Framework for Self-Service Environments
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Introduction
The framework for self-service environments is a recommended functional framework that the providers of public services can use as a basis when designing and realising their customer-focused and convenient self-service environments.

1.1 Target Group of the Document
The framework is targeted to owners of public services, i.e. to persons engaged in development of the content of the public services. This framework has been drawn up, bearing in mind, that the persons working on the business-side, i.e. those who are responsible for the development of services, who invent new service solutions and determine the business requirements for the technological realisation of the self-service environments, are those who have the biggest influence on the essence, quality and user-friendliness of e-services. This is the reason why the document describing the framework has been drawn up so, that it serves the needs of the persons working on the business-side, who are engaged in the development of the content of the self-service environments. Preliminary IT knowledge is not necessary for reading this document.

However, the framework should be of interest also to IT experts. The framework helps an IT expert to comprehend the essential needs and design a technological solution in conformity with the uniform principles.

1.2 Structure of the Document
The final document on the framework comprises the following parts:

- Principles of a Self-Service Environment: This chapter explains the purposes of self-service environments. The difference between a self-service environment and a web page is also dealt with.
- Functional Architecture: This chapter and a corresponding annex describe the typical functional components of self-service environments and give recommendations about the functionalities enabling to provide a good self-service environment service.
- Information Architecture: This chapter provides recommendations about the user interface navigation and about grouping of the activities, taking into consideration different user profiles.
- System Architecture: This chapter and a corresponding annex describe how a self-service environment should fit into the general infrastructure of public sector e-services in Estonia; also recommendations about the technical solutions are given.
- Instructions for Development of a Self-service Environment: This chapter provides instructions to agencies starting to develop a self-service environment (what must be done for developing a self-service environment).

The following annexes are attached to this document describing the framework:

- Prototype of the User Interface: The user interface prototype provides a standard navigation solution, ensuring that in the self-service environments that have been developed, based on this framework, similar items could always be found in similar locations. The prototype will be
presented in the form of an Axure RP source file and a HTML generated from this file. The model is here: https://www.mkm.ee/iseteenindus/#p=projektist.

- Document on the Usability Requirements: The document on the usability requirements presents the requirements that influence the usability of the user interface of a self-service environment, which could not be described as a prototype of the user interface.
- Functional Architecture Model: The type functionality of a self-service environment as UML service history diagrams. The model is here: https://www.mkm.ee/eamudel/.

1.3 Related Documents

Documents and sources of information that have been followed while drafting the framework or that are recommended for reading:

[1] "Integrated Portfolio Management of Public Services". Composed by PricewaterhouseCoopers Advisors, commissioned by the Government Office supported by the Foundation of Smart Decisions that is funded by the European Social Fund, in co-operation with the Estonian Information Systems Authority, the Ministry of Economic Affairs and Communications, the IT and Development Centre of the Ministry of Interior, the Estonian Association of Information Technology and Telecommunications. See: https://www.mkm.ee/et/tegevused-eesmargid/infouhiskond/infouhiskonna-teenused.


[3] "Design of User-Friendly e-Services Based on the Experience of the Estonian Road Administration, Handbook for Public Sector". Composed by Ziraff OÜ, in the framework of programme "Raising Public Awareness about the Information Society", funded by the Structural Funds of the European Union, commissioned by the Department of Information Society Services Development (DoISSD) of the Ministry of Economic Affairs and Communications together with the Information Systems Authority (RIA) and the Estonian Road Administration. See: https://www.mkm.ee/et/tegevused-eesmargid/infouhiskond/infouhiskonna-teenused.


2 Principles of Self-Service Environments

2.1 Starting Point

The following studies have been conducted about the use of the public self-service environments:

- "Kodanike rahulolu riigi poolt pakutavate avalike e-teenustega 2012" ("Citizens' satisfaction with the e-services made available by the state in 2012"),
- "Ettevõtjate rahulolu riigi avalike e-teenustega 2012" ("The economic operators' satisfaction with the e-services made available by the state in 2012").

After having analysed the results of the studies, the following observations can be made.

- The Internet is used by the majority of the population over 16 years of age. 75% of the persons interviewed for the purpose of the studies are permanent internet users. In case of persons involved in entrepreneurship, the percentage is 95%. Thus, e-services are technically accessible for the majority of the population.

- The use of the Internet differs, based, firstly, on the age and, secondly, on the education. Practically all young people are Internet users. Beginning from the older middle age, i.e. from 50-60 years of age, the use of the Internet decreases notably. Approximately one fifth of the persons over 60 years of age use the Internet daily. 94% of the persons with higher education use the Internet, while the same applies to only 54% of persons with basic education. The studies did not show any notable differentiation based on other characteristics.

- The main purpose of using the public sector e-services is to perform some action, e.g. to submit an application for a benefit or an allowance, to apply for a permit or to make a registry entry. In case of economic operators, submitting declarations and reports is a frequent activity. The second most important purpose is to obtain information.

- Regardless of the fact that the satisfaction with the e-services is rather good (76% of the interviewed persons gave 4-5 points on the five-point scale), some problems were also pointed out. Most concerns were related to the usability. The keywords mentioned concerning the usability were - the complexity of using the services, the time spent on that, also the availability of supporting information and of a helpdesk. Questions related with reliability formed the second set of problems. Under reliability is meant not only the actual security level, but also trust building in respect of the e-channel. For example, whether or not the system gives sufficient feedback that a document submitted via the e-channel got through and that it would be dealt with. The small number of offered services and functional possibilities was considered to be the least important of the problems.

Therefore, it can be stated that, when developing the e-services it is advisable to create a limited number, but easily comprehensible and reliable services. It is not reasonable to create a multitude of services, that would not be properly designed and realised due to the shortage of resources for the development, and that would not be used due to poor realisation.

- The main sources of information and ways to reach the e-services are: search portals (used by 60% of the respondents), websites of agencies (used by 44% of the respondents) and internet
banks (used by 40% of the respondents). These are followed by the portal eesti.ee (used by 26% of the respondents) and social communication (acquaintances, forums, information days).

2.2 Purposes for Creating a Self-Service Environment

The maturity for providing a service via electronic channels can be determined pursuant to the document [1], based on the five levels of maturity.

