



# Evaluation of e-Cohesion 2014-2020

## In-depth case study – SL2014 Polish e-Cohesion system

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March 2022

**PPMi**





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## Glossary of terms

**Centralised ITC Eco system** The combined e-Cohesion and monitoring system will replace SL2014 in the 2021-2027 programming period. It implements large parts of SL2014's conceptual basis and functionalities using new technologies. Next to a modernised user interface ECO also provides a module that supports the application phase.

**Teryt statistical data** National Official Register of the Territorial Division of the Country.

**BGK Zlencenia Payment** IT system of Poland's central bank

**eiDAS standard** EU regulation on electronic identification and trust services for electronic transactions in the European Single Market

## List of abbreviations

<b>AA</b>	Audit Authority
<b>CA</b>	Certifying Authority
<b>CF</b>	Cohesion Fund
<b>CPR</b>	Common Provisions Regulation
<b>CSV</b>	Comma Separated Values
<b>DMS</b>	Document Management System
<b>EC</b>	European Commission
<b>ERDF</b>	European Regional Development Fund
<b>ESF</b>	European Social Fund
<b>FAQ</b>	Frequently asked questions
<b>FLC</b>	First level control
<b>GDPR</b>	General Data Protection Regulations
<b>HTTPS</b>	Hypertext Transfer Protocol Secure
<b>IB</b>	Intermediate Body
<b>ICT</b>	Information communication technology
<b>JS</b>	Joint Secretary
<b>LSI</b>	Local information system
<b>MA</b>	Managing Authority
<b>MB</b>	Megabyte
<b>OP</b>	Operational programme
<b>SFC</b>	Structural Funds Management System
<b>SCO</b>	Simplified cost options

# 1. Introduction

SL2014 is a centralised monitoring system covering almost all programmes financed by ERDF, CF and ESF funds in Poland, including two Interreg programmes. Only one regional OP uses a different system, the [LSI2014+](#), that covers the Regional Operational Programme for Śląskie Voivodeship. SL2014 has significantly larger coverage, with 25 OPs and over 100.000 registered users.

**Table 1. Introduction to SL2014**

e-Cohesion system title	SL2014
<b>Years of operation</b>	7 years (2015-2022)
<b>ESI funds</b>	ERDF, CF, ESF
<b>Operational Programmes</b>	
2014PL16CFTA001 - OP Technical Assistance	2014PL16M1OP001 - OP Infrastructure and Environment
2014PL16M2OP001 - ROP 1 Regional Operational Programme for Dolnośląskie Voivodeship 2014-2020	2014PL16M2OP002 - ROP 2 Regional Operational Programme for Kujawsko-Pomorskie Voivodeship 2014-2020
2014PL16M2OP003 - ROP 3 Regional Operational Programme for Lubelskie Voivodeship 2014-2020	2014PL16M2OP004 - ROP 4 Regional Operational Programme for Lubuskie Voivodeship 2014-2020
2014PL16M2OP005 - ROP 5 Regional Operational Programme for Łódzkie Voivodeship 2014-2020	2014PL16M2OP006 - ROP 6 Regional Operational Programme for Małopolskie Voivodeship 2014-2020
2014PL16M2OP007 - ROP 7 Regional Operational Programme for Mazowieckie Voivodeship 2014-2020	2014PL16M2OP008 - ROP 8 Regional Operational Programme for Opolskie Voivodeship
2014PL16M2OP009 - ROP 9 Regional Operational Programme for Podkarpackie Voivodeship	2014PL16M2OP010 - ROP 10 Regional Operational Programme for Podlaskie Voivodeship
2014PL16M2OP011 - ROP 11 Regional Operational Programme for Pomorskie Voivodeship	2014PL16M2OP013 - ROP 13 Regional Operational Programme for Świętokrzyskie Voivodeship
2014PL16M2OP014 - ROP 14 Regional Operational Programme for Warmińsko-Mazurskie Voivodeship	2014PL16M2OP015 - ROP 15 Regional Operational Programme for Wielkopolskie Voivodeship
2014PL16M2OP016 - ROP 16 Regional Operational Programme for Zachodniopomorskie Voivodeship	2014PL16RFOP001 - OP Smart growth
2014PL16RFOP002 - OP Digital Poland	2014PL16RFOP003 - OP Development of Eastern Poland
2014TC16RFCB013 - Interreg V-A - Poland-Denmark-Germany-Lithuania-Sweden (South Baltic)	2014TC16RFCB018 - Interreg V-A - Poland-Germany/Saxony
2014TC16M5CB007 - Poland – Russia CBC	2014TC16M5CB009 - Poland – Belarus – Ukraine ENI CBC
2014TC16RFCB012 - Interreg V-A – Poland-Slovakia	

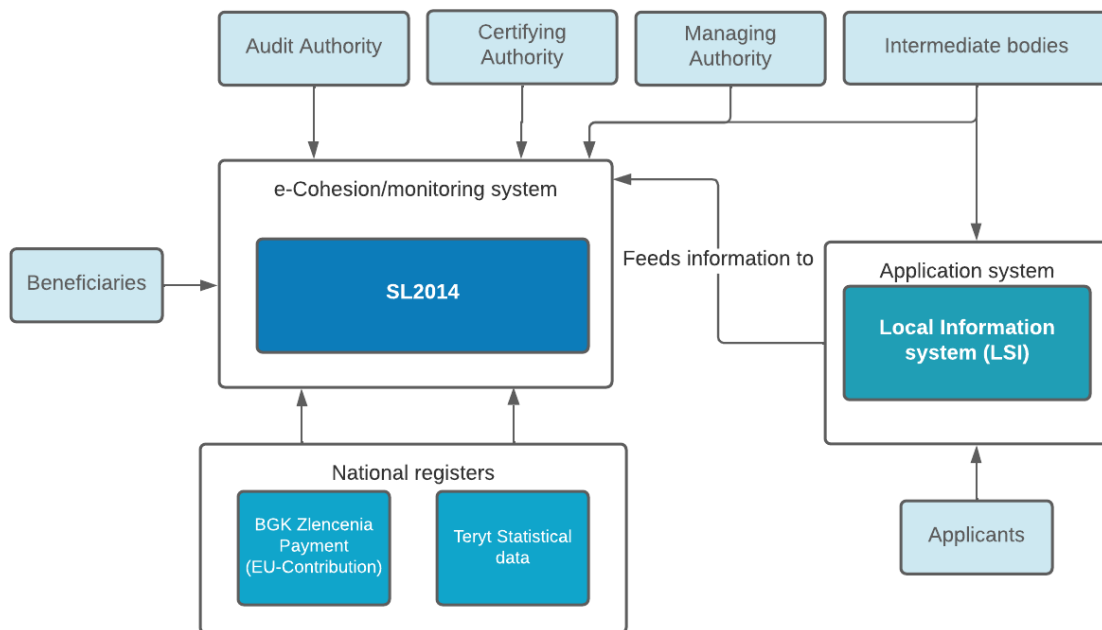
Source: PPMI consortium

Beneficiaries and authorities that use SL2014 took a considerable interest in our survey and participated extensively. More than 900 beneficiaries and 60 authority respondents filled out questionnaires. In addition to the standardised responses, we received many written

comments regarding SL2014s' strengths and weaknesses. According to our survey results, SL2014 (compared to other e-Cohesion/monitoring systems) ranks among the most appreciated systems. This is remarkable because **SL2014 only supports project implementation, not the application phase**. Beneficiaries particularly mentioned good practices related to communication, transparency, and accessibility of integrated data. We also assessed the scale of an overall increase of efficiency in the process realisation. In addition to the survey, we conducted several interviews with the SL2014 beneficiaries and authorities and the Department for Coordination of the EU Funds Implementation Ministry of Development Funds and Regional Policy, responsible for the development and operation of SL2014.

SL2014 is not designed for the application phase. Applicants use the Local Information Systems (LSI) to create and submit applications to the responsible authority. During the implementation of the project, beneficiaries use SL2014 to create and transmit information about the physical and financial progress. SL2014 provides an interface solution for importing application-related information. SL2014 provides access to users of all roles based on their tasks and access rights. It is also connected to various external systems (e.g., for the use of statistical data).

