\\_vedos\\_6.pdf](https://teknologiateollisuus.fi/sites/default/files/file_attachments/2018_ekuitti_eng_sisus_vedos_6.pdf)