<table>
<thead>
<tr>
<th>Level</th>
<th>Title</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Missing or non-existent</td>
<td>Information about the service is not available electronically.</td>
</tr>
<tr>
<td>1</td>
<td>Information</td>
<td>Information about the service is available in an electronic channel. Information concerning the service is made available in the web, but does not contain necessary forms for submitting applications.</td>
</tr>
<tr>
<td>2</td>
<td>One-way communication</td>
<td>The blanks or forms necessary for providing the service are available in an electronic channel, but one cannot submit them in electronic environment.</td>
</tr>
<tr>
<td>3</td>
<td>Two-way communication</td>
<td>The service provider accepts electronically filled out forms. One can download the forms necessary for applying for the service from the Internet, fill them out, sign digitally, and send to the service provider by e-mail. The service provider does not process the received information in an automated manner.</td>
</tr>
<tr>
<td>4</td>
<td>Transaction level, i.e. a web form level</td>
<td>One can fill in the forms necessary for providing the service in an electronic environment, the user is ascertained and the forms are pre-filled. In case of paid services, it is possible to pay for the services on the spot. The data submitted via the web form are automatically transferred into the processing environment.</td>
</tr>
<tr>
<td>5</td>
<td>Fully automated, integrated and proactive level</td>
<td>At all stages, the service can be processed via the e-service channel and the procedural information is available also to the person for whom the service is intended. All necessary and related information is integrated from the interoperable databases. Decision-making is automated.</td>
</tr>
</tbody>
</table>

In the present framework, we consider a self-service environment to be a web environment, made available and used for providing a service, interfacing with the information system of the service provider, or using a machine-to-machine interface based data exchange solution. According to the table above, it is an e-service on level 4 and 5.

In case a web page provides information only or offers services via other electronic channels (via e-mail for example), and the employees of the service provider carry out the whole process, and the integration with the information systems necessary for providing the service is missing (level 3 in the
above table) – in such a case the service is not considered to be a self-service. Self-service should mean that the customers can do something themselves in the course of the service process.

A self-service environment is usually meant for customers, i.e. for the persons for whom the services are intended, however, the environment could be meant also for the partners providing services, exercising supervision or performing other tasks. For the sake of easy reading of the document, only the term “customer” will be used further on, however, the principles described in the document should be applied regardless of whether the self-service is meant for customers or for other target groups.

In case of a self-service on the web form level (4), customers can perform some operations themselves. For example, a customer can submit all data necessary for applying for a service, the data will be automatically transferred to the system used for providing the service, and, in the same environment, a customer will be able to pay the state fee or service fee for the service provided. However, in this case an employee of the service provider still participates in the process of providing the service, e.g. when a decision is necessary on the content of the matter (Figure 1

![Figure 1 Data exchange via web forms](image)

In case of fully automated self-service (level 5), the employees of the service provider are left out of the service process. An automated system for the service provision (ATS) provides the service (Figure 2).

![Figure 2 Fully automated service](image)
In order to implement a fully automated self-service, the service process must be formally describable in detail, to enable programming of the service process into the system software. Each and every service cannot be automated, as the employees of the service provides have to make decisions based on discretion, provide expert opinions, or provide direct services (e.g. advisory service). Besides, always exists a possibility that the automation does not pay off, as the service is provided only on a small scale.

If possible, the self-service should be fully automated, because a fully automated e-service has an important competitive advantage — the reaction time. In case of a fully automated self-service, the customer receives a response within seconds. In case of problems with performance capacity, it is always possible to shop for more capacity. It is not so easy to shop for more employees, and in case the service is not fully automated, the waiting times start to emerge inevitably — if evaluating optimistically, a waiting time could last some minutes, but the actual duration would be rather measured in days.

The importance of the reaction time can be explained using the following example. Let us suppose that a customer wishes to obtain a motor third party liability insurance and he/she is deliberating over three insurance companies. Two of these companies have fully automated self-services through which the customer can receive a price offer, conclude an insurance contract, and pay for the insurance within a few seconds. The third company does not have a fully automated self-service and therefore a sales agent makes the price offer — that means for the customer, that he/she has to wait for the offer, and then, after having compared the offers, call back or send an e-mail to the company, and after that wait for the contract and invoice. How likely it is that the customer will have patience to wait for the offer from the third company, or will he/she make a choice between the first two companies? In order to survive the competition, the third insurance company has to offer some other known advantage to the customer, which will most probably be lower price that in its turn lowers the competitiveness of the company.

In case of public sector, the competitive aspects might not be as clear and acute as in the given example; however, the effect could reveal itself either in more global competition, or in failure to use the service. For example, an economic operator might try to avoid applying for a necessary permit or submitting a report.

If a machine is capable of deciding automatically, whether to provide the service or not, then it would be possible to move on towards offering a more proactive service. (Figure 3).
In case of a proactive e-service, the customer does not apply for the service, but the service providing system offers it automatically, e.g. if a child is born, the payment of related benefits can be started automatically. It will be the decision of the specific service provider, whether the customer will have to confirm the wish to obtain a certain service, or will the service start automatically and the customer would have to interfere only in case they wish to cancel the service or change the terms on which the service is provided. The key issue in creating a proactive service is, whether the service provider will be able to get information from his own information system, or from other public sector information systems, based on which to start the provision of the service. It is important to consider, whether all the information that has been requested from the customer until now is essential for providing the service, or could the service be started based on the information obtained from registries.

Summary:
1. In case it is possible to obtain the information, based on which the service could be offered to the customer, then one should think about creating a proactive service.
2. In case it is possible to entirely formalise and programme the process of service provision, then one should think about creating a completely automated service.
3. Partially automated e-service should be created only in case if it would not be possible to fully automate the controls and activities, and the interference by the employees of the service provider is inevitable in order to make decisions based on discretion, provide an expert opinion, or provide a direct service.

2.3 Connections between a Self-Service Environment and a Website
This chapter points out the main differences and connections between a self-service environment and an internet website of an agency.

It is difficult to draw a very definite line between a self-service environment and a website. Both, a self-service environment, as well as a website, are web environments that are available through the Internet. It cannot be excluded that a self-service environment and a website are realised as a single web environment.
For example, in the course of preparations for this framework, when we asked for the experience of the banks operating in Estonia, it appeared that the major banks used different architectural models, where the self-service environment and web environment could be either technologically separate (technically two different environments) or identical (technically one and the same environment).

It is obvious, however, that an ordinary website cannot offer self-service possibilities. In the following table, the main differences between a self-service environment and a website are pointed out.