**Figure 1. Structure of SL2014**



Source: PPMI consortium

For the current period (2021-2027), SL2014 was integrated into the Centralised ITC Ecosystem (Eco). Technically, Eco was built from scratch using state of the art solutions (for more information, see page 23).

## 2. Development and operation of SL2014

Between 2007 and 2013, the exchange of information between beneficiaries and authorities still relied on paper-based processes in most places. At the same time, the e-Cohesion was launched when there had already been a general development towards e-government and more digitalised processes in public administration.

### 2.1. European and national legal framework

The development of SL2014 started in 2012 – a period in which e-Cohesion related requirements were already intensely discussed in the legislative negotiations for the programming period starting in 2014. The short development time (deadline 31.12.2015) represented one of the major challenges. Developing a centralised IT system for monitoring and e-Cohesion for a country the size of Poland is a challenge. To prevent parallel paper-based processes, **beneficiaries must exchange payment claims using SL2014, except for cases of force majeure.**

### 2.2. Operational aspects in introducing and developing the system

The Department for Coordination of the EU Funds Implementation Ministry of Development Funds and Regional Policy is responsible for the European-related application of the law, guidelines, and the development and operation of IT systems that support the implementation of European co-financed programmes. A team of around 15 people has been responsible for the IT development and operation to support programme implementation. Also, as a result of previous engagements, most of these team members became experienced in software development and activities related to programme implementation. Consequently, they provide a combination of business knowledge and software skills, which is crucial for developing the e-Cohesion instruments.

The main starting point of the development of SL2014 were the data fields that – according to the Commission Delegated Regulation ([EU no. 480/2014 –\(Annex III\)](#))<sup>1</sup> must be recorded and stored in the monitoring system. According to experts of the project team, these were complemented by information elements that were necessary for programme implementation. The developers also analysed existing forms and monitoring systems to identify additional information elements. Ultimately, the first conceptual model was constructed based on the fundamental requirement.

Using the conceptual model as a basis, the developers then asked programme authorities about their additional needs. One member of an interviewed managing authority told us that in the years 2013-2015, he was intensely occupied with the development of SL2014, clarifying requirements and supporting the design of the user interface.

In Poland, the management and control systems of the different OPs are largely the same. Regarding the definition of their management and control system, OPs begin with a similar draft as a starting point. According to interviews with the audit authority representatives

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<sup>1</sup> European Commission (EU) 480/2014 - DA - ANNEX III - List of data to be recorded and stored in computerised form in the monitoring system (referred to in Article 24) - Commission Implementing Regulation (EU) No 1011/2014 of 22 September 2014 laying down detailed rules for implementing Regulation (EU) No 1303/2013 of the European Parliament and of the Council as regards the models for submission of certain information to the Commission and the detailed rules concerning the exchanges of information between beneficiaries and managing authorities, certifying authorities, audit authorities and intermediate bodies. OJ L 286, 30.9.2014.



(AA), this standardised document served as a common basis, slightly adjusted due to the process-specific requirements. It only led to minor changes, e.g., 100% check of verification documents instead of a sample-based check. The changes did not affect the conceptual foundation of the e-Cohesion system. **This approach delivered a high degree of harmonisation and simplification regarding processes, structures, rules, and concepts that form the context of programme implementation.**

**Having almost identical management and control systems, project implementation processes turned out to be highly suitable for harmonisation via the e-cohesion system.**

This is relevant for the core of highly repetitive processes that handle quantitative information related to physical and financial project realisation. It is important when transactional IT systems bring the highest benefits. Project implementation is more standardised than the application. At the same time, the project implementation brings heavier administrative burdens than the project application. Therefore, the development and introduction of a common system supporting project implementation are easier and more effective than having a common system supporting the application phase only.

It was **legally required to use the electronic data exchange for the implementation phase**. At the same time, some of the LSI systems, focusing on the application phase, were already in operation. Having limited resources and a tied deadline, prioritising the implementation phase was the obvious thing to do.

These (on a cross-programme level) highly standardised requirements provided a sound foundation for an e-Cohesion system with high user satisfaction. Strikingly, regarding the transactional processing of progress reports, none of the MAs interviewed could remember a programme-specific requirement. This is significant because, apart from the definition of cost categories, indicators, and the periodicity of forecasts, the system does not offer much flexibility for the authorities. This illuminates how well the requirements are covered by SL2014.

### 3. Key features of SL2014

In the following sections, we focus on the key requirements for e-Cohesion in the mapping framework, which was developed based on the standards and requirements set out in Article 122(3) of the 2014-2020 Common Provisions Regulation,<sup>2</sup> Implementing Regulation,<sup>3</sup> and then further elaborated in various guidance documents.<sup>4</sup> The mapping framework's description of key features consists of four categories: principles, key processes, functionalities, and data security requirements, all of which contain several dimensions.

**Table 2. Main activity in SL2014 for each major user group**

Type of user	Main activity in the system
Applicants / Beneficiaries	Applicants do not use SL2014 to create and submit applications. They use programme-specific local information systems (commonly named LSI) instead. Furthermore, the process related to a project change request also takes place outside the system. Beneficiaries use SL2014 to create and submit progress reports describing and documenting the project's material and financial realisation. In Interreg, programmes have the role Lead Partner or Partner – in which the former includes the latter. Partners provide cost and indicator related information in 'partner progress reports'. Lead Partners manage application-related information, including change requests. During the implementation phase, they synthesise cost and indicator related information transmitted by other partners and themselves in progress reports.
First Level Control (FLC)	During the implementation phase of Interreg projects, the FLC financial controllers do parts of management verification by checking cost-related information covered by transmitted partner progress reports. The FLC hereby uses verification documents (invoices, contracts, timesheets) that can be uploaded to SL2014. In the case of mainstream programmes, management verification is done by Managing Authorities and Intermediate Bodies.
Managing Authority (MA) / Joint Secretary (JS)	The MAs of the different operational programmes use SL2014 for the exchange of information with beneficiaries, as well as further going transactional processes of financial management, verification, and programme-related monitoring. Tasks that include information exchange with beneficiaries consider foremost the verification of progress reports. MAs' operational tasks are frequently delegated to one or several Intermediate Bodies (or a Joint Secretary in case of Interreg programmes).
Intermediate Bodies (IBs)	In some cases, MAs delegate operational tasks of project application and implementation to IBs.
Certifying Authority (CA)	The CA uses SL2014 to certify expenses and payment requests to the EC. Here, CA requests information for a specific period, and the system automatically generates the financial data requested. During the process of certification, the CA checks expenses. Financial corrections are made (withdrawals and recoveries) in case of irregular expenses.
Audit Authority (AA)	To support project-related audits, the AA receives read-only access to SL2014.

<sup>2</sup> Regulation (EU) No 1303/2013 Of the European Parliament and of the Council of 17 December 2013.

<sup>3</sup> Commission Implementing Regulation (EU) No 1011/2014 of 22 September 2014 laying down detailed rules for implementing Regulation (EU) No 1303/2013 of the European Parliament and of the Council as regards the models for submission of certain information to the Commission and the detailed rules concerning the exchanges of information between beneficiaries and managing authorities, certifying authorities, audit authorities and intermediate bodies. OJ L 286, 30.9.2014.

<sup>4</sup> Questions & Answers on e-Cohesion Programming period 2014-2020 (ERDF, Cohesion Fund and ESF), EGESIF\_17-0006-00, 06/04/2017; Building Blocks for e-cohesion: good practices from Member States, regions and programmes, Version 2, December 2013.

