

SOURCE™

Software Outreach and Redefinition to Collect E-data
Through MOTUS

Description of e-HBS & TUS in Belgium & Germany

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1 (Statbel.3) Description e-HBS Belgium

| | |
|-------------|---|
| Deliverable | Documented experiences of e-HBS in Belgium and list of requirements for future use. |
|-------------|---|

STATBEL has experience in collecting household spending data via an e-HBS. An overview on processes in Java, Blaise and SAS gives us a detailed insight in how STATBEL organizes HBS-surveys (see SC.2).

1.1 Digital questionnaire since 2012

Like other NSIs, the STATBEL interviewers used a paper questionnaire to write down the answers of the households. All these questionnaires were post-coded, which was subject to mistakes.

Since 2012, the interviewers use a computer with Blaise installed on it to assist them during the interview. All questionnaires were taken digital since then.

Working with digital questionnaires has some advantages:

- Adjustments can be made directly in the questionnaire
- You can implement routing, so there is no time wasted in searching the correct question
- You can implement checks as a first barrier against mistakes

A disadvantage is that it is more difficult for researchers and other interested parties to have a comprehensive overview of the questionnaire.¹ Also, when a routing is incorrect, this is usually only noticed after the data collection is finished, so you could have erroneous data for all respondents.

1.2 Digital diary since 2014

Up to 2014, there was only a paper-based diary² available for the households to write down their expenses. These expenses are also post-coded, after the interviewers picked up these diaries during the final interviews and sent them to STATBEL. Since 2014, households have the choice between this paper-based diary and a digital diary³. The share of households that chooses to use the digital diary increases every wave (see table 32).

Table 1: share of households that uses the digital diary in Belgium

| | 2014 | 2016 | 2018 | 2020 |
|---------------|------|------|------|---------|
| Digital diary | 30% | 54% | 58% | Ongoing |

The big increase in households participating digitally between 2014 and 2016 lies part in the fact that participating digitally was encouraged financially.

In 2020, STATBEL urges the household to participate digitally as much as possible, due to the current COVID-19 situation.

¹ https://Statbel.fgov.be/sites/default/files/files/documents/Huishoudens/10.1%20Huishoudbudget/Questionnaire_m%C3%A9nage_2018.pdf

² https://Statbel.fgov.be/sites/default/files/files/documents/Huishoudens/10.1%20Huishoudbudget/INTERIEUR_HBO_carnet_2018_NL.pdf

³ <https://hbs.statdata.be/hbs/>

1.3 Current potentials problems

1.3.1 *Declining sample size*

Even though STATBEL invested in innovating the HBS data collection during the last 10 years, an important problems remains for all diary-based surveys for all NSIs and this is a declining response rate.

Before 2012, HBS was conducted yearly between 1999 and 2010. The sample was selected from the Population Register and aimed for representativity on a national level. The response rate fluctuated between 6% and 7%. The sample was between 3500 and 3700 households.

For the 2012, 2014 and 2016 waves, the HBS sample was completely a subsample of LFS. The response rate in relation to the LFS selection was around 9%. In 2017, the LFS survey underwent a big methodological change from a cross-sectional survey to a panel-survey. A direct consequence was that there were no longer enough respondents from LFS to acquire the necessary 5000 responding households since 2012 for HBS.

Since 2018, the HBS sample consists of three parts, with varying response rates as you can see in table 11. The HBS sample now consists of all available LFS respondents, a panel component, where the respondents from the previous HBS wave are invited to participate and an extra, necessary sample from the Population Register.

Table 2: HBS sample and response rates in 2018

| | Recruited | Willing to participate | % | Real participation | % | Overall response (%) |
|---------------------|--------------|------------------------|--------------|--------------------|--------------|----------------------|
| LFS | 19723 | 5264 | 26.69 | 2506 | 47.61 | 12.81 |
| HBS2016 | 4490 | 1796 | 40.00 | 1642 | 91.43 | 36.75 |
| Population register | 41245 | 2541 | 6.16 | 1988 | 78.24 | 4.82 |
| Total | 65458 | 9601 | 14.67 | 6136 | 63.91 | 9.37 |

The response rate of the respondents from the LFS source increased as was expected, because of the panel component in LFS. Respondents from LFS are asked to participate in HBS after the last panel wave, so if they were willing to go through 4 waves, more of them will probably be willing to participate in another survey.

The panel component in HBS, where the respondents from the previous wave are asked to participate, has a high response rate. This is as expected, because these households know the survey already.

The response rate of a sample out of the Population Register has become alarmingly low, as it dropped below 5%.

1.3.2 *Reasons not to participate in HBS*

When households don't want to participate in HBS, the reason is asked. Only a small percentage of the recruited households that are not willing to participate actually answer what the reason is why they don't want to participate. Those reasons are listed in table 12.

Table 3: reasons households give for not participating in HBS in 2018

| Source Reasons | HBS2016 | | Population Register | |
|---|-------------|---------------|---------------------|---------------|
| | Number | % | Number | % |
| No time, too busy, not available in that period | 1084 | 32,43 | 353 | 57,96 |
| I'm too old / sick | 1017 | 30,42 | 59 | 9,69 |
| Not interested | 386 | 11,55 | 29 | 4,76 |
| Other | 295 | 8,82 | 33 | 5,42 |
| Violation of privacy / too private | 166 | 4,97 | 13 | 2,13 |
| Own situation not interesting (single, independent, small income, grow your own vegetables, not at work, ...) | 150 | 4,49 | 6 | 0,99 |
| In retirement home | 100 | 2,99 | 2 | 0,33 |
| Family reason (a loved one is ill/deceased, just moved, just divorced, ...) | 44 | 1,32 | 45 | 7,39 |
| Language problem | 34 | 1,02 | 2 | 0,33 |
| Already participated (too much) | 31 | 0,93 | 61 | 10,02 |
| Doubts about the usefulness of the survey | 30 | 0,90 | 6 | 0,99 |
| Negative towards government (too many taxes, they already know everything ...) | 6 | 0,18 | 0 | 0,00 |
| TOTAL: | 3343 | 100,00 | 609 | 100,00 |

1.3.3 Other problems

It is only after households participate that they can give their opinion about the survey modes. Here, STATBEL often gets the feedback that the survey is very heavy.

Also the fact that it is not possible to give in expenses 'on the go' is a disadvantages which leads to a lot of missed (small) expenses.

Whether you fill in your expense diary on paper or in the web application, the diary is one shared account for all individuals in the household. This means that for examples gifts for other household members are not recorded, as you generally don't want to let know that you bought a gift or how much it has cost.

HBS is a dynamic survey that underwent quite some changes during the last years. As part of the survey flow source code is maintained by ICT, partly with the collection department, partly with the data warehouse and finally by the social statisticians, changes in this code have a cascade effect and flaws are likely to happen.

1.4 [Future requirements/standards for an e-HBS data collection](#)

Future tools and changes for HBS should aim at providing a solution for the multiple problems stated above.

Firstly, the declining sample size should be tackled. Currently, only paper-based or web-based data collection tools are available to conduct the survey. This makes that households don't have a lot of choice in how they participate. Combined with the fact that this is a rigid way to collect data, especially younger households and household members are not easily convinced to participate. A possible solution for this problem is offering a dynamic tool to the households in order to make it easier for all individuals in an household to participate, to have private entrances and with the possibility to keep track of their expenses 'on the go'. A smartphone app would be a solution that could help turning around the declining response rates.

Respondents state multiple reasons as for why they don't want to participate in the HBS survey, even if they now get paid for their efforts. The main reason was that household were too busy, had no time or weren't available during the reference period. It is possible that a part of these households could be convinced in participating, if a dynamic platform was offered.

A majority of households that participate with the web-application find participating in HBS 'very heavy' as is the case with most diary-based surveys. To lower the respondents burden as much as possible, innovative ways of collecting data like speech recognition, scanning store receipts ... should be developed. These innovative data collection modes should be build-in the dynamic platform, so households maintain an overview and control over their responses.

NSIs are government institutes, where mostly civil servants work. Over the last years, the way NSIs has changed drastically and will continue to change, as the digitalisation wave is ongoing. These changes ask for flexibility of the statisticians and flexibility in data organization. This means that the tools and ways to collect data need to change too towards flexible platforms, where minimal intervention and optimal automatization is required.

2 (Destatis.3) Description e-HBS & TUS Germany

| | |
|-------------|--|
| Deliverable | Detailed descriptions and list of requirements for current and future use of HBS and TUS in Germany. |
|-------------|--|

Remark: The following description and list of requirements was compiled in the beginning of the SOURCETM-project (dated April 2019). In the course of the project, based on conducted meetings (e.g. in Brussels in September) and further discussions within the project's consortium, DESTATIS learned more about MOTUS and developed a deeper understanding on the functional and technical requirements of MOTUS. On the other hand own requirements were refined, some postponed or even dropped. Must/Can-criteria for each of the studies have been defined in an additional step (see 2.5.2). The information below therefore does not reflect in every detail the current situation, as requirements are a work in progress.

2.1 [Background](#)

As is the case in most European countries, Germany is confronted with a decline in the willingness of households to participate in diary-supported household surveys. Such surveys are extremely time-intensive for the respondents, due, above all, to the need to keep detailed records about their incomes and expenditures, respectively about their activities, over a given period of time in the form of a diary. To reduce the workload for respondents, Germany is planning to introduce a modern IT tool for its next surveys. This document first explains the core aspects of the studies (overview, sample, survey procedure), and then, based on these aspects, lays out the technical and content-related requirements that will have to be fulfilled by a new IT tool from a German perspective.

2.2 [Study overview](#)

In Germany, the term "diary-supported household surveys" encompasses the sample survey of household income and consumption (EVS), the continuous household budget surveys (LWR), and the time use survey (ZVE). Together, the EVS and LWR form the overall system for conducting household budget surveys. The EVS takes place every five years (the next survey is scheduled for 2023) and is the basis for providing the German results for the European HBS (Household Budget Survey). In the four intermediate years in which no EVS takes place, the LWR is conducted as a subsample of the EVS. The ZVE is conducted on an irregular basis roughly every ten years (as things stand, the next survey is due to take place in 2022). Participation in the surveys is voluntary.

2.2.1 [Sample](#)

In contrast to the other European countries, in Germany all three surveys are based on a quota sample (disproportionate distribution). The net sample size for the EVS covers approx. 60,000 households, in the LWR approx. 8,000 households, and in the ZVE to date approx. 5,000 households. The quota plan for all three surveys splits up the population set of the households into groups by combining the following characteristics: federal state, household type, social status of the main income earner, and household net income. By dividing the sample size with regards to the results of the microcensus, a quota target to be fulfilled for each quota cell is stipulated as being the number of households to be (ideally) surveyed. Within the scope of the recruitment, various measures are undertaken to win over households for each group until the defined quota target is attained. In the case of the EVS and the LWR, among other aspects, participating households from previous surveys are recruited again, which means that many households are included in the samples several times in a row. This circumstance occurs particularly in the LWR because, since 2005, the LWR sample has been a subsample of the EVS, and households are therefore primarily recruited from the previous EVS. Furthermore, households generally remain in the LWR samples for all the intermediate years. For the ZVE, households are

likewise recruited from other voluntary household surveys, and in the past were additionally recruited from the permanent pool of households that are willing to be surveyed (DSP).