<table>
<thead>
<tr>
<th>Target group and purpose</th>
<th>Website</th>
<th>Self-Service Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The information of general interest and contact data are made available to the public, without authenticating the users.</td>
<td>Personalised options are offered to customers or other authenticated and authorised representatives of specific target groups, to participate in the process of service provision, by providing information of legal significance, and performing transactions and routine operations in an automated way.</td>
</tr>
<tr>
<td>Technology</td>
<td>Is usually based on content management software (CMS) and the major part of the development work consists of the content elaboration (copywriting).</td>
<td>The business logic of specific services is realised in the software, and a big part of the development work is concerned with devising and realising the software.</td>
</tr>
<tr>
<td>Connection with the information system for service provision (processing system)</td>
<td>A customer/user can download the forms of documents and send the filled out forms by e-mail, while the data written on the filled out forms is entered into the information system by an employee of the service provider. The information displayed is not directly connected with the user.</td>
<td>The software solution is closely integrated with the information systems used for the provision of a service. The information entered by the authenticated user is automatically transferred into the processing system. Personal information is displayed to the user.</td>
</tr>
</tbody>
</table>

The website and the self-service environment of an agency must have similar visual identity, in order not to confuse the user as to whether the self-service environment offers the services of this agency, or not. The visual design of the screen forms (for direct service provision) should preferably be more conservative in the self-service environment. For example, abundant use of unnecessary illustrations should be avoided. The reason for this is that a user should understand that they are in an official environment, where they perform transactions that are of legal significance.

The homepage of an agency is a gateway through which the customer should be able to enter into the self-service environment. The homepage of an agency should direct the customer to the self-
service environment. The entry point into the self-service environment should be visible on the website of an agency all the time. A customer should be able to find information on why they should enter the self-service environment, i.e. what can they accomplish there.

The website and the self-service environment of an agency must provide similar information about the services offered by this agency. A customer should be able to understand, judging by the information available on the website, whether a certain service is obtainable in the self-service environment. For example, next to the description of a service on the website, there could be a button or a link that invites to use the e-service, enables to log in into the self-service environment, and directs to the web page, where it would be possible to apply for the service in the self-service environment.

Links from the self-service environment to the public website should be avoided, as after having followed the link, a user might not understand whether they are still logged in the self-service environment, how can they return to the self-service environment, of whether they are automatically logged out and can safely leave the computer.

2.4 Necessity of Own Self-Service Environment

In order to offer self-service possibilities, a public agency must not necessarily create its own self-service environment. A service of electronic forms is available, as an alternative, in the state portal eesti.ee.¹ This service enables a service provider to prepare easily and take into use forms for electronic reports, applications, etc., that a customer would be able to fill in after having entered into the state portal eesti.ee. The filled in forms are forwarded to the service provider via the Document Exchange Centre (DEC).

When making a choice between whether to create an own self-service environment, or take advantage of the electronic forms service of the state portal eesti.ee, one should think about the following issues:

<table>
<thead>
<tr>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical platform and basic functionality</strong></td>
</tr>
<tr>
<td>In order to create and maintain an agency’s own self-service environment, in addition to being engaged in the specific services provision, the agency has to buy, install and maintain an IT platform and basic functionalities (authentication, authorisations administration... see chapter 3.2, figure 4). Being forced to deal with such a base platform, means additional workload, and if a simple and fast solution needs to be achieved, one should prefer the semi-finished solution of electronic forms service, provided by the portal eesti.ee.</td>
</tr>
<tr>
<td><strong>Level of maturity of an e-service</strong></td>
</tr>
<tr>
<td>The electronic forms service offered by the portal eesti.ee, suits better for achieving the level of web forms (4), according to the maturity levels of the e-services. For providing services on the fully automated level (5), there must exist a very strong</td>
</tr>
</tbody>
</table>

¹ [https://www.eesti.ee/est/teemad/ettevotja/riigiportaali_abi/partnerile_1/e-vormid](https://www.eesti.ee/est/teemad/ettevotja/riigiportaali_abi/partnerile_1/e-vormid)
integration between the customer's user interface and the system realising the business logic of the provided service that means in principle, that the service provider must most probably have its own self-service environment, which is tightly integrated with the other parts of its information system.

<table>
<thead>
<tr>
<th>Requirements for management and security</th>
<th>The ISKE security classes of the portal eesti.ee are K2S2T2, and the security level is medium (M) at the moment. In case a service provider needs a higher security level, it needs to create its own self-service environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-benefit analysis</td>
<td>The final decision should be based on a cost-benefit analysis. From one side, the amount of the services to be provided should be taken into consideration, as well as the maturity level of the planned service (regardless of the fact that the fully automated (S) level of maturity sounds good, it should be considered whether the requirements of the customers or third parties are time critical and thus uphold such a necessity). From the other side, the investment and administration costs should be estimated — those related to specific services, as well as those connected with the platform mentioned in the first row of the table, in all aspects — purchase or rent of hardware, the cost of software licences, development, help desk and technical support outsourcing or related labour costs, costs for other services.</td>
</tr>
</tbody>
</table>

One of the agreed actions in the Action Plan for 2014-2015 of the Digital Agenda 2020 for Estonia\(^2\) is drafting of a channel strategy paper that would specify the selection criteria, and would help to make better choices between developing one's own self-service environment and using centrally provided solutions.

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\(^2\) [http://www.mkm.ee/326341/](http://www.mkm.ee/326341/)
3 Functional architecture

3.1 A Typical Process of Providing Services by the Public Sector
3.2 Typical Functionalities of a Self-Service Environment

The functionality of a self-service environment could be split into two major parts:

- **Main activity functions** — a functionality used for providing a service to a customer (e.g. provision of a service, submission of an application, submission of a report, getting feedback on the provided service, getting information from a database or a registry).
- **Support functions** — a functionality that is of no direct benefit to a customer, but which is necessary for the operation of the self-service environment (represented in yellow on the figure) and therefore, must exist in every self-service environment.
4 Information Architecture

4.1 Principles of Navigation and Grouping of Services

Direction to self-service:
A customer should be directed to self-service from every possible channel. It is useless to hope, that customers will find the self-service easily by themselves. See also Figure 6 Navigation of a user who is not logged in — different paths take customers to login button.

Desktop as a starting point for navigation:
The first thing to open in front of a logged in customer must be a desktop, where they would find information about their current data. Obtaining the important information and the use of the service start from the desktop and must be, so to say, within one click from the desktop.

The desktop must display the current matters concerning a specific customer, e.g. their outstanding liabilities, services that are offered to them personally, and services, for offering of which a personal input is needed from them.