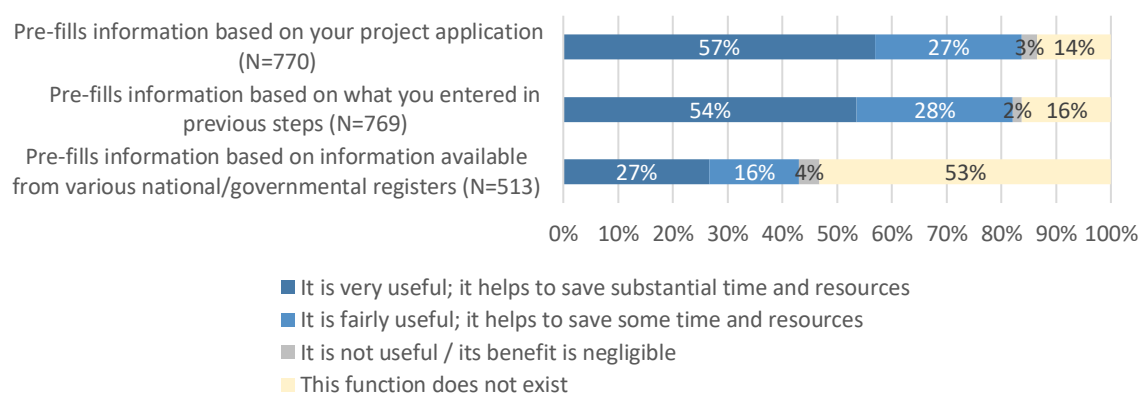
## 3.1. Key principles

**Interoperability and ‘only once encoding’ are the two key principles of the e-Cohesion initiative.** The latter is derived from the ‘do not repeat yourself’ principle, as it is known in software development. In this context, repetition is avoided by repeatedly executing the same function with different parameters. However, in the context of project implementation, the ‘only once encoding’ is accomplished in a situation in which a beneficiary does not have to enter the same information twice. There are different levels of accomplishment. On the project level, it is fulfilled when beneficiary related contact information must be entered only once. On the programme level, it is fulfilled when the same beneficiary may manage different projects in the system, and the address related information can be re-used on a project crossing level. A similar beneficiary does not even have to enter the information on an even higher level, but it is taken from an external system connected to the e-Cohesion system.

The principle of ‘only once encoding’ sounded revolutionary ten years ago – when the concept of e-Cohesion was first discussed. The ‘only once encoding’ is a normal effect of a centralised ICT solution that runs different types of processes and user roles with centrally managed information. Similarly, the concept of pre-filled forms evokes the idea of subsequent and repeated transactions based on already prepared forms with the data that users do not have to enter again. It suggests the model of a paper-based banking transfer form prepared by the bank and containing the client’s account information. Digitalisation options, however, go further than that. **The possibilities of re-use exceed the mere depiction in data fields. The captured data can be analysed in many ways. For example, SL2014 also uses and combines captured data in calculations and validations.** In the material realisation covering section, SL2014 shows achieved values that stem from previously transmitted progress reports; organisational information (e.g., type of organisation) is validated against values stemming from an external system. The concept ‘**pre-filled forms**’ is an expression for fields automatically filled with information items previously collected.

Re-use of information is also the case when previously captured information is summarised in overviews appropriately faded in. Some of the surveyed beneficiaries that use SL2014 did not identify how SL2014 implements the concept of re-used and pre-filled information. Only 16 % did not know that SL2014 uses the data already entered in previous steps, and 2 % valued the benefits as negligible. **Yet, a wide majority agreed the re-use of information is useful and saves both time and resources.** Indeed, a large part of the targeted reduction of administrative burden for beneficiaries was expected to prevent the necessity to repeatedly capture or write down the same information in paper-based forms for applications and payment requests. This is the effect of digitalisation when captured information can be re-used in different mutually connected process types and instances. Its prerequisite is the existence of an integrated data scheme that provides information consistently and flexibly for different transactional processes that create, read, update, and delete single or few data items within the operational work.

**Figure 2. Re-use and pre-fill of information in SL2014**



Source: PPMI Consortium – Beneficiary survey - Question 13: “Does the electronic data exchange system re-use (pre-fill) some information that you have submitted previously, or obtain such information from other sources?”

**Interoperability supports cooperation between different organisations, people, and systems on the IT level.** Consequently, the term refers to both conceptual and technical aspects. **On the conceptual level, Poland’s approach to similar management and control systems and the subsequent standardisation of concepts, structures, processes, and rules provide a sound basis for interoperability.** Technically, SL2014 uses a centralised database that integrates generated and used data. Users of all roles participating in programme implementation have access to relevant information based on their needs. Combining the functionalities of e-Cohesion and transactional monitoring, SL2014 provides all programme implementation users with access to relevant operational project information. As a source system, SL2014 also delivers data to a connected business intelligence analysis and reporting system (e.g., programme monitoring and evaluation). SL2014 supports the exchange of structured data (data records) and unstructured information (pdf-files and other official documents) in creating and submitting payment claims, verification, audits, and additional communication.

**Table 3. External systems connected to SL2014**

External system	Short description	Exchanged data	Decrease of administrative burden
BGK Zlencenia	IT system of Poland’s central bank	SL2014 receives data on executed contribution payments to beneficiaries.	Authorities’ data entry is facilitated through pre-filled fields.
Teryt	National Official Register of the Territorial Division of the Country.	SL2014 receives data address-related data.	Data on addresses are validated, errors are reduced, and repetitive data transmission.

Source: PPMI Consortium

**SL2014 is connected to external systems.** First, it works with the national payment system (BGK Zlencenia Payment), from which it receives payment data. Second, it is synchronised with the statistical system (Teryt statistical data) from which it receives analytical and geographical information data. Teryt is always used to validate addresses. The main focus of both connections is monitoring and evaluation. SL2014 does not utilise the SFC automatic interface solution. A Payment Claim to the European Commission (EC) comprises a dozen numbers and only needs to be submitted three times a year. An Annual Implementation Report consists of more complex information with more demanding database queries. It only needs to be submitted once a year. In addition, the use of the interface solution prescribes the integration of demanding security features (system authentication, security certificates, etc.). Changing information needs cause maintenance

costs that lead to necessary adaptations of the interface solution. For the existing data exchange with the EC, manual entering of data via the SFC2014 web interface is more efficient than using the automatic interface solution for the direct connection of the monitoring system with SFC2014. The costs of developing and maintaining this solution exceed the benefits because transactions happen several times throughout one year and include only a few numbers. This will be different if more data (e.g., more than a thousand records per transaction) must be transmitted more frequently (e.g., weekly or daily).

## 3.2. Key processes

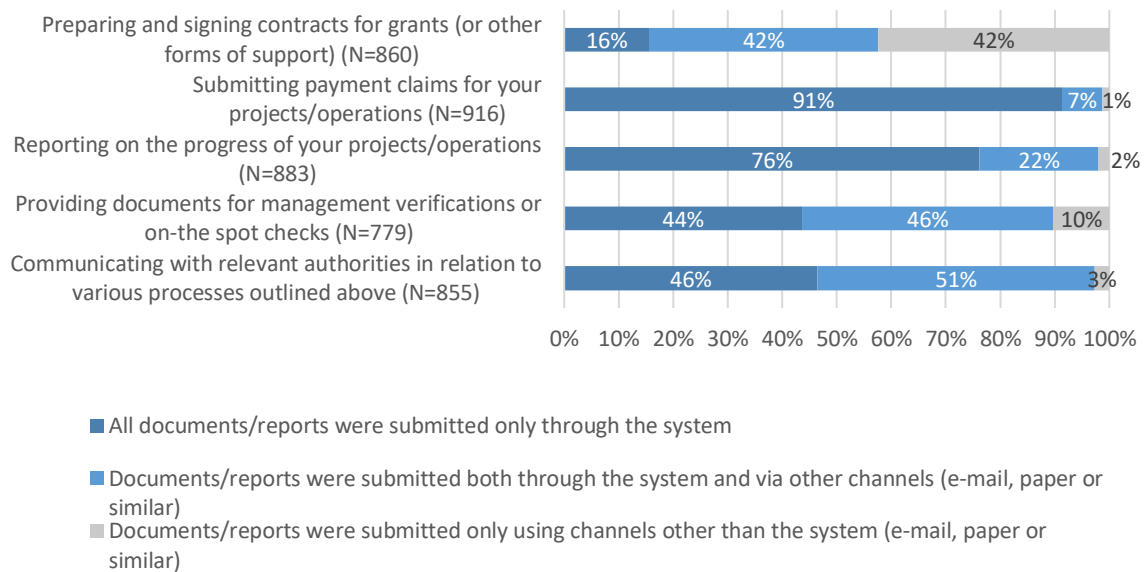
SL2014 is actively used by beneficiaries, different kinds of Intermediate Bodies (IBs), MAs and CAs. Beneficiaries of national and regional programmes only have direct information exchange with the authority that signed the grant contract. Beneficiaries of Interreg programmes have additional contact with the First Level Controllers. Next to read-only access to SL2014, the AA use their proper system connected to SL2014. 72% of beneficiaries using SL2014 and 91% of authorities who took part in our survey use the system at least a few times a month.