2.2.2 Survey contents

The core element of the three surveys are the diaries to be kept in each case. The household budget surveys (EVS and LWR) currently examine the household as a whole. A household book is to be kept for the household over a period of three months, containing details of the actual incomes and expenditures during that time period. The long recording period of 3 months differs from the other European studies for the HBS, in which the surveyed households frequently only have to keep diaries for 1-2 weeks. In future, individual diaries will also be offered which will allow the individual members of a household to record their entries as they arise.

The household books are supplemented by further questionnaires in which sociodemographic data (survey component: Allgemeine Angaben for the EVS and LWR) about the household and its assets (survey component: Geld- und Sachvermögen, EVS only) is requested in a standardised manner. Another survey component for the EVS is the detailed recording of food, beverages and tobacco products, where a subsample of 20% of the households is asked to record in detail their purchases of such products (e.g. soft cheese, whole milk 3,5%). This information is recorded in plain text, stating the respective price and quantity. For future surveys, the separate survey components are to be merged into one instrument and then split up into different modules/sections that are to be filled in within one quarter.

The diary recording time for the ZVE is three days. The participating households, respectively the persons living in the households from the age of 10 years upwards, are requested to document their activities at 10-minute intervals on two weekdays and one day at a weekend within one given week. Alongside the main activity, the secondary activity together with the utilised means of transport, and the persons involved are also noted. Supplementary to these individual diaries, there is an individual questionnaire for each person from 10 years of age, and additionally a household questionnaire.

2.2.3 Need for action

Considering the ever greater lack of willingness to participate on extremely time-consuming diary-based surveys, and in conjunction with the increasing digitalisation, the further development of IT tools for diary-supported surveys (EVS/LWR/newly developed household budget surveys/ZVE) is absolutely imperative.

At present, the data collection tools for diary-supported household surveys still mainly comprise paper-based records. In the household budget surveys – still to a varying extent – this is supplemented by electronic applications in the LWR for all the survey components (eHB = electronic diary), and in the EVS at present solely for the “Allgemeine Angaben”. Previous time use surveys were conducted exclusively using paper questionnaires. Consequently, at this time Germany does not offer any up-to-date survey instruments, which are increasingly in demand among respondents. There is an urgent need for modern IT tools, in particular where the extremely time-consuming surveys are concerned, such as the diary-supported household budget surveys and the time use survey. In future, respondents should be given the opportunity to enter their details about consumer expenditures or activities easily and conveniently using any device, either at home on their desktop PC or on the move on their mobile devices (tablet, smartphone). Usage of these new technologies is expected to improve the quality of the data collection, ease the burden on respondents with appealing and time-saving survey instruments, and make them more willing to participate on the surveys.

As a first step, this paper is intended to specify the central requirements that Germany will have to fulfil to provide a suitable IT tool for diary-supported household surveys from a professional and technical point of view.

With regard to the functional and technical requirements, a general distinction must be made between those requirements that have to be fulfilled for ZVE 2022, the requirements that must be fulfilled for EVS 2023, and those requirements that will only need to be implemented in the application at a later point in time, i.e. for which an earlier implementation is not absolutely essential (see also Section 2.3).

2.3 Time aspects

It is planned to use the new application for the next ZVE, which is currently scheduled for 2022. The IT tool will be used for household budget surveys for the first time for the EVS 2023. The tool (with the appropriate adaptations) is intended to be used for subsequent ZVEs and household budget surveys (LWR 2024 onwards, EVS 2028 onwards, respectively for newly formulated household budget surveys).

2.4 Description of the professional and technical requirements

A description of the common and survey-specific requirements is necessary in order to implement an IT tool that can be used equally for both surveys, i.e. for the household budget surveys (EVS/LWR/newly developed household budget surveys, hereinafter all of them are referred to as HBS) on the one hand, and for the ZVE on the other (with the appropriate adaptations). In the following, the general overall requirements for the HBS and ZVE are first described in Section 2.4.1, and then substantiated in more detail in Sections 2.4.1.1 to 2.4.1.17. Section 2.4.2 explains the survey-specific requirements for the HBS and the ZVE, which differ between the studies in particular as it regards the content-related and organisational aspects.

2.4.1 Overarching requirements from the ZVE and HBS

The ZVE and HBS are similar with regard to the type of survey. Both surveys are **diary-supported household surveys**. Both surveys collect data directly from private households and the persons living in them as primary statistics on the basis of a quota sample. Participation on the surveys is voluntary. Both the ZVE and HBS contain a diary component as the core element of the survey – in addition to **conventional questionnaire parts** – i.e. respondents are requested to regularly write down their activities respectively their incomes and expenditures over a fixed period of time. In both surveys, **the diary entries are mapped to defined classifications**. In the ZVE, main and secondary activities are classified corresponding to a predefined activity list¹. For the HBS, the daily expenditures are mapped to the respective areas in accordance with the SEA classification². In both cases, the user-defined entry process should be supported by a search algorithm that assigns the correct category to the entries. Access to the search algorithm and the stored keyword list must also be possible once the application is in offline mode. The KlassService of the Federal Statistical Office should be used for this purpose if possible. This is to be integrated by means of an appropriate interface.

In both surveys, the application is linked to other in-house business applications, the **administration and data acquisition programs**, which are separately reprogrammed for both ZVE 2022 and EVS 2023. The functional scopes of both in-house business applications will be rather similar to one another, and the application content will build on the previous programs. The respective requirements for a link via corresponding interfaces are described in Section 2.4.1.14.

¹ In the interests of EU comparability, the list of activities in the ZVE 2022 will be partly based on the Activity Coding List (ACL) of the HETUS 2020, and also take specific national requirements into consideration. In order to obtain statements about the temporal change in the results, the list of activities should be as compatible as possible with the directory for the 2012/13 ZVE .

² The current version of the SEA Classification is available here: https://www.destatis.de/DE/Methoden/Klassifikationen/GueterWirtschaftsklassifikationen/SEA2013.pdf?__blob=publicationFile (download on 09.10.2018). It should be noted, however, that due to user requirements there are some deviations from the classification.

The **general requirements**, such as data privacy aspects (incl. informed consent), IT security (incl. passwords) or information documents (FAQ, contact options, etc.), are also comparable in the scope of both surveys.

Alongside the common requirements for the content aspects of the applications, the applications for both surveys must also have a similar layout design and menu navigation in the sense of a "corporate design", and comply with the stipulations of the Statistical Offices of the Federation and the Länder.

2.4.1.1 User group

The ZVE and HBS applications are available to a **semi-open user group**. This means that the app is not used by interviewers commissioned by the Land Statistical Offices, but by the participating **households** themselves who have previously registered for the survey, and who have been informed about the survey (survey procedure, recording period, survey methods, etc.) by means of a letter (by post/email). The households for the ZVE and HBS use their own devices, which means that the application that is to be developed has to fulfil particular requirements. These concern to , among other aspects, provisioning, marketing, end-user device compatibility, (platform-independent) handling of updates, far-reaching requirements with regard to (IT) security (including IT centre operations¹, data privacy requirements), storage management (in particular regarding the offline component), together with many other criteria which will be addressed in more detail in the following sections. Since operating all end-user devices and platforms would entail a disproportionately great effort, only the most commonly used products on the market are covered in Section 2.4.1.4.

For both surveys, it is necessary for each member of a multi-person household in the "Household" user unit to keep a personal diary.² This means that a hierarchical group of respondents has to be administered. This is described in more detail in Section 2.4.2.3.

The application user group therefore comprises private households and the persons living in them.

2.4.1.2 IT security / privacy

On account of the sensitive nature of the personal and household data (e.g. activities, expenditures, incomes, monetary and tangible assets) within the scope of the ZVE and HBS, stringent requirements must be fulfilled with regard to data protection and IT security (see also 2.4.1.3). Participating households must at all times have the assurance that their data is being kept secure and confidential.

This applies to the login process (login credentials), the storage of the data (devices themselves in offline operation, the use of cloud services, server/ITZbund operation), as well as the transmission of the data and security via linked interfaces. The security of the data must be safeguarded for the household even following the loss of a device (e.g. smartphone). In general, the relevant requirements of the Federal Office for Security and Information Technology (BSI) must be complied with.³ In the case of development projects, these are currently defined by the requirements in accordance with the BSI IT Basic Protection Compendium module CON.5 "Development and Use of General Applications"⁴, and the module CON.8 "Secure Software Development"⁵.¹ The specifications for mobile applications

¹ The central IT service provider for the Federal Administration, who, among other things, is responsible for providing the server.

² Previously, personal diaries (solely paper-based) were only used for the ZVE; however, for surveying method reasons it is planned to introduce an app for recording individual diaries for the HBS as well.

³ The BSI's specifications (see links below) are only available in German.

⁴

https://www.bsi.bund.de/DE/Themen/ITGrundschutz/ITGrundschutzKompodium/bausteine/CON/CON_5_Entwicklung_und_Einsatz_von_Allgemeinen_Anwendungen.html

⁵ https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Grundschutz/IT-Grundschutz-Modernisierung/BS_Softwareentwicklung.html (currently only available as a draft)

are currently still being established, and have so far been laid down in an initial draft.²

This requires the development of a dedicated IT security concept. In the event that changes are made to these specifications, such changes must be subsequently and promptly implemented. In addition, the requirements of the General Data Protection Regulation and of national data protection legislation must be complied with, in particular with regard to the necessary consents.

2.4.1.3 Data vulnerability

Details about persons, incomes, expenditures and activities are statistical microdata, which can already be assumed to have a high need for protection.

However, the final determination of the need for protection still has to be made based on the requirements described above.

2.4.1.4 End-user device / cross-platform compatibility

It must be ensured for both the ZVE and the HBS that the offered application enables a large proportion of respondents to participate using the end-user devices at their disposal.³ This means that it must be possible to use and (where necessary) install the application on a desktop as well as on various mobile devices such as smartphones, tablet PCs or laptops; alternatively, different solutions may have to be developed.

The most common end-user device types, operating systems and environments on the market must be taken into consideration. The market shares in Germany at this time are listed here, although it should be noted that these are subject to considerable fluctuations:

- Smartphones, mobile phones⁴: Android (69.1%), iOS (29.5%), Windows (0.8%), Tizen (Samsung) (0.4%), BlackBerry OS (0.1%)
- Tablet PCs⁵: iOS (60.3%), Android (39.3%), Windows (0.3%), Linux (0.1%)
- Desktops/laptops¹: Windows (71.8%), Mac OS X (12.1%), iOS (6.7%), Android (4.4%), Linux (3.3%)

¹ If it is planned to procure and use software available on the market (or which can be downloaded from an online source), the requirements from the BSI IT Basic Protection Compendium, module CON.4 "Selection and Use of Standard

Software" (https://www.bsi.bund.de/DE/Themen/ITGrundschutz/ITGrundschutzKompodium/baustein_e/CON/CON_4_Auswahl_und_Einsatz_vonStandardsoftware.html) must be fulfilled.

When engaging (IT) service providers, the requirements from the BSI IT Basic Protection Compendium module OPS.2.1 "Outsourcing for Customers"

(https://www.bsi.bund.de/DE/Themen/ITGrundschutz/ITGrundschutzKompodium/bausteine/OPS/OPS_2_1_Outourcing_f%C3%BCr_Kunden.html) must be taken into consideration accordingly.