It could be the case that different versions of a desktop should be created for ordinary customers and big customers. The ordinary customers do not need to be in contact with many public authorities simultaneously, therefore, their desktop should not contain very many items, and for each item, an information card providing more information could be placed on their desktop. The big customers have many items (e.g. a leasing company's vehicles in the Traffic Registry) and for them a specialist view, allowing for display of many items together with a filtering possibility, is necessary on the desktop.

The description of the services must be available on the desktop. In case a customer does not have any pending issues and the service provider is also not able to offer proactively any service to him/her, then the user interface focuses on the descriptions of services, as it is quite logical, that a logged in customer would wish to find a necessary service instantly.

See also Figure 7 Navigation scheme of a logged in user — the navigation starts from the desktop, from where it takes one or two steps to start using the service. Two steps are necessary only in case a customer does not know, which service they need, or takes up some old issue.

Grouping of services:
In case a service provider offers many (> 15–20) different services to customers, then the services must be grouped, so that it would be easier for customers to find the services.

It is very difficult to provide a general rule, under which to group the services. Based on experience, a general advice is, that in most cases it is useful to group the services according to topics or areas pertaining to the content of the services. It is not recommended to use a grouping that is based on the nature or life cycle of customers, and not on the one pertaining to the services, as usually the customers cannot categorise themselves based on those characteristics. For example, grouping customers into "private customer" and "business customer" often confuses the sole proprietors.

As it is impossible to lay down a general rule, a method that could be used for grouping services, and that is widely used and tested in the information architecture design, is described in the following. The method is called card sorting and usually it is performed according to the following scheme:
1. The test-users are found — who will sort the cards.
2. A separate card is prepared for each of the services.
3. The cards are given to a test-user, who is asked to organise them into groups.
   3.1. The service groups are not specified. The grouping of cards must take place based on associating the cards with each other (“this one is similar to that one, I'll place it close to that one”), rather than based on grouping them under preliminarily specified groups. One can start thinking on naming the groups only when the cards start to form groups already.
   3.2. The card-sorting task should be given to several test-users or to a team of test-users. A little while after the sorting has begun, one can notice already, whether the thoughts of the test-users are moving in the same or radically different directions. At that time, it becomes also evident, whether more test-users should be involved or not.

In order to validate the results of card sorting, a usability test could be conducted. The usability test is usually conducted pursuant to the following scheme:
1. The test-users are found — who did not participate in the card sorting.
2. Testing tasks are performed (a task describes a problem, for solving of which a service must be found).
3. A test-user is informed of the names of service groups and s/he is asked to look for a particular service.
   - The test-users' prior knowledge of the subject area should be the same as is expected from the potential customers. In case the potential customers are the ordinary or occasional customers, then the test-users must not have prior in-depth knowledge of the subject area.
   - The easiest and fastest way is to use paper cards for card sorting. Several software programs exist that would help with card-sort (search in internet for “card sorting tools”, “card sorting software”). It is reasonable to use the software programs (usually web-based) in case the test-users are in different locations.

Figure 5 An example of card sorting
4.2 Navigation Scheme

Drawing up a navigation scheme, in the course of designing a self-service environment, gives a good and complete overview of the possible paths to be taken by a user on the user interface. For the sake of clarity and for obtaining an overall view, just the main paths should be specified on a navigation scheme. The presented schemes describe the main paths in the prototype of the user interface, attached to the present framework.

Figure 6 Navigation of a user who is not logged in
Figure 7 Navigation scheme of a logged in user
4.3 Prototype of the User Interface

The screens of the user interface prototype are listed hereinafter. You can familiarise yourself with the prototype of the user interface at address: 
https://www.mkm.ee/iseteenindus/#p=projektist

The prototype of the user interface has been made responsive to two screen sizes. In order to see a narrower mobile view on the screen of a computer, the web browser window should be narrowed, until the picture changes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Status / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC PART (before entering the self-service environment)</td>
<td></td>
</tr>
<tr>
<td><strong>A1. Opening page of the self-service environment:</strong></td>
<td>A screen display, through which one enters the self-service environment (authentication), and where the user returns to, after having signed out of the self-service environment.</td>
</tr>
<tr>
<td><strong>A2. A homepage of an agency</strong></td>
<td>An abstract screen form, depicting an institution’s homepage, for explaining — how could the entering into the self-service environment be solved.</td>
</tr>
<tr>
<td><strong>A3. Service group (area, topic) page</strong></td>
<td>A screen image for communicating information about services (incl. e-services) belonging to a group of services, on a public web page.</td>
</tr>
<tr>
<td><strong>A4. Description of a service</strong></td>
<td>A screen image, that opens next to the list of services, and where detailed information (description, preconditions...) about a particular service can be found. A user can start using the service.</td>
</tr>
<tr>
<td><strong>A5. Making public enquiries</strong></td>
<td>Information search from databases through a public web page that enables a user to see unrestricted information without having to log in</td>
</tr>
</tbody>
</table>
into a self-service environment; or by logging in for obtaining
information, access to which is restricted to the public at large.

### A6. Result of a public enquiry
A detailed view of one data object, found in a list of data, as a result of
the information search from databases.