**The key processes include activities to create, submit, modify, check, and approve applications, progress reports, modification/change requests, and payment claims. Other types of key processes are audits and ad hoc communication.** SL2014 itself does not support the interactive information exchange during the application phase. Polish national and regional OPs use programme-specific local IT systems (LSIs) to support application creation, submission, and approval processes. Application related information, such as budgets, is often captured in excel files.

Although SL2014 itself does not provide beneficiaries with the option to create and submit applications, it handles application-related information. Information related to the application and the subsidy contract is entered or imported by the authority who signed the grant letter. **SL2014 provides an interface to import application-related data, consisting of around 70 data fields.** These fields cover information on the project name, address, time scales, objectives (target values for output and result indicators), costs, financing, and other fields. Work packages differentiate costs and financing rates.

This causes important changes in comparison to the conventional paper-based process. Because application-related information is transferred to SL2014, beneficiaries do not have to enter the same information manually again. This explains why 73% of the same group agreed to the statement that, also regarding the application phase, benefits of electronic data exchange indeed exceed costs (see Figure 4). Even if SL2014 only supports the implementation process, more than 58% of beneficiaries answered that they were, at least to some extent, able to use the system to create and submit documents within the application phase. **This gives the impression that the LSIs provided by programme authorities to support the application phase is widely regarded as a part of an integrated e-Cohesion system.** SL2014 does not support the application phase. Applications are created and submitted using the programme specific local information systems.

**Figure 3. Extent to which beneficiaries use SL2014 for key processes**



Source: PPMI Consortium – Beneficiary survey - Question 12: “When implementing your project/operation, to what extent did you use the indicated electronic data exchange system for the following processes:”

In the context of SL2014, the concepts of **payment claim** and **progress report** are synonymously used regarding physical and financial realisation. Information on incurred costs and financing forms an integral part of the progress report. 91% of SL2014 beneficiaries that took part in our survey declared that they could only use SL2014 for the creation and submission of payment claims – from their point of view, it was not possible to use any other channel for the transmission. Even when it comes to submitting verification documents in the context of on-the-spot checks, 90% of the same group declared that they use the system at least to some extent. The use of SL2014 in ad hoc communication is the most striking: 97% of SL2014 using beneficiaries that took part in our survey answered that they at least to some extent would use the system for this purpose. Even 46% of the same group answered they would only use the system. This provides evidence to suggest that **the use of SL2014 is well integrated into the operational work of beneficiaries.**

### 3.3. Key functionalities

The third key requirement category relates to **functionalities that enable user-friendliness, usability, and accuracy**. SL2014 provides payment claim-related functionalities to manage correspondence payment schedules and information on procurements, project staff, and project participants (ESF-related). SL2014 is a fully web-based solution that allows users to enter information using interactive forms. **Totals and remaining amounts of costs, financing and indicators are automatically calculated. The system validates data on missing and wrong values – including compliance with complex business rules, if dates lie within certain periods, and if calculated values comply with provisions.** Warnings are signalled in orange and errors in red, complete with explanations. Validation is continuously improved based on the results of periodically conducted quality assessments.

**Whenever the status of the document changes, beneficiaries receive automatically generated notifications by email. All users can track the status of created reports through a defined life cycle. The status can be: prepared, submitted, in approval and approved. Whenever the status of a processed progress report changes, responsible users of all roles involved receive a message by email.** Even if there is no direct information exchange between auditors and beneficiaries, the latter still have access to a list of audits related to their project. **SL2014 provides all users, including beneficiaries, access to all progress reports that have previously been transmitted,** including the uploaded documents. The maximum size of document that can be uploaded for ERDF and

CF projects is 20 MB and most standard file formats are accepted (e.g. pdf, xlsx, docx, avi, jpeg). There is no limit to how many files a beneficiary can upload per project.

Next to the assignment of verification documents to single invoices, it is also possible to assign uploaded verification documents to a progress report, a certain procurement, or the entire project. All uploaded verification documents are visible in a specific document management section in which they can easily be searched and accessed. This repository of documents can be filtered and searched using elaborated Document Management System (DMS) functionality.

**SL2014 integrates all payment claim related transactional data in one central database**, for which it differentiates two types of payment claims: reimbursement and advance payments. **Every payment claim includes an overview that depicts automatically calculated amounts of total and eligible expenditure.** The main sections of a payment claim include physical progress, financial progress, additional information, and attachments. SL2014 also includes a part dedicated to project-related information, which depicts pre-filled information such as programme, priority, and beneficiary's name based on application.

Within the sub-section, beneficiaries account for every project's work package's actual status and physical progress. In addition, they also report quantitative values of achieved indicators – which include output and result indicators. While output indicators are reported with every payment claim, result indicators are only reported at the end of the project. The section on physical progress also includes fields for verbal descriptions on the status of single work packages – which include descriptions of achievements and encountered problems. The part for output indicators shows pre-filled information about target values (that stem from the application) and already achieved values (from previous payment claims). In addition, this section also provides fields to describe the project status and plans.

The section on financial progress covers information related to invoices/expenses, simplified cost options (e.g., unit costs), corrections, reimbursements, and financing. Invoice related information includes invoice ID, payment date, cost category, gross and net amount. An upload functionality allows the assignment of attachments to single expenses and other project related information. Additionally, it is possible to assign expenses to contracts managed in the procurement section described below.

Within the financing section of the payment claim, eligible amounts are assigned to different financing sources. SL2014 distinguishes ERDF, public and private financing sources, whereby public sources are additionally differentiated (community, regional, others). Financing is linked to an expense type (e.g., staff costs, investment). Thus, the structure of financing can vary across different expense types. This becomes, for example, relevant for state aid-related activities that necessarily demand another division of financing than other types of expenses do. In rare cases, the financing structure can also change during the project implementation. Another financing source might have to be included, or the financing rate of a certain source might change due to the results of an audit. It is worth mentioning that a necessary change of the financing rate of one source always influences the financing rate of other sources and that already paid amounts need to be considered.

SL2014 offers two ways for entering information related to expenses. Firstly, information related to expenses can be entered using the webform, which is part of the financial progress section. Financing the different sources is automatically pre-calculated according to information that stems from the application. **The beneficiary can still adapt the calculated financing, which is flexible enough to deal with exceptions (e.g., state-aid relevant activities).** An additional section on the payment schedule helps create and submit information on planned total and eligible expenditures. According to a programme's specific requirements or authority, the planned expenditures can be differentiated by quarter or month. The related planned public support is likewise differentiated.

Secondly, **SL2014 also provides an excel feature for a bulk import of invoice related data.** This feature is widely used by beneficiaries to import data of invoices that they have

previously exported from their proper accounting system. Doing so prevents the necessity of recording each invoice manually into the system. However, using the excel upload feature for expenses, financing is not automatically calculated. Instead, there is the possibility to consider financing directly in the excel sheet, which is imported into SL2014. Additionally, there is the option to create and update financing-related information using the webform.

**SL2014 aims to integrate all information that is generated during project implementation.** The correspondence section provides a feature for email-like messages to support ad hoc communication and a feature to create and submit letters, including attachments. These letters include additional fields for categorisation and retrieval and can also be signed using an advanced certificate (Polish users only) or a qualified certificate. SL2014 also provides a feature to verify the certificate of signed letters. In addition, SL2014 devotes a section to the management of staff costs. This relates to the staff that is engaged in the project. For each staff member, information regarding ID, period of engagement, working time, the type of employment (e.g., self-employed, contract or employment), etc., are captured. Individual staff members can later in the process be connected to specific expenses.

The section for public procurement provides functionalities to manage public procurements and related contracts. The status of each procurement (e.g., 'in preparation', 'sent', etc.), type (e.g., open procedure or competitive dialogue), and an estimated amount are recorded. If the estimated amount exceeds EU thresholds, the procurement number from the official EU-Journal is recorded as well. The sub-section contracts manage information on the actual contracts linked to the procurements. One procurement can be connected to one or many contracts.