Additionally, the BSI Minimum Standard for the Use of External Cloud Services

(https://www.bsi.bund.de/DE/Themen/StandardsKriterien/Mindeststandards_Bund/Externe_Cloud-Dienste/Externe_Cloud-Dienste_node.html) must be observed if the IT service provider is not an officially appointed IT service provider (ITZBund or a Statistical Office IT service provider), and services are rendered against payment on the basis of an individual contract.

² https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Grundschutz/IT-Grundschutz-Modernisierung/BS_Mobile_Anwendungen.pdf?__blob=publicationFile&v=6

³ It will not be necessary to realise a full-scale deployment. The bandwidth of the offered end-user devices is too diverse for this to be practicable. For example, older models that are still in use, but which no longer meet current standards, cannot be included.

⁴ <https://de.statista.com/statistik/daten/studie/184332/umfrage/marktanteil-der-mobilbetriebssysteme-in-deutschland-seit-2009/>

⁵ <https://de.statista.com/statistik/daten/studie/306850/umfrage/marktanteile-der-tablet-betriebssysteme-an-der-internetnutzung-in-deutschland/>

- Browsers²: Chrome (39.1%), Firefox (26.1%), Safari (12.8%), Internet Explorer (9.3%), Edge (6.4%), Opera (3.5%)

For the application to have the greatest possible degree of cross-platform compatibility, and for it to be compatible with the most commonly used products on the market, the mobile version must currently at least be compatible with Android and iOS, while the desktop version must be supported by Windows, and ideally by Mac OS X as well. Insofar as it is necessary to resort to browser technologies or their functionalities, compatibility with Chrome, Firefox, Safari and Internet Explorer must also be assured.

Compatible in this case means that the functionalities necessary to fulfil the stated requirements must be usable with just a few exceptions ("can" criteria). For example, the application must take a device-adapted user navigation into account. This means that interface elements automatically adapt themselves to the respective device in use such as the screen size (full screen) or screen orientation. In addition, if permitted by the functionalities of the respective end-user device, paradata (e.g. screen activity, use of certain functions, apps) must be stored and the use of hardware components such as the camera and offline usage must be made possible. At a later date, it must also be possible to use data from connected devices (e.g. smart watches) and geographic coordinates.

2.4.1.5 Provision of the application

The application (ZVE/HBS) must be made available to at least all participating households by means of a simple and secure access method so that the respondents can open the application on their respective end-user device(s). Households not participating in the survey should be given the opportunity to download a test version of the application. This test version should incorporate some basic functions, can support the recruitment process for households by making them curious about the survey, and can enable them to register for the survey using the contact details provided in the test version. Here, a procedure familiar to the respondents and commonly used on the market must be chosen which is trusted by the respondents. At present, for mobile devices this only applies to provision of the application from the leading app stores. For quick access, corresponding links to the mobile application in the respective app stores can be included, for example, in the letter of invitation.

The advantage of using the official app stores is that the majority of users already have experience with the download procedure. This also ensures a broad acceptance among the respondents, coupled with greater confidence in the application as it is tested by the app stores before it is made available for public download. The application must therefore be provided and supplied through the leading official app stores (Apple App Store and Google Play Store). These can be supplemented by offering additional channels.

The size of the download necessary for using the application (in particular in offline operation) must not exceed a size consistent with the prevailing technical standards at the time of provision of the application. This will prevent respondents from becoming frustrated right from the outset. The application must also be free of charge for respondents. Any costs that may be incurred in conjunction with the download (e.g. without a data flat rate outside the wireless network) will be indicated in the letter of invitation (with a recommendation for downloading the application in a wireless network), in particular in view of the fact that young people will also use the application.

Other aspects will also need to be taken into consideration depending on the provision method and associated IT architecture. For example, it must be clarified which requirements will have to be fulfilled

¹ <https://de.statista.com/statistik/daten/studie/158102/umfrage/marktanteile-von-betriebssystemen-in-deutschland-seit-2009/>

² Relevant only if the application needs to rely on browser functions.

<https://de.statista.com/statistik/daten/studie/13007/umfrage/marktanteile-der-browser-bei-der-internetnutzung-in-deutschland-seit-2009/>

for the first publication in the respective app stores, and what effort will be involved or over what period of time the application will be made available for download.

In general, it will also be possible to choose different implementation or provision methods depending on the end-user device (e.g. a locally installed application for mobile devices from the app stores, and browser-optimised, web-based solutions for desktop PCs).

The method used for providing the application must also be BSI-compliant, i.e. it must fulfil BSI security requirements for such applications that have a "high" need for protection (see also 2.4.1.2 and 2.4.1.3).

2.4.1.6 Maintenance / serviceability

It must be possible to update the application (ZVE/HBS), e.g. for bug fixing or content/design adaptation purposes. Modifications to the software must be simple, focused and without any undesirable side effects. However, these should be implemented at moderate intervals to avoid annoying respondents with frequent updates. To remedy errors that could result in data loss or otherwise prevent respondents from participating in the survey, updates must also be generally delivered at short notice.

For updates or program changes, a system is to be found which avoids task duplication (e.g. for different platforms such as Android or iOS) to as great an extent as possible. Depending on the IT architecture and the platform being used, it is possible that how updates are handled will be heavily dependent upon the respective platform. Every modification and delivered update must be logged for tracking the development of the updates. The version used for creating the data package must be evident from the delivery of the sent data (see 2.4.1.17).

A suitable method must also be found for updating the information and data stored for the search functions (classification versions, keyword lists, etc.). This applies in particular to using the search function in offline mode. The search function must access the most up-to-date active data here as well and, where necessary, the active data installed as part of an update.

A network connection is required for delivering updates to the end-user devices.

If multiple solutions are planned for different platforms and end-user devices, it is to be clarified how it can be ensured that the updates/patches are realised as concurrently as possible in the various solutions.

When using an externally programmed application, a corresponding concept must be submitted which defines the responsibilities for any modifications that are made and their prompt implementation by the customer. Preferably, in-house updates by employees should be possible after the appropriate training.

2.4.1.7 Access / login

After the participating households have downloaded the application onto the used end-user devices (or after opening a web browser-based application for desktops by clicking the link on the website), they are prompted to enter their login credentials (user ID and password). Although the application can be downloaded without a password, it cannot be used without entering valid login credentials. In the event that previously uninvited persons download the application out of curiosity (e.g. after searching for "Household book" in the app store), an information dialog box with the contact options is displayed. It is also possible to test the application without registering.

The login credentials are transmitted to households registered for the survey in different ways. Login credentials can be sent by post. In addition to the login credentials stated in the letter, a QR code will also be provided so that users of the application for mobile devices can conveniently log in by scanning

the code with the device's camera. Provided there are no security concerns on the IT side, households are also offered the option of having their login credentials sent to them by email, as well as by post. The first time a user logs in, it is always necessary for the login credentials to be actively transmitted to make sure that the user belongs to a sample household.

After logging in for the first time, the user is prompted to choose a new secure password (entered twice for confirmation). If the household forgets the password, it must be given a quick and uncomplicated possibility for resetting the password, taking into account data protection requirements and IT security. It must also be possible to change the password later at any time. The new password must be transmitted in a BSI-compliant manner and – due to the need for timely diary entries – immediately by electronic means just as users are used to experiencing with other login credentials (e.g. with a link sent by email or text message). The change process should be oriented to the future IDEV¹ "Reset password" procedure.² The requirements for the password to be provided by the respondents must guarantee a certain degree of security, but must also not be too strict to avoid frustrating the participants when choosing a new password (e.g. it should not have to be of a precisely stipulated length).

After logging in, the application remains active for a defined time window (e.g. 30 minutes analogue to the electronic diary for the LWR). If no user activity is recorded by the system, the user is automatically logged out, after which a new login is required. When logging in, the user can stipulate that he wants to stay logged in to prevent being automatically logged out after a given time period.

Since respondents will generally use the application several times a day to make their diary entries, they must have fast access to it. It must therefore be possible to open the application by clicking an icon on the home screen of the end-user device. Such a call option would also be preferable for the desktop variant, but is not mandatory.

As is already the case with many other applications, it must also be possible to safeguard access to the login using modern encryption methods (e.g. touch or face ID). These functions do not necessarily have to be provided by the application itself, but it may also be possible to resort to solutions already implemented in the systems on the end-user devices.³ Furthermore, for fast access the last screen must always be displayed when the application is opened; this should be implemented for all devices. This also applies if a new login is required due to the automated logout.

2.4.1.8 Online/offline usage

One of the focal requirements for the planned application – for both the ZVE and HBS – concerns online and offline usage:

- It must be possible for respondents to access the application from their (mobile) end-user devices regardless of their location and independent of an existing data or internet connection (i.e. access must also be possible in offline mode).
- In offline mode, at minimum the functions for making entries (including photographing the sales receipts), correcting previous entries and saving entries, search functions for coding the

¹ Internally developed online registration procedure used by the Statistical Offices in Germany.

² Possible "Reset password" procedure: The reporting party starts the password reset process by reporting the loss on the Survey Portal. The data entered here by the reporting party (identifier and security query) are checked to authenticate the reporting party. The survey portal then triggers the automated telephone query with which the reporting party confirms that the request to reset the password is correct. The return telephone call to the phone number previously stored in the online registration procedure ensures that the password reset request was only made by an authorised person. Afterwards an email containing a link to the change password page of the responsible online registration procedure is sent to the reporting party. The reporting party can change his password on this page.

³ iOS, for example, features an integral password manager secured with the touch ID function.

activities and expenditures, and functions for creating individual evaluations/balances, must be possible (see also 2.4.1.11).

- However, an internet connection is required to download the application, to log in for the first time, and to update the application as required. Functions such as chat/email support, changing or resetting passwords, synchronising entries between devices, import/export interfaces, or for printing individual evaluations, likewise require a (transient) online connection.

Effectively, this means that to record the data it must at least be temporarily stored locally in offline mode so that it can be transferred when the network and server are subsequently accessed.

If any changes are made offline, priority rules must be described when using multiple end-user devices. Supplementary, non-conflicting entries are transferred together with the latest versions of conflicting entries.