### MAIN FUNCTIONS (the activities of a customer who is logged in into the self-service environment)

| S1. An information / obligatory actions' page that opens after logging in | A screen display that might appear in certain cases after logging in, in
order to force the user to perform some obligatory actions and read
important notices. |
| --- | --- |
| S2. Desktop — small customer | The desktop opens after logging in and one can always return to the
desktop. On the desktop, one can find information on one's
outstanding liabilities, on one's current issues (incl. can start actions
concerning the issues), notices, quick selection buttons for starting the
actions, a list of services available in the self-service environment, and
other information blocks (the content of a information block could be
changing). |
| S3. Desktop — big customer | A desktop for a big customer / a specialist. The main difference
between the desktops for a small or a big customer, is in the number
of connected issues, and therefore, the big customer's items should
be displayed in a different manner. Additional functions: filtering,
bookmarking — i.e. "nailing" some items to the desktop / removing
from the desktop. |
| S4. Desktop for a group (area, topic) of services | A screen image for displaying information concerning a group of
services (the issues of a customer connected with this group of
services, the services and data search concerning this topic, the
descriptions of services belonging to this area). |
| S5. Earlier data, i.e. history | A screen form for displaying information about a customer’s issues,
that cannot be displayed on the desktop because of the lack of space,
or because it is not sensible, as they are outdated. |
| S6. Performing a task — an easy one | An example depicting how a customer could use a service (a service
that can be attained by filling in a few data fields). An option that
allows for performing the task as easily as possible, should be the
most preferred solution. |
| S7. Performing a task — a difficult one | An example depicting how the performance of a more difficult task
could be resolved (e.g. necessary to insert a lot of data). Therewith,
also the payment of a state fee and the digital signing procedure are
shown. More difficult solutions should be used only in case it is not
possible to simplify the tasks. |
| S8. Performing a task — a voluminous one (in a table) | An example depicting how could, via a file import, be resolved the
submission of a report comprising a large amount of data. As an
additional opportunity, the downloading of templates and earlier
submitted data, is demonstrated. |
| **S9. Detailed view on My Data — application for a service/proceeding/decision** | A screen image, from which a customer can get information about the proceeding (a document initiating the proceeding, the course of the proceeding, the documents submitted in the course of the proceeding, the decision made as the result of the proceeding). Additionally, a possibility is offered to deliver the data out of the system, or make it available to a third person (downloading, sending via e-mail, authorising an access in the system). |
| **S10. Detailed view on My Data — a registry item** | A screen image, from which a customer can get information about their registry items (e.g. their immovables, vehicles, licences). Similarly to S9, an additional possibility is offered to deliver the data out of the system, or make it available to a third person. |
| **S11. Description of a service** | A screen image for disclosing detailed information to a logged in customer concerning a service (difference between disclosing information about a service to a customer who is not logged in: notes about the fulfilment of the prerequisites). |
| **S12. Messages** | A screen image for displaying the messages sent to, or by a customer (incl. opening of attachments and references, replying to messages, displaying the messages connected with one and the same topic next to each other, initiating an action next to a message, forwarding a message to an e-mail address). |
| **S13. Sending a message** | A screen image, from which a customer can send a message to an agency (incl. attachments and references). |
| **S14. Making an enquiry** | A screen image for searching information from databases. Alternatives: a simple enquiry, a detailed enquiry. Additionally is offered an opportunity to save and reuse previously made enquiries. |
| **S15. Detailed display of an entry found as a result of an enquiry** | A detailed view of one data object, found in a list of data, as a result of the information search from databases. |

**SUPPORT FUNCTIONS (the activities of a customer who is logged in into the self-service environment)**

| **T1. Customer’s data** | A screen image for displaying to a customer, and for enabling a customer to change the data about themselves or the persons, represented by them (e.g. contact data, ordering of automatic notifications, bank details), for administrating the settings and for displaying information about the use of the data related with them (who, when, etc. has used the data collected about the customer). |
| **T2. List of authorisations** | A screen image, where the lists of authorisations given to and by a customer are displayed. |
| **T3. Detailed view of an authorisation** | A screen image for displaying the detailed information about the authorisations given to and by a customer. |
| **T4. Addition of an authorisation** | A screen image for authorisations, changing and depriving of authorisations, or for renouncing the authorisations by an authorised person. |
5 System Architecture
The purpose of the present framework is not to dictate a specific technical solution. A self-service environment is a part of a service providing agency’s information system, and the framework and principles of the state information system apply to it 3.

5.1 Connections with Other Systems

![Diagram of Connections with Other Systems]

Figure 9 The connections of a self-service system with other systems

The above picture displays the possible connections of a self-service environment with other information systems.

Some systems that are displayed on the scheme do not exist (in gray colour on the picture) at present, or they should be amended to a certain extent. In the following part is presented a summary of the development needs that were ascertained in the course of the performed analysis.

5.2 A Summary of Recommendations Concerning the Development of Central Solutions

The agencies developing self-service, wish to use ready-made solutions, that offer ready-made services for self-service environments, or which could be integrated into a self-service environment. The central ready-made components should not be obligatorily applicable, but should be rather created so, that their application in a self-service environment would be beneficial to an agency, saving time and money owing to the reduction of the development work volume.

Concerning the development of central solutions, the following expectations became apparent:
• the development of the authentication service must continue,
• the administration of contact data must be developed further,
• the confirmation of the receipt of a document should be received from ADIT,
• an information system should be created for authorisations,
• a payment solution component should be created,
• a technological solution for administering the portfolio of services should be created,
• improvements must be made for making better available and machine-processable the data that is necessary for checking the rights of a customer (this is concerned with obtaining information on a person’s active legal capacity, and from the Commercial Register about the special conditions of the representation rights).

Recommendations for further analysis:
• To improve the availability of the information about the most necessary X-Road services for the development of self-service environments. Within the framework of the present paper, it has been necessary to study the possibilities of making available for the self-service the information concerning a customer and their authorisations. Practical experience showed that the information available from the RIHA (Administration System of the State Information System) is not adequate. It is recommendable to perform a detailed analysis that would result in detailed instructions for using the X-Road services (and for amending those, if necessary), necessary for obtaining information about the data and authorisations of customers.
• It is recommendable to conduct an analysis of existing legislation, in order to initiate amendments, as the existing legal acts impede the development of the digital data exchange channels and self-service environments. The present legal acts consider the digital information forwarding to be an exception, for which a separate agreement with a customer needs to be concluded. For instance, Article 27 of the Administrative Procedure Act provides that "A document shall be delivered to a person by electronic means if the person agrees thereto". It would suit better the ideology of a successful e-state if the approach were opposite: a document shall be delivered to a person by electronic means, with the exception, if the person does not agree thereto. In the State Gazette, it is possible to find about twenty acts within one search, which stipulate that a document should be delivered by post as a standard letter, a registered letter, or a registered letter with a notice of delivery.
Recommendations for the development of central solutions: to offer services based on the life events.

The customers need solutions based on life events. The life events are, for instance:

- I wish to obtain a driving licence,
- I buy a car,
- I’ll become a parent,
- I have lost my wallet,
- I got into a traffic accident,
- a child starts school,
- a close person died,
- I change my place of residence.

A number of public agencies offer services connected with the same life event. The services offered by private sector may supplement the services provided by the public sector — e.g. in case of a traffic accident, the information will be forwarded also to an insurance company, and in case a leased car is involved, also to a leasing company, or in case of losing one's wallet:

We have no reason to hope that one of the agencies providing a service would start thinking about the customers’ life events more broadly. It is very natural that a specific authority focuses on its own role, tries to fulfil its own part, i.e. to provide its own services as well as possible. A solution for offering the services that are based on life events and are offered supra-institutionally, has to be centrally arranged (e.g. by MKM (Ministry of Economic Affairs and Communications), by RIA (Information System Authority), or by another authority).
5.3 User Devices

Nowadays, the spread of smartphones and other smart devices is a topical issue. According to the publicly available survey results of the Statistics Estonia, one third of the population of Estonia uses mobile devices to visit the Internet sites, and at least half of the businesses have bought mobile devices for their employees ⁴. Unfortunately, this survey does not offer a clear picture about visiting the Internet via smartphones and tablets, as also the laptop computers have been taken into account in this survey. Based on the experience of the customers of Trinidad Consulting, the percentage of the users of smart devices is not very high yet — about 10–20% of the users of self-service environments and portals use smart devices. The percentage of the users of smart devices depends on the target group — the younger the target group of a portal, the higher the percentage of the smart devices users. Naturally, the suitability of a particular environment for use with smart devices has an effect on the percentage of the users of smart devices. According to different information sources found in the Internet, which all give different information about the percentage of the smart devices users in different countries, but agree only on one thing — the use of the smart devices is growing fast worldwide ⁵. When devising a future self-service environment, it should be expected that quite a large number of customers would wish to contact the environment via a smart device.