Most verification documents are uploaded and assigned to certain invoices. In exceptional cases, paper-based documents are physically transported, e.g., in the case of very large, originally paper-based documents like building designs that need to be transferred for checks or highly sensitive information. In such cases, the effort of scanning the documents or the risk of violation would cause an administrative burden that exceeds the benefit of electronic exchange. This practice considers beneficiaries' digital or physical information exchange choices in line with CPR. **Finally, even if the workflow of SL2014 is highly standardised, there are call-specific settings, like the periodicity of the payment schedule, indicators, and expense types, that can be defined individually on the programme level.**

### 3.4. Key data security requirements

SL2014 uses HTTPS to secure communication and database encryption to secure sensitive information such as passwords. Additionally, running sessions are automatically closed after 20 minutes despite ongoing user activities. A graphical item shows the remaining time and turns red when the last 1-minute starts. Users must explicitly refresh the session by clicking a respective button.

SL2014 provides three different options for authentication:

1. An advanced electronic certificate that only Polish citizens can use.
2. A qualified electronic certificate that applies to the **eiDAS standard**.
3. A combination of name and password.

Depending on the selected authentication type, the necessity for handwritten signatures is replaced, and legally valid declarations can be made within the system using the provided communication feature to submit a letter. Periodically data quality checks are executed. A respective validation check is developed and deployed to prevent similar issues if a systematic problem is identified.



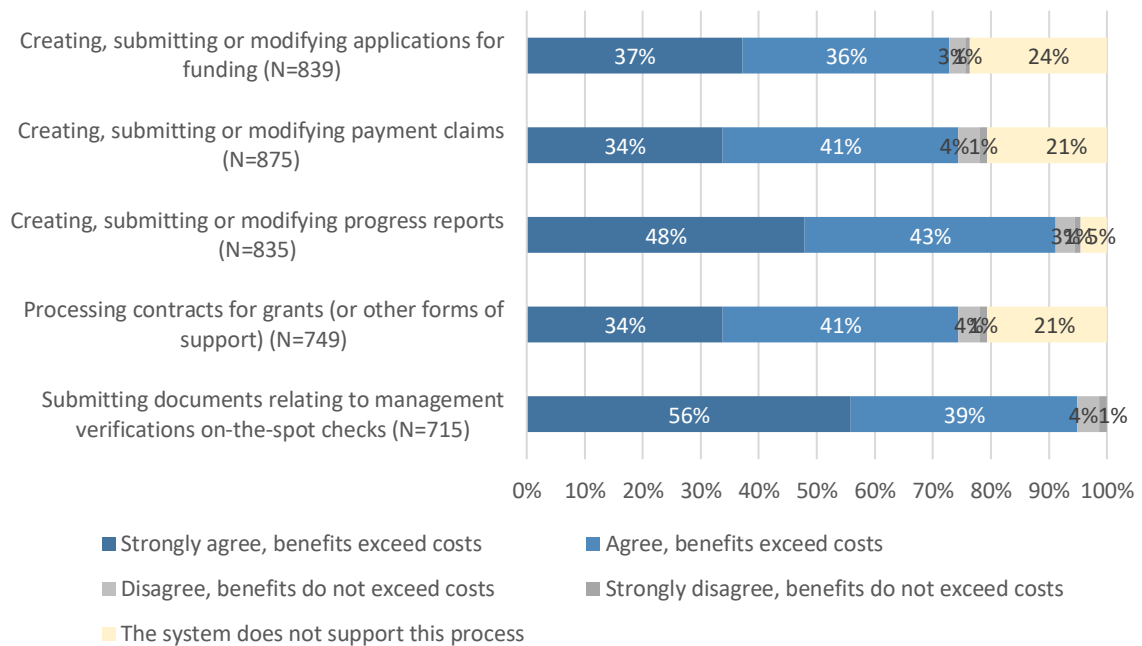
## 4. Usefulness and performance of SL2014

This section describes the impact that the introduction of SL2014 has had on administrative burdens, resources spent, and time saved for beneficiaries and institutional users. Indeed, the pandemic situation has enforced the feeling among users that SL2014 is significant support for their daily work. Both the interview and survey data indicate that most authorities and beneficiaries alike are satisfied with the system and consider it integral.

### 4.1. Overall usefulness and performance

Interviewed beneficiaries, who managed projects in the previous period, confirmed that **the system is widely used for most key processes. The change from paper-based to digitised processes led to significant improvements.** The accessibility of integrated information and exchange possibilities led to more transparent and efficient processes and fostered communication between projects partners, financial controllers, and other authorities.

**Figure 4. Beneficiary survey result on benefit vs cost of key processes**



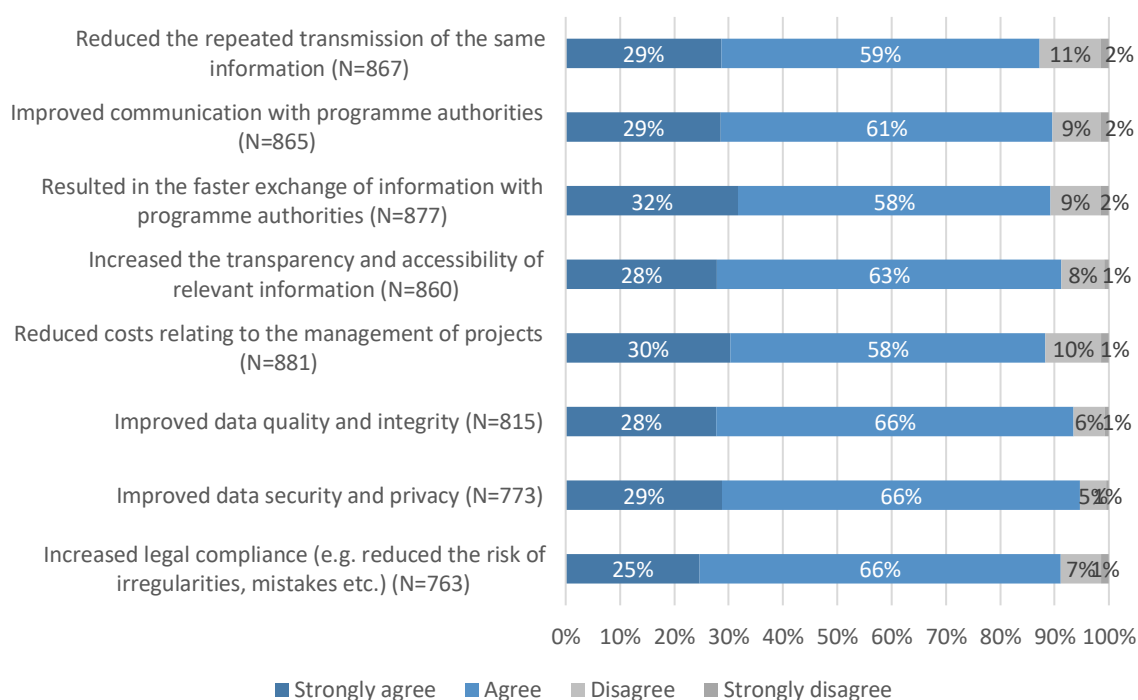
Source: PPMI Consortium – Beneficiary survey - Question 15: “Please assess the following statement: the benefits (e.g., reduced administrative burden, simplified procedures) of the introduction of the electronic data exchange system between beneficiaries and authorities exceeds the associated costs (e.g., the time and effort required to use it) for the following processes:”

**87% of surveyed beneficiaries agreed that using SL2014 decreased the necessity for repeated transmissions of the same documents.** The avoidance of errors is mainly achieved by integrated features such as automatic calculations and automatic validation controls. Automatic validation controls check values of data fields for missing and wrong entries (e.g., wrong data type) and the compliance of more complex business rules (e.g., the summation of eligible expenses must not be higher than the amount of the related contract). Also, the fact that responsible authorities have read-only access to information beneficiaries have not submitted yet helps clarify potential problems.