2.4.1.9 Synchronisation of the entries

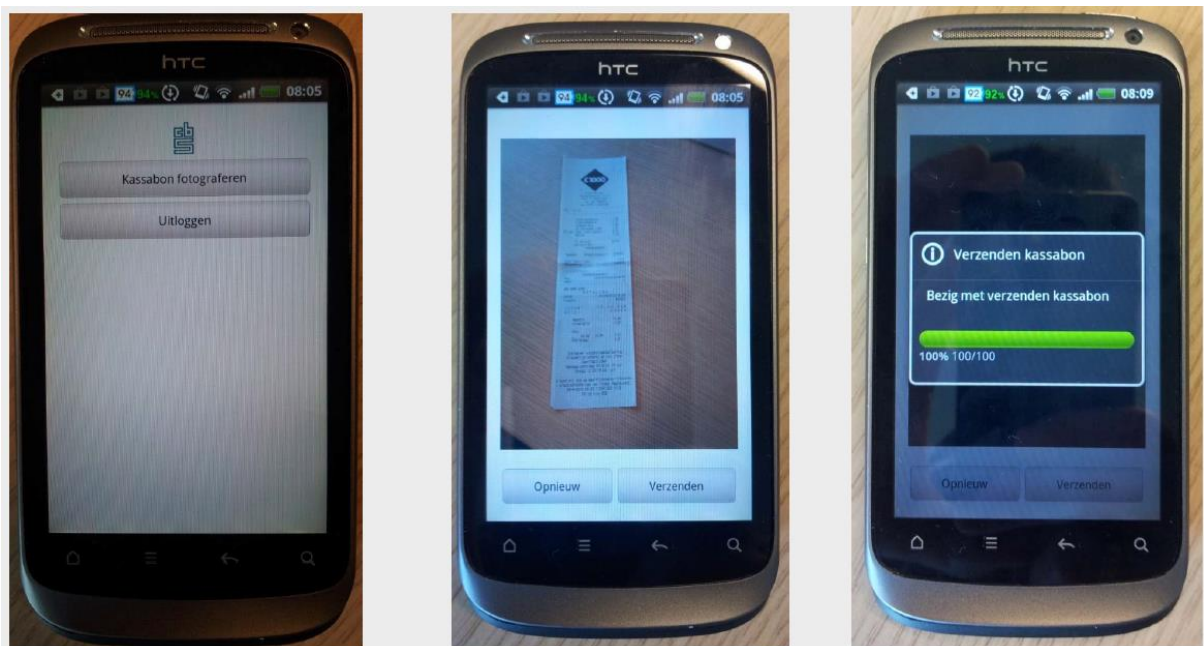
In both surveys, households and respondents must be given a free choice as to which end-user device(s) they wish to use for participating in the survey throughout the reporting period. For example, they must be able to enter their daily activities or expenditures on a desktop PC at home, while being able to enter activities or daily expenditures (e.g. for lunch in the canteen or when buying newspapers at the kiosk) promptly on a smartphone when they are on the move. This also means that switching between the devices must be repeatedly possible at any time. This assumes that the application allows synchronisation of the end-user devices that are being used (desktop, tablet PC, smartphone). It should be noted that these can run with different operating systems (e.g. a Windows PC must be able to be synchronised with an iOS smartphone, or both devices must be able to access the same data stock). Synchronisation requires network access on the respective end-user device. This also means that when data is entered offline, the entries are synchronised when online access becomes available (see 2.4.1.8).

2.4.1.10 Access to hardware components and metadata/paradata

In order to offer the receipt scan or barcode scan option used in other countries (e.g. in the UK in cooperation with the University of Essex, in NL) or in the private sector (e.g. GfK Smartscan), the application for the HBS also allows camera access provided that the end-user device being used offers this functionality and the user gives his/her consent.

Photographing cash register receipts (e.g. at the supermarket) and sending the image from the application makes things considerably simpler for the respondent. Different stages are possible for the further processing. In the simplest variant (with the corresponding extra workload for the Statistical Offices), cash register receipt images are processed independently of the application, and are then recorded at the Office by entering the data manually or electronically. The person entering the data manually uses the sent receipt images in the near-term (e.g. by importing them into the administration and data acquisition program). The electronic processing takes place using an appropriate tool (text recognition tool/OCR, interpretation software, SEA coding), which imports the data into the administration and data acquisition program. The recorded data is not imported back into the application, which means that the respondents do not get a full view of all their expenditures. In a more complex variant, the scanned and coded data would be transferred back into the application, and allow corrections to be made by the respondents and transmitted in the near-term.

Figure 1: Using cash register receipts, "Bolt" pilot project, Netherlands (2013)



Various challenges in the electronic processing still need to be resolved, including non-standardised cash receipt formats/layouts, poor quality of the receipts (scarcely legible due to a lack of ink, poor photographic quality), completeness of the existing data for mapping on a 7-digit level, as well as precise mapping to the corresponding SEA code.

In any event, the application must be prepared for camera access¹ for the 2023 EVS; whether the cash register receipts will only be taken into account for manual input, or whether further electronic processing (subject to the aforementioned content and time-related restrictions) will also be possible, is still an open issue at the present time.

Furthermore, the application must be able to call up basic metadata or sensors such as the time, date, battery status, user usage logs², information about the origin of the data (for individual entries), as well as an existing internet connection/wireless network, for the pending ZVE and HBS surveys.

For later follow-up surveys (i.e. for the ZVE after 2022 and the EVS after 2023), it must be assumed that additional data will be used that is automatically generated by mobile devices (i.e. smartphones, but also increasingly so-called wearables/activity trackers) in order to be able to deduce activities or effected entries/expenditures, or for obtaining additional information. The following functional areas are conceivable:

- Localisation data: e.g. GPS data, geographical coordinates (e.g. supermarket xy)
- Movement measuring data (accelerometer, gyroscope, barometer, light): times and travelled routes for car/train journeys can be displayed here, for example. For the ZVE, it must be possible to synchronise this data with the start and end times of activities entered by the user by means of appropriate user support.
- Voice recordings via the microphone: this makes it possible, for example, to identify whether other persons are present with the respondent (alone, with other persons, possibly also according to the number of persons present).¹

¹ Camera access should be designed in such a way that it can either take place directly from the mobile application, meaning that the application accesses the camera, or a photograph can be taken with the aid of the integrated camera app for uploading to the mobile application as an image file.

² E.g. frequency and duration of usage of the app.

- Data using (social) interaction: e.g. via Bluetooth or NFC (Near Field Communication) for purchases made at the supermarket.

Irrespective of the hardware components or metadata that are used, the consent of the interviewed households/participants must obviously be obtained so that users can decide for themselves which means of access they give their consent to or refuse. Data protection aspects must be taken into consideration (e.g. the provisions of the GDPR). It will also be necessary to monitor how acceptance of the sharing of such data evolves.

A link to other apps (e.g. banking apps) that provide information on expenditures (e.g. purchase of a train ticket using a rail/regional public transport app) or activities (e.g. calendar entries, travel times for ticket purchases) is also of perspective interest. The use of external data sources (e.g. administrative data for income, household data, scanner data from supermarkets, customer loyalty cards such as Payback, etc.) for collecting information about passive data generation (and later matching it against survey data at the Statistical Office) is likewise conceivable.

If and when this form of collecting data will actually be employed, and whether it will apply in equal measure to both surveys, will be demonstrated by the many pilot projects and research activities currently under way in this area.² The applications developed within the framework of ZVE 2022 and EVS 2023 must be designed in such a way as to enable the later use of sensor data or the integration of external data sources. In particular, IT security aspects must also be taken into account here (see also 2.4.1.2 and 2.4.1.3).

2.4.1.11 Further basic functions of the application

- **Languages:** At this time, there are only plans to introduce German-language versions of the applications to be used within the framework of ZVE 2022 and EVS 2023. For subsequent surveys, the integration of additional languages (e.g. English, Turkish) should be possible via a language selection option in the application.
- **Voice input:** Text input by respondents must be supportable by speech input/recognition functionalities (in particular when entering activities or expenditure categories in plain text). Depending on the state of the development, this option will presumably be conditional on the end-user device that is being used.
- **Evaluations:** As is the case with many other applications available on the market, households must be able to create their own evaluations. This incentive can motivate respondents to enter their information as precisely and completely as possible (i.e. with a small proportion of "mapping not possible" cases) in order to obtain a detailed overview of their financial situation or time use. Typical gaming elements (so-called gamification, e.g. via progress bars, scores for the number of purchases made) are to be integrated in the app for this purpose. A personal evaluation will also be offered for respondents who are keeping individual diaries. The LWR electronic diary already features simple evaluation options. These will be developed further with regards to the layout and extent of the evaluation options, and supplemented by comparisons with external data. Data requests must be possible at all times³, and it must be possible to evaluate this data according to various aspects:

¹ Studies/apps in the field of psychology already exist for this purpose. The article "The Smartphone Psychology Manifesto" by Geoffrey Miller gives an informative overview of relevant sensors that can be used in future psychological research.

² Pilot studies and various forums are currently investigating the integration of sensors and metadata (e.g. within the framework of the TUS task force "Innovative Tools and Sources", the FSO network "New Digital Data", and the RatSWD working group "Data Collection With New Information Technology"). Data generated by smartphones or similar devices (smart watches, activity trackers, etc.), such as from GPS trackers, sensors, cameras, etc., is used for passive data generation.

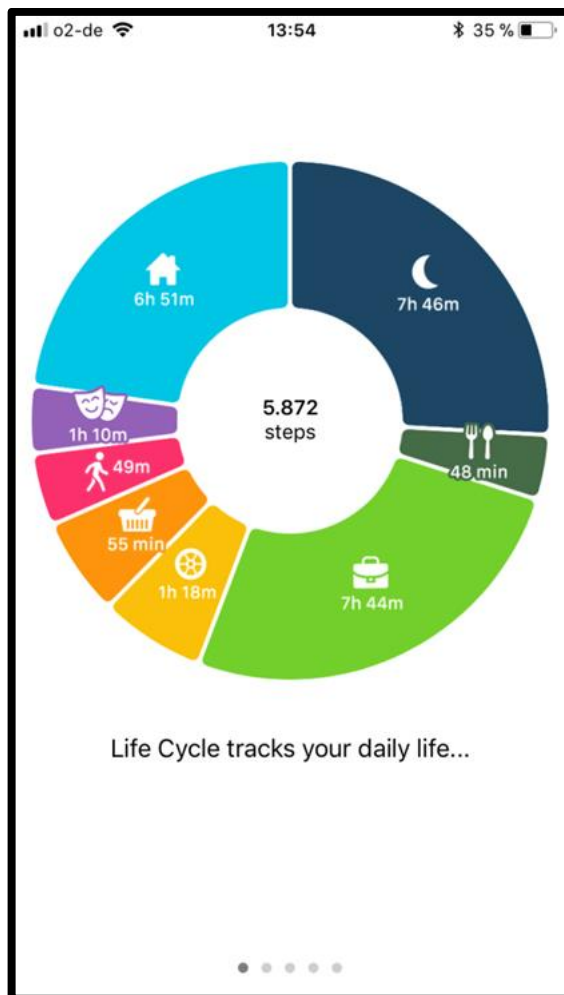
³ Results are dependent upon the synchronisation of entries in individual diaries.

- According to predefined categories (e.g. for HBS: clothing, food, transportation, etc., or for ZVE: work, hobby, care, etc.)
- For the HBS, according to monthly and variable expenditures (e.g. rent, electricity, communication vs. daily expenditures), or for the ZVE, according to workday/weekend activities
- For the HBS: Depending on the recording time for different time periods (weekly, monthly, average over the recording time)
- Possibly according to the household members (after consent has been given for individual diaries)
- Further analysis possibilities are still being examined (e.g. other time use apps)

The evaluations (both graphical as diagrams and as tables) should be exportable (in PDF, .csv and/or Excel format¹), e.g. for further processing after the processing period, and it should be possible to print them as well. Both exporting and printing the evaluations should be possible on the device that is being used (desktop variant and mobile device).

Various examples from currently available time use or household book apps are shown below.

Figure 2: Visualisation of time use in the Toggl app



¹ Respectively in commonly used data formats at this time.