The three possibilities for enabling the use of smart devices:
- an app (a dedicated (native) application) installed into a smartphone,
- a responsive web environment,
- an entirely separate web environment for smart devices.

A general recommendation is to prefer a responsive web environment. An app installed in a smartphone, that has been created for that particular operation system, would most probably grant the best user experience, but it is inevitable that the development and administration of separate platforms (e.g. for Android, iOS, Windows Phone) needs much more resources. In case of using one of the applications, the users would have to, firstly, install it into their devices and thereafter update it regularly. In case a so-called ordinary citizen would use the e-services of one agency less than once a year, they would need to start using the e-service by installing a new version of the application each time. A web environment works in a server and a user always gets the most recent version. The advantage of a responsive web environment is the possibility to avoid the problems related to the realisation of apps meant for different platforms, as well as the problems with the version control.

It is reasonable to create an app to be installed in a smartphone only in case a target group exists who would use it daily. The last choice would be to create an entirely separate web environment for smart devices, which would be reasonable only in case the development of a new functionality is planned that the users would use only via smartphones, and the service provider does not have

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enough resources to develop an app for at least two most widely spread operation systems (iOS and Android today).

6 Instructions for the Development of a Self-Service Environment

6.1 Development Process

6.1.1 Starting Points
The development of a self-service environment means primarily the development of a service, not merely the development of a software. From the point of view of the software development, it does not differ essentially from the development of software for another information system.

In order to create a good self-service environment, it is essential to understand the needs of a customer. Therefore, the key issue is the understanding of the customer's needs, and the specialists responsible for the content of the service are the key players, not the IT officers.

A positive effect on the user experience of a self-service environment can be produced by (in order of importance):
1. a good idea, a well functioning service process, substantive use for a customer,
2. good technical realisation — if a system is slow or defective, then the whole good idea is overshadowed,
3. a good visual solution — in case a user sees a screen image with disturbing visual design, a negative reaction is about to form already before one goes deep into the subject matter.

The development of a public sector self-service environment is rather a conservative process.
Nowadays, much is talked about quick or agile methods for software development. In case the public sector is involved, an agile solution usually does not work. The reason for that might be, that the nature of the public sector is not agile. The public sector activities are regulated by a great number of agreements and legal acts that impose restrictions on their activity. This does not mean that the new e-services should be kept being restrained by the existing legislation, the whole legal framework can and must be amended, if necessary, but this takes inevitably time. The changes might effect many partners and information systems, and it takes time to reach agreements with different partners. For all these reasons, a longer and more thorough planning process is often necessary.

However, the opening with the e-services should be as agile as possible. The idea of being agile means, first of all, to prepare and put into operation as simple as possible, but a most useful e-service, that is targeted to as large as possible, or (based on other criteria) to an important target group. It is not sensible to prepare, put into operation, and launch a complex set of e-services all at once. The first launched service could be targeted only to a specific important group, and the specific needs of the niche groups could be overlooked at first. The objective is to put the service into practice, get feedback from the customers, observe the functioning of the service, and to develop it further, based on the feedback on the practical functioning of the service. It is very easy to fall into the trap of "thinking too much" — a very big and beautiful solution is planned, the discussions about special cases take a lot of time, a lot of resources are spent on realising the sophisticated software, but in practice, nobody can use anything yet.
The activities of the development process are iterative. Each development stage passes 3 cycles at least.

- The process scheme cannot be done this way that someone opens EA, Bizag, yED, Visio, or other modelling software, and starts drawing up the process from an initial event, and when reaching the final event, the scheme of the process is considered ready. In practice, it is impossible to comprehend a complex process at once. One should always check, whether a produced process scheme corresponds to the reality or not, for instance, by presenting it to the project team. In order to ensure that the process schemes can be understood, it is most probably necessary to restructure them.

- It is not possible to produce a user interface prototype this way, that someone opens the software for prototype drafting and starts to lay data elements on the screen, and continues until all screen forms are done. At first, an entire overall plan of the whole solution should be drafted, the main path of a user’s movement should be envisaged, and a navigation plan should be produced, after that the details can be specified and visual design produced. In the meantime, it is necessary to test the usability of the created solution, and, if necessary, to change it, based on the test results.

Within each cycle, the following takes place:
- planning (e.g. to think over who should be interviewed),
- doing (e.g. to draw a process scheme, or produce a screen form of the user interface),
- checking (e.g. to present the process scheme, or conduct a usability test based on the prototype),
- reacting (e.g. to analyse the test results of the user interface prototype, and decide, what should be changed or specified).

One should start with as simple tools, as possible. The best tools for making the first draft are a board or paper, felt pens and post-it labels. The efforts concerning how to shape the whole thing, should be kept to the minimum at the beginning. The reason for that is that if the content turns out to be wrong, then one would not have regrets about the time spent on shaping the wrong content, which is to be disposed of now. Each cycle takes towards greater precision and elaboration.

The development projects of different self-service environments differ inevitably from each other, based on their preconditions, preliminary preparation and resources, and its is impossible to present a project plan that fits without any amendments in each case. However, certain issues need to be thought over sooner or later in each development project. Thus, the following should be considered as a list of stages, activities and topics for discussion, based on which it is possible to check whether the prerequisites are met, the necessary activities are done, or taken into account in a work plan.
### 6.1.2 Mapping

- The analysis of the service processes AS-IS — for understanding how is the service provided at present, what activities are conducted, who participate in the service process, what kind of systems are in use. The mapping of processes has been thoroughly dealt with in document [2].
  - Often, it is advisable to map the processes more widely, not only within the scope of one service, as the possibilities and needs for unification may become evident as an outcome of wider mapping.
  - During the process mapping, the whole process must be mapped — not only the activities of an agency providing the service, but also the activities of a customer and third parties. This will give necessary background information for understanding the needs of a customer.