Indeed, **beneficiaries widely acknowledge the improvements that using SL2014 provides in comparison with paper-based processes.** Even higher numbers of beneficiaries confirmed that using SL2014 improved the communication with authorities, has led to faster exchange of information, and cost reductions: 90% versus 89% of beneficiaries agree that the use of the system has resulted in improved communication and faster information exchange with programme authorities, respectively. Communication supporting features that SL2014 provides are widely accepted and used by beneficiaries. This led to a decrease in other means of communication such as email. As a result, SL2014 integrates all information related to project implementation in one place. 88% recognise a reduction of management costs related to the digitisation of processes.

Before introducing SL2014 processes, information exchanges between beneficiaries and programme authorities were mainly paper based. One interviewed authority stated that handling legally binding declarations, which often included multiple handwritten signatures, transport, and confirmation related activities, was (and is) widely regarded as particularly inefficient. This was specifically true if something was missing or wrong and activities (signing, transport, confirming) had to be repeated. Other improvement aspects consider data quality, legal compliance, and data security. **The improvement of each of these aspects was confirmed by more than 90% of responding beneficiaries.** 94% see improvements regarding the data's correctness, completeness, consistency, and timeliness. This confirms that data integration and application of validation controls did help to achieve desired objectives. In addition, more than 90% also see improvements regarding data security, privacy, and compliance with legal provisions. **This shows that fears and suspected risks that existed before SL2014 introduction concerning data security and legal compliance – in contrast, turned out to be strengths of the system.**

**Figure 5. Impacts of SL2014 introduction**



Source: PPMI Consortium – Beneficiary survey - Question 19: “Please assess the following aspects and the impact of exchanging data using the electronic system, compared with paper-based processes or email exchanges. Has using the electronic data exchange system led to improvements in the following areas:”

These quantitative findings correspond well to **comments related to good practices stated by beneficiaries using a free-text field of the questionnaire.** The most prevalent themes of comments were **data integration** (i.e., all documents and information in one place, ability to import data, etc.), **communication and e-signature** (i.e., no need to post

documents anymore for information exchange with authorities), and **user-friendliness and efficiency** (e.g., intuitive and easy-to-use system, efficient correspondence and information exchange).

**Box 1. Beneficiary quotes on good practices of SL2014<sup>5</sup>**

**Data Integration**

- *“The ability to export and import data from other databases (Excel format).”*
- *“Easy access to any documents sent to SL2014, access to the history of correspondence on the project.”*
- *“Systematisation of documentation and correspondence in one place, help in completing documents.”*

**Communication and e-signature**

- *“Transferring online documentation, communication with the project supervisor.”*
- *“Electronic signature, due to the lack of necessity to move (work in several locations) has contributed to a significant saving of time.”*
- *“Efficient communication using the mail module. Fast obtained answers.”*

**User-friendliness and efficiency**

- *“Restricting multiple transfers of the same information, simplifying the delivery of documents related to verification checks.”*
- *“Friendly interface.”*
- *“All functions work well and correctly, which is placed on efficient project support.”*

Source: PPMI Consortium - Beneficiary survey - Question 21: “What would you indicate as examples of good practice in the electronic data exchange system we discussed in this survey? What are the specific features or functionalities that work really well, and result in a considerable simplification of our work?”

## 4.2. Drawbacks to usefulness and performance

Conclusions about the general usefulness of SL2014 must be confronted with existing criticisms that several beneficiaries expressed. Around 25% or the more than 900 beneficiaries using SL2014 that took part in our survey seized the opportunity when asked an open-ended question about what they perceived to be the most significant weaknesses in the system. Most of these issues (e.g., performance problems, tedious handling of verification documents, and incomplete process support) also appear in the context of other programmes using other solutions. Therefore, **the described list of drawbacks may be seen as suggestions directed to SL2014 and help raise the general awareness for common difficulties across e-Cohesion systems and how they can improve.**

Some beneficiaries also complained that **the session time is restricted to 20 minutes**. Without a refresh triggered by the user, the session is closed after 20 minutes, and unsaved changes get lost. Even though the system clearly shows how much time remains before the session is closed, these complaints were mentioned. The new Eco system extends the session from 20 minutes to 30 minutes. There are also general complaints by beneficiaries that regard the self-descriptiveness of the system and supporting guidance. One suggestion was to include a FAQ feature to cover recurring questions. In addition, an intensified

<sup>5</sup> Quotes have been corrected and condensed for spelling and grammatical mistakes to enhance clarity.

application of tooltips was proposed to describe certain functionalities and more user training. One Interreg beneficiary also complained that the English documentation that existed at the beginning of the period was too extensive (around 200 pages) to be practical for partners that only scarcely use the system.

Also, the handling of verifications and other supporting documents is described as tedious by some beneficiaries. In this context, the restriction of 20 MBs, conflicts with document names and replacements are mentioned. The new Eco system extends this limit from 20 MBs to 50 MBs.

Beneficiaries also called for improvements of automatic alerts, like, for example, reminders of deadlines. One interviewed beneficiary suggested that the messaging feature should also be usable on mobile devices and provide a full-text retrieval functionality to facilitate the search of sent and received messages. Another beneficiary suggested that SL2014 should provide a feature to integrate the accounting systems used.

SL2014 was not originally designed to support Interreg programmes and had to be adapted in this respect. Although this succeeded in large parts, there still exist some necessary workarounds. For example, Swedish partners must use the feature for the upload of expense related information and calculate currency conversion themselves, as the alternative use of the webform (for Interreg programmes) only supports Euro as currency. Also, from the point of view of Interreg beneficiaries, the calculation of national currencies into Euro is not sufficiently supported and is prone to errors. Furthermore, there were complaints from several beneficiaries that the automatic calculation of financing wasn't always correct. On the one hand, rounding issues and changes in the financing structure may lead to problems. Using the bulk-upload feature for expenses, beneficiaries must also calculate flat rates independently. Even if the respective information (as is also the case with financing rates) exists in the system: As default values, financing and SCOs could be calculated automatically during the upload process. **In this sense, automatic calculations are a way to implement the 'only once' encoding principle.**

#### **Box 2. Beneficiary quotes on weaknesses of SL2014<sup>6</sup>**

##### **Uploading supporting documents**

- *"Limiting the volume of annexes to 20 MB, which is also problematic in particular with a large number of attachments to invoices or tender procedures and their comprehensibility and the need to ensure the readability of the scan"*
- *"The need to enter certain data repeatedly, for example, when one invoice applies to several tasks or expenses category - to everyone must be introduced separately"*

##### **Session time-out**

- *"Automatic logout after 20 min and no automatic recording of the entered data. This is a functionality that often causes the need to perform some of the activities several times and brings to the creation of errors that are not verified by the system."*

##### **Performance and stability**

- *"Usually in the first days of a given month, the SL2014 system often works too slowly due to too much of its load, you must improve the speed of its action."*

<sup>6</sup> Quotes have been corrected and condensed for spelling and grammatical mistakes to enhance clarity.

- *“Temporary system overload in particular on the recruitment, complicated system operation”*

#### **Self-descriptiveness**

- *“The system requires further improvement. Its service is not intuitive, requires training. The remaining schedule for the obligations of the beneficiary would have to avoid charging financial corrections.”*

#### **Automatic calculation functionality**

- *“The beneficiary must run their own calculations “on the side”, because the system does not count data cumulatively (e.g., the contribution of own, accounted for co-financing, paid tranches of ETC.).”*
- *“Lack of automatic calculation, when possible, e.g., regarding flat rates and re-calculating from national currency to Euro.”*

#### **Messages/communication**

- *“The chat function (chatbot) would be useful for users of less experienced and seeking answers to basic questions or clarifying the definition of field data. It would be a significant improvement in relation to searching for information in the user’s guide, FAQ or ringing on Helpdesk.”*
- *“The message sending system is at a very low level, eg if I sent a message once, and I did not receive an answer and I want to send another message to the institution, I have to copy the entire message to the institution manually and send a new message and below paste information about what it applies (i.e., previous message). It duplicates the number of messages sent, and could work similarly to emails sent through, for example, Google Mail.”*

#### **Integration with the application system**

- *“The application for co-financing was submitted by the LSI and paper system, requests for payment and other documents by the SL system, the need for one system that supports the above.”*
- *“No applications for co-financing and contracts in one system (they are in LSI).”*

*Source: PPMI Consortium - Beneficiary survey - Question 22: “What does not work, or requires further improvement, regarding the electronic data exchange system we discussed in this survey? What are the main weaknesses of the system?”*

Another open-ended question asked beneficiaries to indicate features and processes not supported by the system; several beneficiaries criticised SL2014’s missing support of the application phase and change requests that come with changes of application-related data. Since SL2014 focusses on the handling of progress reports and doesn’t support the application phase, there were quite a few complaints about data integration and the fact that some information processing still needs to be done outside the system and that, in consequence, not all project-related information (e.g., co-financing agreements) is accessible in SL2014. This is also true for change requests. Some criticise that SL2014 still requires the exchange of paper-based documents related to some processes. There is the view that project application and implementation phases are connected and that corresponding data should be managed in an integrated way. The new Eco system also provides a solution to cover the application phase and change requests, and until now, 80% of programmes have declared that they will use this solution.