Figure 3: Visualisation of time use in the Motus app

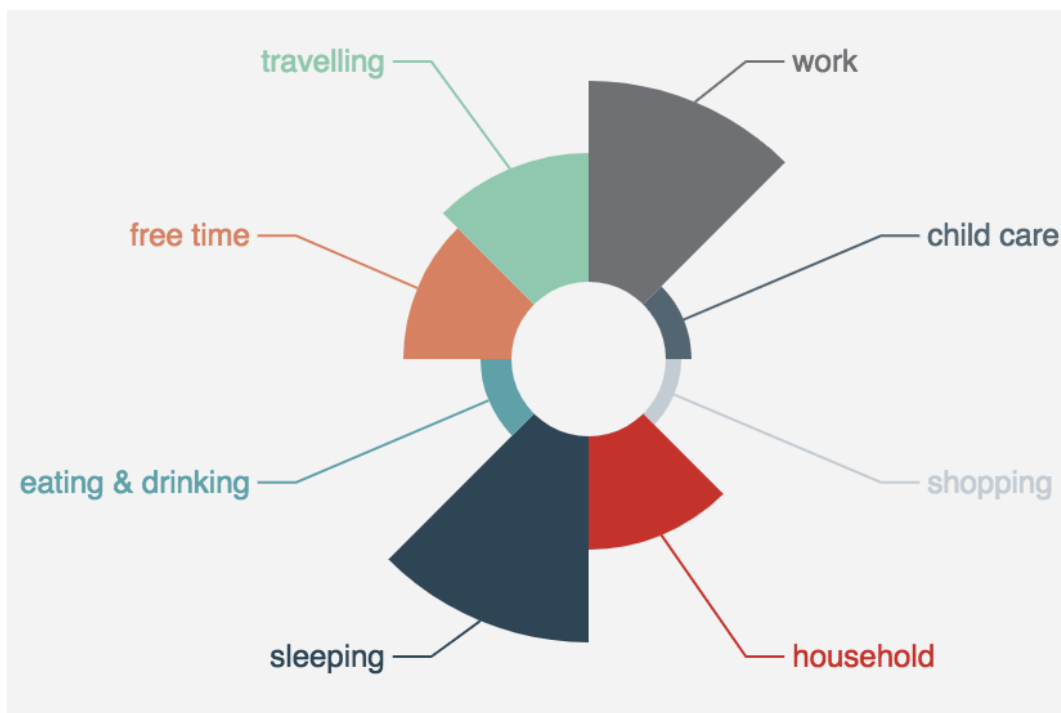


Figure 4: Visualisation of the household book in the MoneyControl app

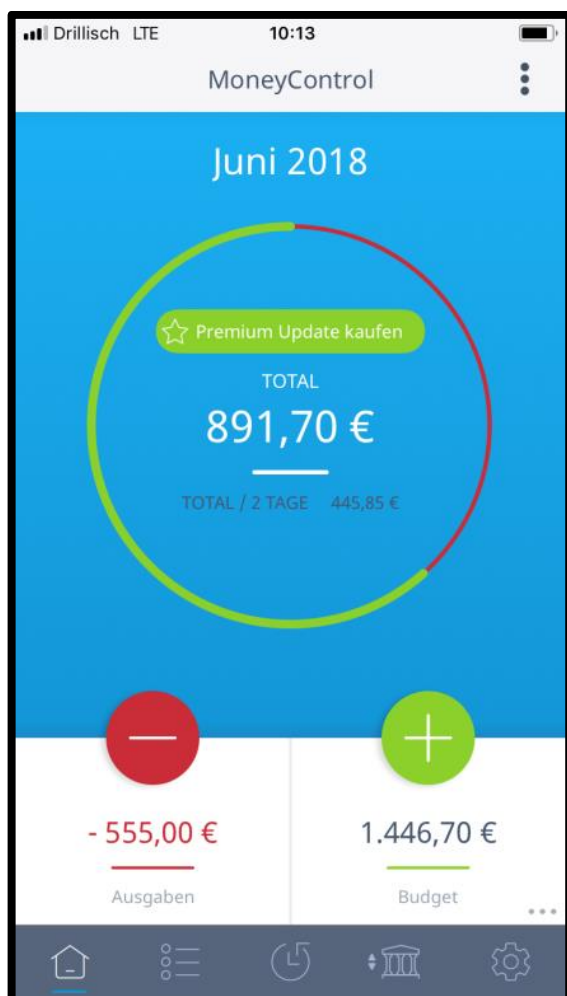


Figure 5: Visualisation of expenditures in the app from provider financier.com



- **Printing:** It should also be possible to print the completed questionnaires (incl. individual diaries) in a clear layout. It must be clarified as to whether these can or should be prepared in such a way that they are suitable for alternatively sending the survey documents to the Statistical Office (e.g. for data privacy sceptics). It must also be clarified whether and how printing from mobile devices is possible.
- **Currency converter:** In the case of the HBS, it must be possible to set the appropriate currency for expenditures in other countries so that respondents do not have to convert the currencies for their entries. The default currency for each new entry is the euro. This can be changed as required from a drop-down list. When entering a foreign currency, the corresponding amount is shown in euros (e.g. in a smaller font below the amount in the foreign currency, converted at a previously defined conversion rate).
- **Direct communication:**
 - Push messages as a reminder function¹, e.g. shortly before the begin of the recording period and/or recurring reminders/motivation messages, e.g. if the respondents have not made any entries over a certain period of time. This requires that the access actions are recorded in the system.
 - Contact options for respondents using the application: In addition to the previously available contact options (email/telephone) that are given in the letters of invitation or on the website, respondents are given the opportunity to address their questions directly from within the application. The following contact options are to be provided in the application menu (e.g. "Service" section - "Your questions to us"):
 - Written contact option for respondents' questions: Either using a standardised contact form in which the respondents formulate their question (possibly stating a category for the question (organisational/general software issue/specific question

¹ A reminder function via email may have to be taken into consideration if push messages are not possible (e.g. web app?).

- about an entry/etc.), as well as desired feedback by telephone¹/email/application²), or with a link to the email program used by the respondent.
- At a later date, these options should be supplemented by integrating a chat function (possibly with a chatbot) in the application.
 - Telephone contact option: Depending on the available resources (e.g. via a central call centre), participants are given the opportunity to make a call from within the application by clicking a button/telephone number³. For decentralised contacts (e.g. in the Länder), an appropriate routing must be stored for each federal state.
 - A callback option could be provided for in the case of a centralised support (via a call centre).
- **Additional information on the study:**
 - Respondents are provided with information on how to use the application in a menu:
 - How to use the application, e.g. with a short explanatory video, FAQs
 - About additional information on the study
 - About data privacy issues/IT security
 - Etc.
 - Where practicable, information must also be provided with the aid of functions analogue to the mouseover functions extensively used in today's desktop applications (e.g. electronic diary).
 - **Bonus system:** In addition to the bonus linked to individual or collective performance, a bonus system could be implemented for entries (e.g. by application). Possibilities in this respect must be examined. Offering a bonus system must under no circumstances result in methodological effects (e.g. a bonus system could disadvantage certain user groups, such as low-income earners, with regard to the frequency of making entries).

2.4.1.12 Usability / user friendliness

Usability is the capability of a technical system (e.g. an app) to adapt to the respective user's needs by means of a simple and intuitive application. A lack of usability usually creates frustration and confusion, meaning that the user could soon quit the application. In the specific case of the ZVE and HBS, this can result in the user discontinuing with the survey.

Usability is consequently a core challenge in the development of the application for the ZVE and HBS, so that the participating households see tangible benefits when using the application (compared to recording information on paper), and they will not get frustrated and stop participating on the study.

Some of the determining factors regarding usability (e.g. offline mode, performance and loading times) have already been discussed in detail above. The following criteria must additionally be taken into account:

- **Intuitive operation:** The application must be extremely simple and intuitive to use, so that the users – especially older respondents who may have less experience in using mobile applications – easily find their way around it. In the programming, the usual functionalities for working with mobile applications must be implemented, if required specific to the end-user device and platform⁴ (e.g. call-up menu/menu display, wipe down).

¹ With a field for the telephone number (fixed-line network/mobile) and an additional field for other information (e.g. availability)

² Insofar as feedback within the app is practicable and possible

³ With reference to availability, e.g. between 8 a.m. and 8 p.m.

⁴ For example, where/how the menu bar and back button appear; what do the buttons look like, etc.; for a small selection of guidelines, see <https://medium.com/@vedantha/interaction-design-patterns-ios-vs-android-111055f8a9b7>.

- **Presentability for different screen sizes:** Attention must be paid to ensure that the application can be used on different screen sizes (from desktops to smartphones).
- **User interface design:** The design of the user interface must be user-friendly. All the available buttons and fields must be arranged so that they are clearly visible and easily clicked (keyword: "touchability"). Households must be able at all times to cancel an operation and return to the main menu or the previous input mask. All information must be displayed in a sufficient size (on all end-user devices). Pop-up windows should be used for error messages and notices. A native look & feel may be of significant interest to the user; the guidelines for the various platforms must therefore also be examined.
- **Automation:** The entries must be automated to as great an extent as possible, so that respondents do not have the feeling of having to enter information that they have already entered (in a similar manner) elsewhere. This includes, among other things, copy functions for recurring entries (activities, expenditures), but also the capability to save their personal settings (e.g. frequently used search words, individual evaluations). In the case of plain text fields and mappings, the system should, where applicable, remember details frequently entered by the user and display them by preference, or "learn" the mapping (keyword: machine learning). Practicable usage possibilities must be examined.
- **Reliability:** Operating errors and incorrect entries must not result in application downtimes.
- **User involvement:** Early involvement of those people who will eventually work with the application is indispensable for the later usability of the product. This is assessed by means of regular pre-tests and feedback loops (e.g. in an IT laboratory).
- **Clear feedback to the respondents:** For example, if the entry was successful, about ongoing loading processes (e.g. a pop-up window with the message "Data is being loaded"); possible success and error messages (e.g. for can/must errors) must be visually displayed in a practicable manner in pop-up windows (green, yellow, red).
- **Response times:** Another aspect of an application's user friendliness are short response times, so that households can use it without getting frustrated.

2.4.1.13 Accessibility / simple language

In order to not exclude certain user groups from using the application, it must be barrier-free in accordance with the stipulations of the Federal Statistical Office. To this end, the requirements laid down in the ordinance on the creation of barrier-free information technology in accordance with the German Disability Equality Act (BITV 2.0) must be taken into consideration. ¹ When developing barrier-free information technology, it is recommended to take the Web Content Accessibility Guidelines (WCAG) into account as well.

Any requirements for facilitating use of the application (e.g. simple language) should likewise be taken into account provided that they are reconcilable with the application's other functionalities.

2.4.1.14 Interfaces

The following programs must be linked to the application via interfaces.

- Special application "Administration and Data Acquisition Program" (import and export), respectively for the ZVE and HBS each: e.g. for importing household numbers into the application, processing the data collected by the application, as well as for communication with households.