- A survey of the needs of customers — to ascertain the expectations of the customers and the problems that need to be solved. The analysis of the needs of customers is additionally described in section 6.2 (Customer Needs Survey) of the present framework document.

- An analysis of restrictions — to clarify what kind of restrictions must be taken into consideration in the course of planning, and to analyse whether all the restrictions have impact on fulfilling the needs of customers and are essentially justified, i.e. should a restriction be maintained, or is there a reason to change it perhaps. The restrictions pertaining to business and production technology, information technology, as well as legal restrictions must be analysed.
For example, in case of the services connected with agriculture, it is very logical, considering
the production technology, that the time from the receipt of an application until to making a
decision is very long, from spring to autumn, because for providing the service it is necessary to
observe how the crops grow.

The mapping must provide information of the situation AS-IS, and based on that, it is possible to start
to make plans for the future.

6.1.3 Strategy Development
- An analysis of the objectives of a service provider — for understanding the general objectives
  and tasks of the organisation providing the service (e.g. which services could be added, which
  ones could lose their purpose, how could the number of services change).
- Development of a strategy for e-services — for planning what kind of services to establish, what
  purpose are the e-services expected to fulfil, and who are the target groups. The outcome
  should be a plan specifying the services that are to be established within a five-year period. In
  the course of developing the strategy, an analysis on the cost-effectiveness must also be carried
  out (see section 6.3 Cost-Benefit Analysis).
- An analysis on the capability of implementing the strategy for e-services — to analyse, whether
  the organisational prerequisites for the development of e-services are met (the organisational
  prerequisites are described in section 2.2. of document [3]), whether the necessary resources
  and team members are available (the roles in process analysis are described in section 3.6 of
  document [2] and in development of e-services in section 2.3 of document [3]), and to plan
  solutions for finding the lacking people (e.g. a procurement plan for finding development
  partners).

The strategy has to get an approval from the management on such a level, that sufficient budget and
motivation to carry out the projects will be guaranteed.

6.1.4 Planning the Service Process
- The analysis of the TO-BE service process — to plan, how will the e-service process take place.
  - At this stage, first of all, one should think about the path of a customer through a service
    process (who, what, when and why should do), and not about the customer’s path
    through a user interface. It must be analysed, whether the present activities are
    necessary at all, could they be automated, are the tasks and responsibilities assigned in
    an optimal way (e.g. could the service provider perform some tasks instead of a
    customer).
  - To carry out a risk analysis — what impact the planned solution could have on the
    actions of a customer or on those of an employee of the service provider, could some
    opportunities arise for fraudulent activities, or for impairing the interests of other
    persons in some other way (e.g. in the event a booking opportunity is made very easy for
    customers, wouldn’t they take advantage of this and impair the interests of other
    customers by that).
• Planning the user interface navigation — to think over and describe as a navigation scheme how will the customer move through the user interface, and in the event an existing self-service environment is developed further, then one must consider how the new service would fit into the existing user interface.

• Development of a vision concerning an information technological solution — to list, what changes must be made in the existing software, or what attributes must the new software have. Based on that vision, it must be possible to predict the extent and duration of the software development.

• Planning changes in legislation — to list, what amendments need to be made in legislative acts in order to be able to initiate the legislative processes, and to evaluate the extent and duration of those processes.

• Cost-benefit analysis – to conduct a cost-benefit analysis, or review and specify the cost-benefit analysis made in the framework of the strategy planning (see the present document, section 6.3 Cost-benefit analysis).

6.1.5 Drafting the User Requirements for the Software

• A style guide and user interface guidelines (UIG) – a style guide and UIG must be drawn up before starting to develop specific services, in order to ensure a uniform style of all services. A style guide of a self-service environment must in addition to the visual style determine also the style of the general communication and of addressing people (e.g. will the system address a customer as Sina (second person singular) or Teie (second person plural)).

• Drafting a prototype of the user interface – to draw a prototype of the user interface on the wireframe level (screen forms with requisite texts, input fields, buttons and other functional elements without visual design, except in those places, where the visual design is integrated with the functionality). To carry out the usability tests based on the prototype of the user interface.

• Drafting an initial task for the software development — to describe the following items concerning the software solution of the self-service environment:
  o functional requirements: to describe in the form of use cases or user stories, and in the form of business rules — what the system must do in the customer view, in the service provider view, as well as concerning the data exchange.
  o non-functional user requirements: users’ expectations concerning the performance (how big data volumes and how many users are expected), concerning the availability (at what times should the system be available), security and integrity (think over the threats — who and for what reason might try to gain access to confidential information or change the data).
  o requirements for the architecture of the information system and additional requirements: the requirements set by the IT solutions administrator of the service providing agency for technical solution and documentation that would enable them to install and manage the software.

• Creation of the visual design of the user interface – to create a designed draft user interface (based on the wireframe prototype of the user interface) and a style guide.
6.1.6 Realisation

- Software realisation and testing — to program and test the software, necessary for providing the e-service.
- Legislative drafting — to amend the existing legal acts, or to draft new ones — so that the legal acts would support the e-service provision.
- Content drafting and translation — to create the texts or drawings to be displayed to the customers. As compared with the in-house information systems, the creation of a self-service environment is very similar to creating a website, as both comprise a lot of texts to be written and edited, and drawings. In case of a multilingual environment, translation work adds too.
- Data collection and organising — if needed, to collect and enter the data necessary for putting the self-service environment into operation (e.g. classifications or parameters, the values that the business rules (that are to be implemented for providing the automated service) use).

6.1.7 Implementation

- Software installation and activation — to install the software and open the access to users.
- Description of the services in the portfolio — to add a service description to the services' portfolio administration system; technical details will come into view after the creation of a technical solution for the administration of the portfolio of services).
- Notification of customers — to notify about the new available e-services via different channels, e.g. by sending e-mails, via the website of the agency or public media. It is very important to notify actively about the new e-services — not for the reason of image building, but first of all, for ensuring that the customers would be aware of the services' existence.
- Measuring and collection of feedback — after having launched a self-service environment or a new service in the existing environment, start measuring (based on measure instruments) the use of the self-service environment, and ask feedback from the users, and based on that, start planning new services or improving the existing ones. For creating a measuring system, it is advisable to read this document[ 10 ].

6.2 Customer Needs Survey

In this section an overview of methods is presented that would help to understand the needs of customers, in order to fulfil the needs as well as possible in the self-service environment, which is under development yet or being developed further.