Even after the move to a cloud-based infrastructure, which allows for the flexible adaptations of capacities, performance issues seem to appear within specific periods – e.g.,

before the end of a common deadline when many beneficiaries tend to simultaneously work with the system to finalise their progress reports for submission. According to our survey results, only 57% of beneficiaries valued performance as sufficient (Figure 6). Some beneficiaries complained that access to the system was restricted for specific user roles. In addition to users who execute creating, updating, and deleting transactions, there are sometimes additional demands for user profiles that merely need read-only access to overviews that clarify the project's status or certain processes. The new Eco system provides some additional role definitions considering respective requirements.

### 4.3. User-friendliness and user satisfaction

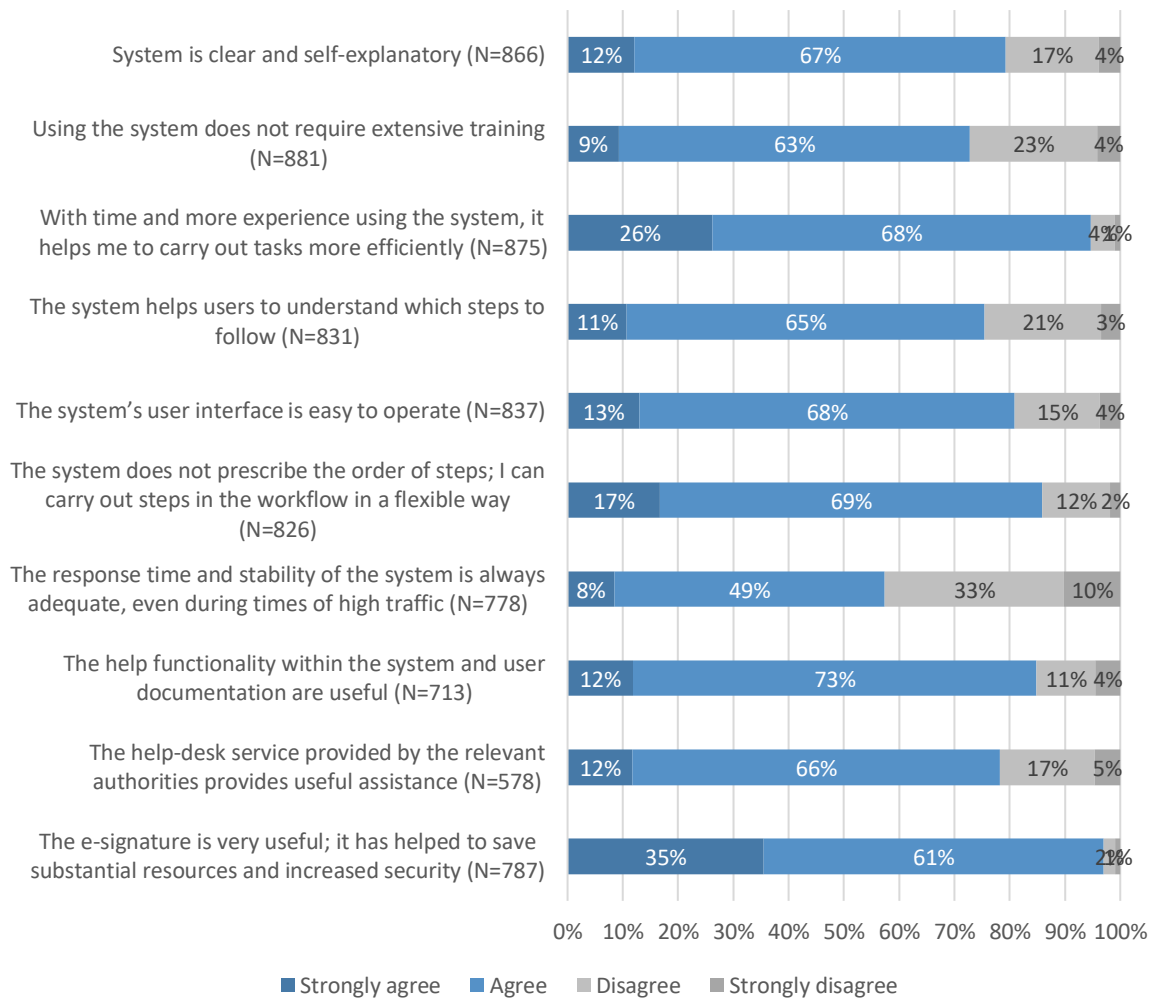
**Despite some caveats, SL2014 provides a high degree of user-friendliness. 79% of beneficiaries that took part in the survey valued the structure and functioning of SL2014 as clear and self-explanatory.**

SL2014 provides the project overview screen as the central starting point for any project related navigation (available functionalities and access to information differ depending on user privileges). Essentially, the project screen consists of two vertically structured parts. The top part depicts project related information such as project name, priority, name of the beneficiary, etc. The part underneath comprises different sets of related functionalities. Each bundle of related information items and functionality are combined in a tab. The user interface depicts a toolbox that gives access to a set of applicable functionalities within the given context. Each of these functionalities is represented by a specific icon that does not change depending on the context. A tooltip appears if the user hovers with his mouse over such a control, providing explanations. Consequently, 73% of beneficiaries agreed with the statement that no training was needed, and 75% believe that the system shows which step to do at any point within the workflow.

**SL2014 harmonises patterns of user interaction that proceed similarly in different contexts – by doing so, the system behaves in line with user expectations.** 86% of beneficiaries believe that SL2014 allows users to fulfil tasks according to their preferences and that it does not prescribe an order of activities. Indeed, the existing functionalities for staff cost calculation and procurement management are not used by all projects. For example, most regional and national programmes take advantage of staff flat rates and, for that reason, do not use the staff cost calculation. The same is true for the procurement and the ESF-related participant features. Optional features like these do not cause unwanted complexity as they are integrated so that they can, in fact, easily be ignored and forgotten by those users who do not need them. Indeed 81% of beneficiaries agree with the statement that the user interface of SL2014 is easy to operate.

Furthermore, 85% of beneficiaries value the help functionality as appropriate, and 78% are satisfied with the provided support and guidance provided by the helpdesk. Even 94% of beneficiaries believe that after a period of use, the system helps them do their tasks more efficiently. In addition, SL2014 provides different language versions (e.g., Polish, English, German) – for which controls are translated respectively. Users also can adapt the font size according to their preferences. For different sets of information items (e.g., payment claim, uploaded documents), SL2014 allows full-text filtering for different attributes. In addition, a columns manager allows users to change the selection of columns that are displayed in overviews. Finally, the provided e-signature feature to replace the necessity of handwritten signatures is appreciated by 96% of beneficiaries. Supporting different types of certificates and integrating a function to verify received documents easily, this feature offers high usability.

**Figure 6. SL2014 user-friendliness**



Source: PPMI Consortium – Beneficiary survey - Question 18: “Do you agree or disagree with the following statements describing the user-friendliness and effectiveness of the indicated electronic data exchange system you used:”

## 5. Good practices, challenges and lessons learnt

This section presents a synthesis of the good practices and lessons learnt of the Polish e-Cohesion system that have been uncovered through this case study. The aim is to provide effective solutions for the other Member States, as well as identify the pitfalls and mistakes that may occur when implementing e-Cohesion systems; in this way, we facilitate policy learning and knowledge sharing, which can inform and underpin efforts to set up and/or improve e-Cohesion systems in the 2021-2027 programming period.

### 5.1. Good practices

Within the first step, the development of SL2014 addressed minimal requirements of e-Cohesion and monitoring in a rather top-down manner. The specifications focused on requirements derived from the respective legal EU provisions. The primary objective was to achieve the necessary implementation and deploy a functioning system by 2015. In a second step, programme authorities were asked for their specific needs. **This rather minimalistic and functional approach resulted in an important reduction of complexity and, therefore, a simply structured and easy-to-use application.**

More than 300 SL2014 beneficiaries that took part in our survey took the opportunity to comment on the system's good practices. Coming from paper-based processes, most of these comments relate to improved **data integration and communication with authorities.**

#### **Beneficiaries appreciate good practices related to usefulness and user-friendliness:**

- All current and historical information related to project implementation is direct, fast, and easy to access. This results in a high degree of transparency and includes information on overall project-related properties (e.g. descriptions, addresses, financing rates, sources), payment claims, procurements and contracts, project staff, verification and other supporting documents.
- Submitting information on expenses is facilitated by the functionality to bulk import the data from CSV files which prevents the necessity to enter each expense individually. Procurement and staff related information is centrally managed and can be connected to different expenses.
- Features support ad-hoc communication, including the option to use advanced and qualified certificates to replace the need for handwritten signatures in the context of exchanging legally binding documents.

#### **SL2014 also contains several good practices related to the development and structure of the system:**

- The use of management and control systems in national/regional OPs resulted in harmonised organisational structures, processes, rules, and concepts.
- Standardised transactional processes between different OPs, which has resulted in minimal programme-specific requirements
- SL2014 also successfully balances convenience (e.g., automatic pre-calculation of financing) and control (possibility to adapt pre-calculated financing if necessary).



## 5.2. Barriers, challenges, and lessons learnt

Given the tight deadline, the transformation of EC-related legal requirements (foremost the list of recorded and stored data fields, provided by the Commission Delegated Regulation (EU) No. 480/2014, Annex III) into technical specifications caused the major challenge within the development phase. This was also due to existing ambiguities and the late publishing of the list. The coming into effect of GDPR legislation caused additional requirements during operation. This foremost regards the processing of sensitive data of ESF projects but also had implications for ERDF and CF programmes. It caused additional coordination effort with auditors and resulted in additional data security measures and changes of the role model.

**One of the main challenges was to estimate the necessary server capacity.** There were serious issues with the performance and response time of the system in 2017 when the system got used more frequently and more intensely by more users. This issue is also reflected by our survey results, in which only 57% of beneficiaries were satisfied with the system's performance and stability. Because of these issues management of SL2014 decided to move the hosting from dedicated server infrastructure to a cloud-based solution, allowing more flexibility regarding the adaption of the capacity during periods of more intense use. The cloud-based solution's calculation and memory-related capacity can be easily adapted according to temporary needs.

Further requirements caused by additional legal provisions and increased user expectations represent the major challenges for the new funding period. The revised and enlarged list of to be recorded and stored data fields stated in CPR 2021/1060 (Article 72(1)(e))<sup>7</sup> needs to be interpreted, discussed, and transformed into technical specifications. Given that this list was only published in the late autumn of 2020, this left very little time for implementation.

Compared with the situation in 2015, nowadays, users are more experienced in working with web applications both in private and professional contexts. The resulting demands for solutions that offer a high user experience need to be seriously addressed. **At the beginning of the 2021-2027 programming period, SL2014 was replaced by a new Centralised ITC Eco system ("Eco").** While the underlying business logic of Eco is very similar to SL2014, the 'look and feel' is modernised; however, the core structure and navigation of Eco essentially do not differ very much from SL2014. This is because users appreciate SL2014 and are used to the functionalities that SL2014 provides. Regarding selecting technologies, the underlying strategy is to use products that already have reached a certain degree of maturity and have been tried and tested in the industry – which corresponds to the strictly functional and reliable approach.

The new system heavily relies on the concept of microservices. Following a strictly modular approach, applicants and beneficiaries use two applications: One supporting the application phase (including change requests) and another supporting the implementation phase. Eco uses responsive web design, which aims to be usable on different kinds of devices (including mobile devices). Eco also provides other apps, each providing services for related use cases (e.g., ad hoc analysis and reporting). All apps that the central ITC Eco system provides are linked to an integrated database and employ a common role and user management, including a single sign-on mechanism that prevents the users from managing different usernames and passwords. The progress report app provides essentially the same features as the respective module of SL2014 does. **Eco also provides an application module that covers the exchange of data related to the original application process**

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<sup>7</sup> Regulation (EU) 2021/1060 of the European Parliament and of the Council of 24 June 2021 laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, the Just Transition Fund and the European Maritime, Fisheries and Aquaculture Fund and financial rules for those and for the Asylum, Migration and Integration Fund, the Internal Security Fund and the Instrument for Financial Support for Border Management and Visa Policy.

**and change requests. The application app was launched in 2020.** Next to mandatory and optional fields, the solution allows programmes to add programme-specific fields to the application form. This offers high flexibility to address programme specific requirements. Although its use is voluntary, most Polish programmes have already opted to use it in the current period.

### 5.3. Summary

Focusing on project implementation only, following a rather minimalistic approach, SL2014 successfully reduces the administrative burden for beneficiaries in many ways. SL2014 embodies a practical tool that provides a coordinated and well-developed set of features that address the most burdensome activities of project implementation. In Poland, national and regional OPs use similar management and control systems. The subsequent harmonisation of organisational structures, processes, rules, and concepts positively impacts SL2014 success. There is little need to take programme-specific requirements into account regarding the highly standardised transactional processes.

Regarding the period 2021-2027, it will be interesting to see how the newly developed solution will support application and change request related processes. Considering that information needs differ more substantially between different programmes in the application phase than they do in the implementation phase, the respective solution will offer programmes the option to extend the application form with programme specific information fields. One may expect that this balanced approach will lead to another example of good practice in the future.

#### Box 3. Summary of SL2014 good practices

##### Good practice examples showcased by SL2014

- Capturing information on expenses is facilitated by offering a tool to bulk import the data from excel files, preventing the necessity to enter data on each expense individually.
- Procurement and staff related information is central management and can be connected to different expenses.
- SL2014 provides powerful communication features that users accept as a replacement for email and other means of communication.
- All information related to project implementation is accessible in one place.
- For handling uploaded verification and other supporting documents, the system provides document management functionality.
- By integrating an easy-to-use e-signature feature, the system supports paper-free processes for private and public beneficiaries.
- SL2014 succeeds in providing a good balance between convenience (e.g., automatic pre-calculation of financing) and control (e.g., possibility to adapt pre-calculated financing if necessary)

Source: PPMI Consortium

# Annex

## List of interviewees

No.	Institution	Type of interview	Date of the interview
1	Department for Coordination of the EU Funds Implementation Ministry of Development Funds and Regional Policy	Policy perspective / technical perspective /	7 December 2021
2	Department of Analysis, International Cooperation and Information Department of Territorial Cooperation Ministry of funds and regional policy	Policy perspective / technical perspective / institutional	11 January 2022
3	Department of Management of the Regional Operational Program Marshal's Office of the Lubelskie Voivodeship in Lublin	Institutional user perspective	11 January 2022
4	Department of Management of the Regional Operational Program Marshal's Office of the Lubelskie Voivodeship in Lublin	Institutional user perspective	11 January 2022
5	NetPort Science Park	Beneficiary perspective	13 January 2022
6	Department of Supra-Regional Programs Ministry of Funds and Regional Policy	Institutional user perspective	11 January 2022
7	Contact Point Sweden South Baltic CBC Program	Beneficiary perspective	14 January 2022
8	Senior Specialist (Fund-Raising Office)	Beneficiary perspective	18 January 2022

## Various literature and other sources

Building Blocks for e-cohesion: good practices from Member States, regions and programmes, Version 2, December 2013

Ernst & Young, 2019. Background study for the Preparation of the Implementation Structure for the 2021+ Period. Available at: <https://dotaceeu.cz/getmedia/7fc9a367-c69d-49b2-b0b0-601f9de82ba6/2021- Final-Report.pdf.aspx?ext=.pdf>

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