¹ <https://www.bmas.de/DE/Service/Gesetze/barrierefreie-informationstechnik-verordnung-2-0.html>

- To be able to identify those households that submit data electronically, the unique household numbers must be imported into the application from the administration and data acquisition program. The same applies to the reporting quarters respectively the diary entry days explicitly mapped to the households. The electronic reports are sent by data transmission to the office responsible for processing them (Statistical Offices in Germany) and read in automatically.
- For the HBS (possibly also for the ZVE): Partial deliveries and (interim) reports during the recording period are also to be provided for to control the support for the households, and for conducting initial checks where necessary.
- Tool for generating passwords: e.g. if the password is forgotten (see 2.4.1.7), if necessary including via the aforementioned interface to the administration and data acquisition program.
 - *It must be possible to map the household number and reporting period to the access identifier. A separate administration application (possibly as part of the application) outside of the administration program may be required for administering (incl. assignment) the identifiers and passwords.*
- Search function for activities and the SEA classification.
 - *For the search function, a search algorithm must be used that is available in both online and offline mode. It should additionally be possible (at least at a later time) to extend the search function to incorporate machine learning tools. If necessary, the classification server could be used for this purpose. For offline use, the offline library for the classification server is to be integrated as a jar file.¹*
- If necessary, a user help desk (with an integrated central call centre) or an administration and data acquisition program for controlling communication with the household: Chat/email support (possibly only in conjunction with the administration and data acquisition program, without a direct link to the application).
 - *Both contact and survey information (paper vs. electronic survey instrument, contact attempts, recording period, number of household members, etc.) must be available from the administration and data acquisition program for support and queries in the help desk program.*
- If necessary, integration of the structure and contents of the reporting data to be delivered (XML-based interface) created in SteP tools² (sdfeditor).
- If necessary, integration of the survey database.
 - This database is used to assign a nationwide unique, standardised survey identifier for marking reporting data and the associated resources for controlling and supporting statistical service processes. In addition to the provision of information for statistics, software manufacturers and the public, another key task of the survey database is to support the electronic workflow as well as the automation of processes using the stored resources provided as a survey identifier. The survey database, with the identifiers and associated resources contained in it, acts as an intermediary between the tools for creating the technical descriptions in the statistics (pleditor, sdfeditor, formulareditor), as well as the online data acquisition processes (IDEV, CORE), and the internal processes for further processing of the data (KonvertCenter, PL runtime environment, PL in-house business applications).
- If necessary, integration of plausibility rules created in SteP tools (PL-Editor) for verifying the entered data (XML-based interface or Java-based interfaces).
- If necessary, integration of layout and control information created in SteP tools (form editor) for entering the data to be collected (XML-based interface).

¹ See 2.5.1 for a description of the classification server as a possible participatory system.

² SteP tools are standard tools used by the Statistical Offices in Germany for different statistical environments and in the various phases of statistical production.

- If necessary, CORE component¹ for transmitting the reporting data to the joint data input (Java-based or https communication interface).
 - Based on the information in the metadata from the sdfeditor, the data relevant for the survey is extracted from the electronic data stock of the software system by integrating a statistics module. The .CORE communication interface is used by software manufacturers to support the realisation of statistical modules for creating and sending data deliveries in a standardised and survey-neutral XML data format (XStatistik = DatML/RAW) to the common data input for eSTATISTIK.core.
- If necessary, integration of the input database.
 - Using the input database, reporting data for any form of statistics can be managed and shared between the Statistical Offices. Each Statistical Office runs an input database for this purpose. They receive reports in the XML format XStatistics, the standard delivery data format used for official statistics, and forward them (depending on the configuration) to the report recipient and the office responsible for the production. Interfaces to hardware components and metadata/paradata (see 2.4.1.10), and to other apps where applicable, taking into consideration IT security issues and GDPR requirements.

2.4.1.15 Loading times and performance

An extremely important aspect of an application is its performance. The provision of digital technology makes it easier for respondents to enter the required data in many respects (e.g. automatic totalling, user-formulated entries with search function). Nevertheless, entering the data – in particular the many daily (small) expenditures or the activities in 10-minute intervals – is extremely time-consuming for the surveyed households.

Consequently, respondents must be given the easiest possible means of entering data (see also 2.4.1.12). This means that the application must run without significantly perceptible loading times during all phases of the survey (from downloading and logging in through to entering incomes/expenditures respectively activities including coding, the search function, saving and transmitting the data). This applies to both online and offline usage.

The prevailing rapid technical advances mean that it can be assumed that both mobile devices and desktops, as well as internet transfer rates, will have developed to such an extent by the time the application is launched for the first time in 2022, that there will be no issues regarding loading times and performance for storing, transmitting and editing data on the vast majority of the devices in use (both desktops and mobile devices). Nevertheless, it is necessary to test and evaluate whether performance problems could occur with regard to storage, data transfer, processing and synchronisation (also where integration of the classification server is concerned). Restrictions may arise from parallel running functions (or parallel running apps/applications). In this case, priorities may have to be determined for the single functions.

2.4.1.16 Plausibility checks (during the entering of data by the household)

While entering data, the user is notified if any entries may be implausible (e.g. high expenditure amount/HBS, same main and secondary activity entered for the same time/ZVE), or if they are incomplete (e.g. expenditure category has been entered, but no amount/HBS). A distinction is made between different types of error (field assignments, combination checks, "can" and "must" errors). Most errors will be "can" errors, of which a relatively small number will be implemented. A corresponding specification of the plausibility checks for each study is prepared on the specialised unit,

¹ <https://erhebungsportal.estatistik.de/Erhebungsportal/#FSzxi1rjujbpysv2/unterstuetzung-fuer-entwickler/spezifikation-zu-core>

and if it can be used for programming the application, it is maintained in the PL-Editor (see also Section 2.4.1.14). It should be possible to install or implement the generated verification code in the application from the specialised unit. Otherwise, alternative solutions are to be provided for which allow plausibility checks to be updated quickly and easily, particularly based on the assumption that the application will be distributed through the app stores.

2.4.1.17 Data transmission / release of the data by the household

At the end of the reporting period, and if the questionnaire has been completed in full, each household member receives a message stating that all the necessary data has been entered, and that a final validation of the data will now take place. Once the data validation has been successfully completed, the information is released by the respondent (using the appropriate button), which completes the survey. Partial deliveries (e.g. on a monthly basis) are generally also possible in order, for example, to obtain data for analysis and evaluation purposes from households that have prematurely discontinued the survey, or for enabling preliminary reviews.

An overview of the executed release of the individual household members is shown in the household profile (personal profiles, see 2.4.2.3). Provided that all the persons have successfully completed their entries (including the household questionnaire), the household then releases all the data for transmission to the Statistical Office. If any individual persons have opted for paper-based records, this is indicated in the user profile.

The household receives a confirmation (which is displayed directly in the application and also sent by email) after the data has been successfully transmitted (possibly for successful partial deliveries as well).

2.4.2 Detailed survey-specific requirements for the ZVE and HBS

As already described above, the studies vary in particular where the content and organisational aspects are concerned. Due to the different subject matter of the surveys, the HBS, for example, requires that the collected data is summarised at household level, while the survey units for the ZVE (in particular the diaries) are the persons living in the households. This results in different requirements for the application, which are explained below and must be fulfilled supplementary to the requirements listed in Section 2.4.1.

2.4.2.1 Structure of the application / user management

For both the ZVE and HBS, it must be possible to enter data at two levels in the application:

- Household level with details about the household (household questionnaire)
- Personal level including individual diary

This means that a hierarchical group of respondents has to be administered.

After registering for the first time, a member of the household states how many people live in the household and enters their first names and ages.¹ One of the household members is also nominated as the so-called household administrator².

Mixed records (electronic survey instrument and paper-based) are generally possible, but should only be permitted if the household administrator has chosen the electronic method for collecting data. In

¹ The ages have to be entered because with the ZVE, for example, diaries are only intended to be kept by persons from 10 years of age. For the HBS, it is necessary to define from which age entries are expected in the individual diary.

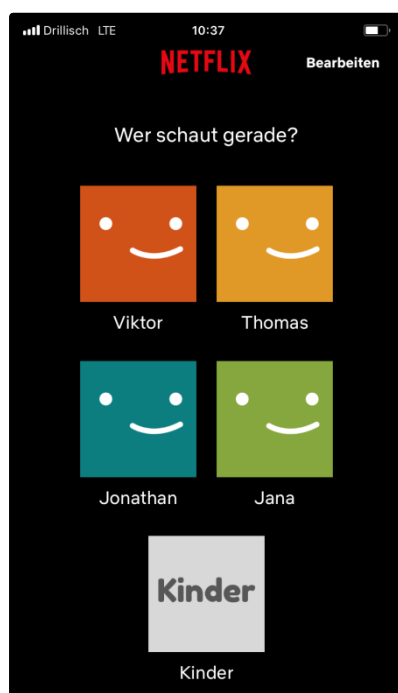
² A household administrator has to be stipulated for the final data transfer.

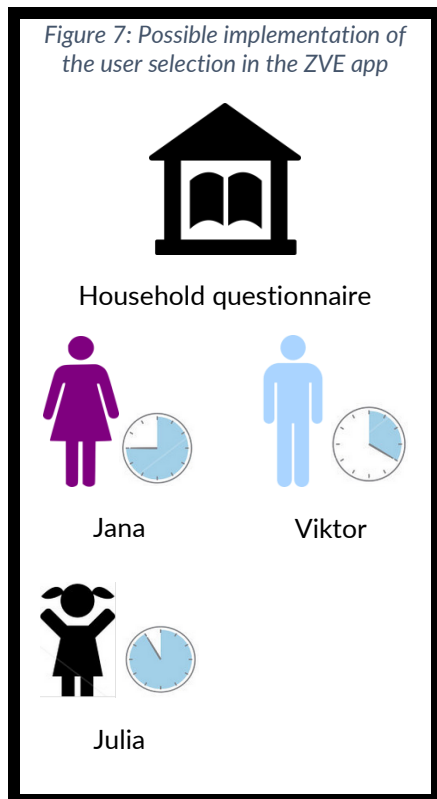
households where the household administrator opts for paper documents, this collection method must also be used by all other members of the household. The decision to keep a paper-based diary triggers an automated request in the administration and data acquisition program to have the paper diary sent to the household for the named members.

Based on the general entries (first names, ages) that have been made (which are entered by the household administrator and can later only be changed in exceptional cases), the application automatically creates the higher-level household profile for the household – split up into "Basic Data" and "Household Questionnaire" as required – together with so-called personal profiles (incl. individual diary) for each household member. After the basic data has been entered by a member of the household (administrator), each person sees the point of access to the individual personal profiles on the start screen (from the first names), and can make entries in his/her personal profile. A profile system similar to the Netflix streaming service is conceivable (see Figure 6). For more information, see Section 2.4.2.3.

The electronic diaries can be opened on various end-user devices. It must be possible to assign personal identifiers and passwords for opening the individual diaries. Proxy situations that may arise are acceptable, i.e. it must also be possible to open multiple individual diaries on one end-user device, but not simultaneously.

Figure 6: User selection for the Netflix streaming service provider





The household profile contains a questionnaire for collecting general details about the household. In the individual personal profiles, there is an area for entering personal details (questionnaire structure), and the individual diary for daily expenditures and activities (see Section 2.4.2.3).

If required, it must be possible to protect each individual profile with a password to prevent them from being accessed by other members of the household. It must be possible to reset the password (whereby only the household member concerned may be allowed to do so), e.g. using an email address entered and confirmed when setting the password. This profile password, which could be used in addition to the parent password, helps to ensure that individual household members have no reservations about entering their (sensitive) expenditures or activities, so that a positive contribution to data quality can be expected. If the user does not wish to assign a separate profile password, the individual diaries can also be viewed and modified by other members of the household. This is necessary because, within a household, sometimes entries for individual household members cannot be made personally, but have to be made by another member of the household (a so-called proxy interview, e.g. because a suitable end-user device is not available, entries are not possible for health/age reasons).

Whether and how the envisaged profile passwords can be implemented, in particular where compliance with data protection legislation is concerned, remains to be clarified. It is also necessary to establish how to avoid having to enter two passwords (household, individual) every time a person opens his/her personal profile to enter data in it.

Appropriate icons are displayed for each profile to indicate the data input progress (e.g. for the ZVE, a clock with correspondingly filled segments). This can be easily implemented with a simple questionnaire structure (e.g. from the number of questions in the household questionnaire); this is also viable for the ZVE activities (fixed number of activities: three days over 24 hours). Which specific solution is practicable within the framework of the HBS still has to be clarified from the specialised unit.

2.4.2.2 Household level (household questionnaire)

At the household level, information is recorded which concerns the household as a whole. This is information that can usually be entered by one person since it involves characteristics that can be assumed to be known to all members of the household (e.g. highest school leaving certificate, social status, current school attendance, net household income). This survey component is to be structured analogue to the current "Allgemeine Angaben" (possibly supplemented by "Monetary and Tangible Assets") for the EVS or to the "Household Questionnaire" for the ZVE. The personal information entered in this section is transferred, at least in part, to the personal level after it has been entered, and can be modified there as required.

2.4.2.3 Person level incl. individual diaries

The personal profiles, and in particular the individual diaries integrated in them, are respectively the centrepiece of the application, but differ between the ZVE and HBS in the following points:

- Duration of use: three days (ZVE) vs. up to three months (HBS)
- Envisaged frequency of use: several times a day (ZVE) vs. at least once a day (HBS)
- Contents: Activities during the day (ZVE) vs. daily expenditures (HBS)
- Synchronisation within the household: Activities remain at personal level (ZVE) vs. expenditures of the individual household members must be totalled up at household level (HBS)

The personal profiles, including the individual diaries for each survey, are therefore shown below.

ZVE¹

Within the framework of the ZVE, all household members (aged 10 years and over) keep records over a stipulated period of three days, namely on two workdays and one weekend day within a given week. On these three days, their main activities and any secondary activities have to be recorded in increments of ten minutes. The close time intervals of ten minutes mean that respondents are required to make entries many times a day.² This requirement is supported by offering a mobile application.

Once the respective user profiles have been created as described above, each member of the household begins editing their own profile. When the user profile in question is opened, a new window appears with a navigation tree (similar to the electronic diary). The individual questionnaire (with the respective sections A to X) is stored at the top, and can be pre-filled with the personal information already entered in the household questionnaire. Embedded further down are the activities (diary), presumably with three sections for each of the given days, which are taken over from the administration and data acquisition program.

This navigation tree must enable the respondents to find their way in each section, whereby each section can be edited separately. The individual questionnaire predominantly contains structured questions, but there are also details that are recorded as plain text by the user (2012/2013: 25 questions, similar scope in 2022).

The diary entries will probably not be entered down to the minute (e.g. 10:24 to 11:38 a.m.), but only in rounded 10-minute increments (from ... to ...) analogue to the paper version. Respondents must be able to collate several time periods (e.g. 11:30 p.m. to 6:10 a.m.) so that the entry does not have to be

¹ The questionnaires for ZVE 2012/2013 can be downloaded at https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Einkommen-Konsum-Lebensbedingungen/zeitverwendungserhebung-2012-2013.pdf?__blob=publicationFile&v=3

² It is also possible to record the times of the activities even more distinctly or, for example, as a "from-to time". What is important is that the evaluation is possible later for the ten-minute cycle.

repeated for each individual time period. If possible, the information should be coded in accordance with the ZVE list of activities with the aid of a search function. For this purpose, the user records the activity in plain text and then, if possible, codes it using the suggestions selected by the search algorithm. This function must also be available in offline mode (see also Section 2.4.1.14). For the actual implementation in the application, a user-friendly as possible solution is to be found which is still to be exactly specified.

For frequently recurring activities, the respondent is offered a quick method for entering the data, such as a function for copying previous entries, (self-created) icons, or a preview of frequent entries for selection/completion. Due to the fact that the main activity may have overlapping time windows, it must be as simple as possible to enter any secondary activities. The specialised unit is still gathering empirical knowledge in this regard from other Member States. In addition, further information is requested for each activity (incl. "Who took part?", "Used means of transport", other information may be included based on national or HETUS requirements for 2022). The precise formulation of the query is explained in the technical concept.

HBS¹

Within the framework of the HBS, households record entries over a period of (up to) three months.² To improve the quality of the data, individual household members are encouraged to use the application at least once a day (ideally several times a day if they have more frequent expenditures) for either entering their daily expenditures in the appropriate fields for each day, or for making a note that they did not have any expenditures on a given day (e.g. in the event of illness).³ A balance between the data quality and the effort required by the respondent must be found for the implementation.

Here, too, the centrepiece of the diary is a search function with which users can easily code their expenditures in accordance with the SEA classification. This function must likewise be usable in offline mode.

In contrast to the ZVE, a personal evaluation is not necessary, which means that all the details for the different household members are collated at household level for processing the results. In order to obtain as realistic a picture as possible of all the expenditures, however, it is still possible to enter the daily expenditures for each household member⁴, although this is optional for each person. For instance, a parent can take over making the entries for a child, either in his/her own profile or in a separate profile. Another child in the household and the spouse or partner, on the other hand, choose the individual diary so that the household members can gain an overview of their own expenditures, or the household can conduct personal evaluations. Before the data is transmitted, the details entered by various household members must be merged into one household data set.

For the actual implementation, for example, it still needs to be clarified whether and how the household members will be notified that they can make entries immediately (e.g. only by word of mouth or by means of a separate invitation link), as well as when and how the various individual diaries are to be linked to a household diary.

The final release / transmission of the data is only permitted from the last day of the reporting period so that all the entries are taken into account. However, monthly deliveries (e.g. within one week after

¹ The questionnaires for EVS 2013 can be downloaded at https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Einkommen-Konsum-Lebensbedingungen/einkommens-verbrauchsstichprobe-2013.pdf?__blob=publicationFile&v=3

² The recording period up until the EVS 2023 is three months; it is being considered whether the recording period in the new concept for the household budget surveys should be reduced (e.g. a minimum of 2 months, plus a third month in return for a generous extra bonus).

³ However, it must still be possible to make entries at a later date. If respondents do not make any entries on a particular day, they should be reminded about this, for instance by means of a push notification from a device app or with an email from a web app (possibly with the feedback that entries will be made at a later time).

⁴ From an age still to be defined (e.g. at least 10 years).

the end of the first quarter) are also planned. Until then, the Release button in the program is hidden/deactivated. It is also possible for the responsible Statistical Office to reset the release (on the final delivery) so that the household can make any necessary corrections.

2.5 [Appendix](#)

2.5.1 [Classification server – brief description](#)

2.5.1.1 [Technical interfaces](#)

[Internet user interface¹](#)

The primary point of access for external users of the classification server is the classification server system² on the internet. In this user interface, the user can find information about the respective structures and contents of the contained classifications, or they can search for specific items and their codes. The content links between different versions can also be tracked by means of so-called comparisons.

[Web service interface](#)

In addition to the user interface, the classification server also offers a web service interface that enables third-party applications to call up its many functions. The interface is documented in the WSDL.

[Classification Server Offline](#)

With the ongoing project "Classification Server Offline" (KlassService-Offline or KSO), in future offline use of the classification server functions will also be possible. The KSO library can be used in the form of a jar file. Since KSO requires external libraries (Spring, Hibernate, etc.) which must be available in a certain version, a variant of the jar file is offered which uses the correct library versions via a separate Java ClassLoader.

Data storage for KSO requires the availability of a MySQL database. If a MySQL database server is not to be set up, as an alternative KSO offers the use of an embedded H2 database. However, the performance of this database in KOS is slower than with MySQL, and is considered to be experimental. The database user being used must have the necessary permissions (for creating tables, etc.). It is used by directly calling the web service methods for the classification service project, e.g. `instance.searchItem (...)`. Javadoc is offered for the individual methods.

2.5.1.2 [Further documentation](#)

Documentation on the application can be downloaded at any time as PDF files from the classification server system by clicking the "Documentation" menu item in the main menu bar. This opens a list of the available documents. This list also contains further documents on using the classification server via its web service interface.

¹ It should be noted at this point that this is a general functional description of the classification server. In the case described here, the online user interface is of no significance because the classification is directly integrated into the application for mobile devices and used in the application (see "Web service interface").

² <https://www.klassifikationsserver.de/>

2.5.2 Overview of requirements and classification of Must/Can-criteria

Table 4: overview of the mandatory requirements towards e-HBS & e-TUS for Germany

| Consec. no. (sorted) | Subject | Requirement – brief description | ZVE 2022 | EVS 2023 | ZVE 2027/ 2032 | LWR 2024/EVS 2028 et seq. |
|----------------------|--|--|----------|----------|----------------|---------------------------|
| 1 | 1. User group, marketing / provision | The application must be available to at least those households and individuals willing to participate in the survey, and at minimum it must be possible to make it available for downloading from the leading official app stores (Apple App Store and Google Play Store). | Must | Must | Must | Must |
| 2 | 2. IT security | The stipulations regarding IT security (in particular those of the BSI ¹) are taken into account in the planning, procurement, development, installation, regular usage and deinstallation of the application. | Must | Must | Must | Must |
| 3 | 3. Data protection | Data protection regulations for personal and household data are implemented (according to an assessment of the protection requirement as being high) and are guaranteed in operation. | Must | Must | Must | Must |
| 4 | 4. End-user device / cross-platform compatibility | The application can be run (with a few exceptions, e.g. because the functions are not supported by the end-user device) with all its functions on the most commonly used mobile devices and with their operating systems. | Must | Must | Must | Must |
| 5 | | The application can be run (with a few exceptions, e.g. because the functions are not supported by the end-user device) with all its functions in the most commonly used desktop environments (usually Windows). | Can | Can | Can | Can |
| 6 | 5. Provision of the application | At minimum, the application must be available to the participating households. | Must | Must | Must | Must |
| 7 | | A dummy version for previously unregistered users is available for advertising purposes (see 2.4.1.7). | Can | Can | Can | Can |
| 8 | | The application can be distributed through the usual app stores. | Must | Must | Must | Must |
| 9 | | The application can also be distributed without using the app stores (e.g. via an URL). | Can | Can | Can | Can |

¹ Federal Office for Security and Information Technology

| Consec. no. (sorted) | Subject | Requirement - brief description | ZVE 2022 | EVS 2023 | ZVE 2027/2032 | LWR 2024/EVS 2028 et seq. |
|----------------------|---|---|----------|----------|---------------|---------------------------|
| 10 | | BSI requirements must also be taken into consideration; these must be guaranteed if more stringent protection requirements apply. | Must | Must | Must | Must |
| 11 | 6. Maintenance / serviceability | It must be possible to promptly provide all users with updates/patches (i.e. for all platforms and end-user devices). | Must | Must | Must | Must |
| 12 | | The changes and deliveries must be logged so that the progress of the updates can be tracked. | Must | Must | Must | Must |
| 13 | 7. Access / login | The application provided on the end-user devices can only be used with valid login credentials (presumably a user ID and password). | Must | Must | Must | Must |
| 14 | | Without logging in, the user can only access a test/dummy version with limited functions (see also 2.4.1.5). | Can | Can | Can | Can |
| 15 | | When the application is used for the first time, previously assigned login credentials can be read out by scanning a QR code using the cameras installed in the end-user devices. | Can | Can | Can | Can |
| 16 | | It must be possible to reset the password as quickly as possible (preferably by email) with the aid of a practicable procedure (which also complies with data protection and IT security requirements). | Must | Must | Must | Must |
| 17 | | The login credentials (at minimum the password) can be changed by the user. | Must | Must | Must | Must |
| 18 | | After a specified time without user activity, the user is logged out automatically. | Must | Must | Must | Must |
| 19 | | The automated logout can be deactivated by the user. | Must | Must | Must | Must |
| 20 | | The application can be started by clicking an icon on the home screen of the mobile device. | Must | Must | Must | Must |
| 21 | | The desktop version of the application can also be started by clicking an icon on the desktop of the terminal device. | Can | Can | Can | Can |
| 22 | | Access can also be secured using modern encryption methods (e.g. touch ID or face ID). | Must | Must | Must | Must |
| 23 | After logging in again, the previously displayed screen should always appear, ideally on every end-user device. | Must | Must | Must | Must | |

| Consec. no. (sorted) | Subject | Requirement - brief description | ZVE 2022 | EVS 2023 | ZVE 2027/2032 | LWR 2024/EVS 2028 et seq. |
|----------------------|--|---|------------------|----------|------------------|---------------------------|
| 24 | 8. Online/offline usage | <p>Core functions of the application must also be offered without an established data or online connection (at least for mobile devices):</p> <ul style="list-style-type: none"> - Entries incl. scanning of sales receipts - Corrections of previous entries - Saving of entries - Support for entering data using stored search functions (classifications) - Creation of individual evaluations/balances <p>Exceptions to this are:</p> <ul style="list-style-type: none"> - Delivery and servicing/update of the application - Chat support - Changing or resetting passwords - Synchronising entries between devices - Importing/exporting interfaces - Printing individual evaluations | Must | Must | Must | Must |
| 25 | 9. Synchronisation of the entries | It is possible, repeatedly and at any time, to switch between the devices being used to enter the data and on which the application can be started. | Must | Must | Must | Must |
| 26 | | Entered data can be called up and/or modified in equal measure on any end-user device as soon as it has been transmitted over an established online connection. | Must | Must | Must | Must |
| 27 | 10. Access to hardware components and metadata/paradata | See "Access / login": When the application is used for the first time, previously assigned login credentials can be read out by scanning a QR code using the cameras installed in the end-user devices. | Can | Can | Can | Can |
| 28 | | See "Access / login": Access can also be secured using modern encryption methods (e.g. touch ID or face ID). | Must | Must | Must | Must |
| 29 | | Bar codes and QR codes can be read out with the aid of the camera integrated in the end-user device. The resultant data can be utilised by the application. - Mobile device - | Not provided for | Can | Not provided for | Can |
| 30 | | Sales receipts can be photographed with the aid of the camera integrated in the end-user device. The resultant file can be saved in the data record. - Mobile device - | Not provided for | Must | Not provided for | Must |

| Consec. no. (sorted) | Subject | Requirement – brief description | ZVE 2022 | EVS 2023 | ZVE 2027/ 2032 | LWR 2024/EVS 2028 et seq. |
|----------------------|---|--|------------------|----------|------------------|---------------------------|
| 31 | | The information on the sales receipts can be converted into strings by the application by means of text recognition, and then used for other purposes. - Mobile device - | Not provided for | Can | Not provided for | Can |
| 32 | | The time, date, battery status, user usage logs, as well as the established online/WiFi connection, can be called up. - Mobile device and to some extent desktop - | Must | Must | Must | Must |
| 33 | | Data from external wearables (e.g. smart watches, activity trackers) can be accessed and used further. | Can | Can | Must | Must |
| 34 | | Other metadata and sensors, such as GPS data for location/geographic coordinates, can be called up. - Mobile device - | Must | Must | Must | Must |
| 35 | | A link to other apps and their data is possible, e.g. rail tickets, calendar entries. | Can | Can | Must | Must |
| 36 | | Direct usage of external data, such as from cash register scanners, is possible. | Can | Can | Must | Must |
| 37 | 11. Further basic functions of the application | The user can choose between different languages (e.g. German and English). | Can | Can | Can | Can |
| 38 | | Entries in user-defined text fields should also be possible using speech input/recognition functions (possibly depending on the end-user device). | Must | Must | Must | Must |
| 39 | | Users should be offered various graphically appealing evaluations of their time use and expenditure. | Must | Must | Must | Must |
| 40 | | In the evaluations, users are offered reference values for making comparisons with other households/persons. | Must | Must | Must | Must |
| 41 | | It should be possible for users to export and print the evaluations in standard formats (Excel, PDF, etc.). | Can | Can | Must | Must |
| 42 | | It should be possible to print the completed questionnaires in a clear layout. | Can | Can | Can | Can |
| 43 | | As an alternative to sending data electronically, it is possible to print out all the questionnaires and send them by post to the responsible authority. | Can | Can | Can | Can |
| 44 | | A currency converter is offered to the user for converting expenditure incurred in other countries. | Not provided for | Can | Not provided for | Must |
| 45 | | It must be possible to automatically display or (where necessary) send push messages to users. | Must | Must | Must | Must |

| Consec. no. (sorted) | Subject | Requirement – brief description | ZVE 2022 | EVS 2023 | ZVE 2027/2032 | LWR 2024/EVS 2028 et seq. |
|----------------------|--|---|----------|----------|---------------|---------------------------|
| 46 | | It is possible to contact the responsible authority by telephone and email or using a standardised contact form from within the application. | Must | Must | Must | Must |
| 47 | | A chat function (where appropriate with a chatbot) for communication between the user and the responsible authority is implemented in the application. | Can | Can | Must | Must |
| 48 | | A telephone contact option is also to be offered, which will enable participants to make a telephone call or initiate a request for a return call via a button/click from within the application. | Can | Can | Can | Can |
| 49 | | The provision of information by means of a mouseover effect or equivalent functions for mobile devices is possible. | Must | Must | Must | Must |
| 50 | | The realisation of a bonus system or gamification elements for entered details is supported. | Can | Can | Must | Must |
| 51 | 12. Usability / user friendliness | Usage of the application must be as simple and intuitive as possible. Among others, the following aspects must be taken into account: <ul style="list-style-type: none"> - Intuitive operation - Presentability for different screen sizes - User interface design (taking into account guidelines for the various operating systems) - Automation of data input wherever possible - Reliability - User involvement for improvements - Clear feedback to respondents by means of pop-up windows - Short response times | Must | Must | Must | Must |
| 52 | 13. Accessibility / simple language | The stipulations of the Federal Statistical Office regarding accessibility are taken into account. BITV 2.0 and the WCAG are to be taken into account. | Must | Must | Must | Must |
| 53 | | Guidelines for easier access to the application (e.g. simple language) should also be taken into account. | Can | Can | Can | Can |
| 54 | 14. Interfaces | Data can be imported into the application, for example from an administration and data acquisition program that is to be developed separately. It is also possible to perform this procedure repeatedly as required. | Must | Must | Must | Must |

| Consec. no. (sorted) | Subject | Requirement – brief description | ZVE 2022 | EVS 2023 | ZVE 2027/2032 | LWR 2024/EVS 2028 et seq. |
|----------------------|--|---|----------|----------|---------------|---------------------------|
| 55 | | It must be possible to send the collected data as electronic messages via data transmission to the authority responsible for processing the data. | Must | Must | Must | Must |
| 56 | | The electronic messages via data transmission are also possible for partial deliveries / (interim status) messages. | Must | Must | Must | Must |
| 57 | | A tool for creating passwords must be integrated in the administration and data acquisition program (export) via an interface (import). | Must | Must | Must | Must |
| 58 | | The application can also access a search function that allows the correct codings to be mapped to the entries. This search function can also be accessed offline. | Must | Must | Must | Must |
| 59 | | If necessary, the classification server could be used for the search function. For using the function offline, the offline library is to be integrated as a jar file. | Can | Can | Can | Can |
| 60 | | It should be possible to extend the search function with machine learning tools. | Can | Can | Must | Must |
| 61 | | The application allows the integration of plausibility rules created in SteP tools ¹ (PL-Editor) for verifying the entered data (XML-based interface or Java-based interfaces). | Can | Can | Can | Can |
| 62 | | The application allows the integration of layout and control information created in SteP tools (form editor) for entering the data to be collected (XML-based interface). | Can | Can | Can | Can |
| 63 | | The application allows the integration of a CORE component for transmitting the reporting data to the joint data input (Java-based or https communication interface). | Can | Can | Can | Can |
| 64 | 15. Loading times and performance | All phases of the survey (from downloading and logging in through to entering income/expenditure respectively activities including coding, the search function, saving and transmitting the data) run without significantly perceptible loading times. This applies to both online and offline usage. | Must | Must | Must | Must |

¹ SteP tools are standard tools used by the Statistical Offices in Germany for different statistical environments and in the various phases of producing statistics.

| Consec. no. (sorted) | Subject | Requirement – brief description | ZVE 2022 | EVS 2023 | ZVE 2027/2032 | LWR 2024/EVS 2028 et seq. |
|----------------------|--|--|----------|----------|---------------|---------------------------|
| 65 | 16. Plausibility checks | During the entering of data by the user, field and combination checks can be conducted as "can" and "must" errors. | Must | Must | Must | Must |
| 66 | 17. Data transmission / release of the data by the household | Before the household transmits the data, it can initiate a final validation of the data. | Must | Must | Must | Must |
| 67 | | The data can be transmitted after the validation has been carried out. Household members who do not report electronically, but by means of a paper-based diary, are labelled in the application. | Must | Must | Must | Must |
| 68 | 18. Structure of the application / user management, collection of data at household level, collection of data at personal level (incl. individual diaries) (see requirements, Section 2.4.2) | Data can be recorded both at household level and at the level of the surveyed household members. | Must | Must | Must | Must |
| 69 | | The various levels can be called up as profiles in a graphical user interface. | Must | Must | Must | Must |
| 70 | | A household administrator can be defined in the system who is then identifiable for the system. | Must | Must | Must | Must |
| 71 | | The callable profiles are automatically created by the application according to a defined trigger. | Must | Must | Must | Must |
| 72 | | Different masks containing questions, answer categories, value cells, user-defined text fields and classifications / search functions can be created in the profiles and filled by the user. | Must | Must | Must | Must |
| 73 | | The questions can be structured according to topic fields and called up from a user-friendly menu structure. | Must | Must | Must | Must |
| 74 | | Horizontal or vertical scrolling is possible. | Must | Must | Must | Must |
| 75 | | Data from other profiles within a household can be accessed, for example recourse to data from the personal profiles for an overview in the household profile. | Must | Must | Must | Must |
| 76 | Routing is possible. This means that questions/fields can be hidden or displayed. The variables/characteristics that can be triggered by the routing can be repeatedly changed (or undone) within the application. | Must | Must | Must | Must | |