- Interviewing:
  - ask from customers about their positive as well as negative experience in connection with using services,
  - if the customers are asked a too general question about what kind of services or self-service environment they would like to have, then people might not be able to describe their actual needs and they stick to the present time, however, if the customers do not reply to such questions, it does not mean that new solutions are not necessary,
  - interviews can be replaced with written questioning:
    - the advantage of an interview: the direct communication during the interview helps to achieve better contact, one can ask specifying questions,
the advantage of written questioning: an opportunity to involve more customers, however, the number of replies can be low, or the replies might be vague and indefinite.

- one should not take unfair advantage of the customers' motivation — if the customers reply, they do not do it because they are bored, but wishing to change things for the better. If no development follows, then their efforts have been of no use and it will be very difficult to involve them again in the future.

- Observation:
  - for example, by spending a few days in service halls, shadowing the job of customer service personnel, one can get a lot of information about the needs of customers, or what troubles or remains unclear for them.

- Thinking about the customers (placing yourself into the customers' shoes):
  - Going through the process:
    - look through the AS-IS model of the process, thinking that, if you were a customer, which changes might you want the most (note: the description of a process should, in addition to the activities of the service provider, describe also the activities of a customer and third parties),
    - in order to comprehend the process better, collect measurable information about the activities (how much time do specific actions take, how often the process goes along the mainstream and how often some exceptional cases emerge).
  - Compiling personas:
    - a persona is a description of a personality type of a customer that focuses on personal characteristics (e.g. age, education, cultural background, emotions, experience and skills with computers and in service area).

- Testing the usability = testing on users:
  - to have a potential customer to perform a real task with the help of the results of the development work, to observe how the customer succeeds (how much time does the task take, where does the customer stumble and has to seek for help) and ask for the customer's opinion,
  - the usability tests are performed on a prototype, thus the errors can be discovered and repaired before the realisation of the solution. The usability tests can be applied also to content texts (e.g. does a potential customer comprehend the description of a service), to ready-made software, or to an entire service as a whole.

- An analysis of the customer feedback and of measuring the use of the self-service environment (the recommended measure instruments are described in document [10]).

6.3 Cost-benefit analysis
A service provider starting to create a self-service environment or add a new service to an existing self-service environment, must be able to show the benefit from the renewal, and that the benefit outweighs the costs and investments to be made for the renewal.

The gainfulness of a development must be measured from two aspects:
- benefit for a user of a service,
 benefit for the service provider (decrease of costs / increase of profits).

The benefit gained from a service should not be always financially measurable, however, if possible, the financial benefit should be brought out. The benefits gained from a service can be measured as presented in document [1], based on a reference model defining 60 indicators (in document [1] table 12, pgs. 91 to 96). Naturally, the development of a service must not have effect on all the 60 indicators. In the cost-benefit analysis, the indicators which are essentially influenced by the development of a service, should be brought out. Regarding each pointed out indicator, a logical justification must be given about how the planned change would influence the value of the indicator.

When assessing the benefits of a service, the component of administrative burden has an important role to play. The value of the benefit can be ascertained by comparing costs and profits. The administrative burden is at the costs' side. The administrative burden means for citizens and businesses spending time and money in order to handle matters with the public sector (the criteria 47 and 48 in the list of indicators as presented in document [1]). The meaning and calculation of the administrative burden is explained on the following web page http://hkm.mkm.ee/.

The results of the process analysis provide input for the calculation of the financial costs related with the provision of a service. The results of the analysis of the process reveal what activities are actually performed for providing a service. Further on, it will be possible to ascertain the quantity of resources necessary for performing activities. One can obtain the total cost of a service by multiplying the quantities of the resources to be used with the costs of the resources and with the number of times, the service is provided.

<table>
<thead>
<tr>
<th>Consumable resource</th>
<th>Year 1</th>
<th></th>
<th>Year 2</th>
<th></th>
<th>Year n (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of service provision (no of times (X))</td>
<td>Quantity of the consumable resource (A)</td>
<td>Unit price (B)</td>
<td>Cost of the resource (C=A*B)</td>
<td>Quantity of the consumable resource (A)</td>
<td>Unit price (B)</td>
</tr>
<tr>
<td>Total cost to be divided</td>
<td>e.g. labour costs (C1)</td>
<td></td>
<td></td>
<td>e.g. office costs (C2)</td>
<td></td>
</tr>
<tr>
<td>Direct costs (e.g. material)</td>
<td>e.g. a licence blank (Cn)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost of one operation ( \sum (C1..CN) )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost of providing a service ( \sum(C1..CN)*X + CX )</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

By doing similar calculations for a service provision process without e-service and for one with an e-service, and by adding the amounts of investments, it is possible to calculate the cash flows and to analyse whether the innovations help to reduce the present cost, or the cost will remain the same.
<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year n</th>
</tr>
</thead>
<tbody>
<tr>
<td>The present cost of service provision without e-service (A)</td>
<td></td>
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<tr>
<td>The cost of service provision with e-service in the future (B)</td>
<td></td>
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<tr>
<td>The cost of service provision without e-service in the future — the share that will remain in the office (C)</td>
<td></td>
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<tr>
<td>Cash flow from investments (own labour costs, outsourced consultation, software development, cost of media campaign ...) (D)</td>
<td></td>
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<tr>
<td>The difference of the cash flow (B+C+D-A) — if it is &gt; 0, then the development is justified considering the costs of a service provider.</td>
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</tbody>
</table>

For evaluating the long-term cash flow, the net present value (NPV) of the investment could be calculated, using the discounted cash flow method.

The total cost of the resources could be calculated based on the ABC – activity based costing principles. The methodology of the activity based costing refers to one important question that needs analysing. Namely, when analysing a single service separately, one could come to a conclusion that by making changes, the use of some resource would decrease and therefore the cost will also decrease. At the same time, that resource could be possibly needed for some other activities and therefore, one should not discontinue to maintain that resource, and thus, the fixed costs remain the same. Therefore, it is necessary to think it over — to which extent the discontinuation of, or reducing the use of some resource would have impact on the fixed costs.

It is not necessary to use very complicated calculation methods. At least a simple cost-benefit analysis should be conducted, so that the decision would not be based on emotional arguments only. In the end, the quality of the cost-benefit analysis is determined by the exactness of the prediction of the investment amount and of changes that will take place. As the development work advances, the more exact the assessments become. Therefore, it is necessary to conduct the cost-benefit analysis repeatedly: