Evaluation of e-Cohesion 2014-2020

In-depth case study – Electronic Monitoring System (eMS)

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Glossary of terms

BIRT	Business Intelligence tool that is widely used in the eMS community
eMS	Electronic Monitoring System – e-Cohesion and monitoring system developed for Interact
eIDAS	Electronic identification and trust services for electronic transactions in the European Union's internal market
eTrustEx	A tool used to support document exchange between DG Competition and external stakeholders
HIT initiative	Harmonisation and implementation tool initiative aimed at harmonising and simplifying concepts and tools across programmes
Jems	Joint Electronic Monitoring System, successor to eMS
Keep.eu	A platform that allows users to access information on Interreg programmes, projects and partners

List of abbreviations

AA	Audit Authority
CA	Certifying Authority
CF	Cohesion Fund
CPR	Common Provisions Regulation
EC	European Commission
ERDF	European Regional Development Fund
FLC	First Level Control
GDPR	General Data Protection Regulations
IB	Intermediate Body
JS	Joint Secretary
MA	Managing Authority
OP	Operational Programme
SFC	Structural Funds Management system
SCO	Simplified Cost Option

1.   Introduction

The over-arching aim of this in-depth case study is to provide other member states (MS) inspiring examples of good practices and lessons learnt to facilitate policy learning. The case study also provides useful information that should underpin efforts to set up and/or improve e-Cohesion systems in the 2021-2027 programming period. This report will examine the Electronic Monitoring System (eMS) about its development process, key features, user-friendliness, usefulness, and performance and identify and examine any barriers and challenges faced. The data that informs this report comes from semi-structured interviews with authority representatives (including those who use the system in an institutional and/or administrative capacity, i.e., 'institutional users' and those responsible for system management and development) and survey results from beneficiary respondents, who have used eMS to apply for funding under one of the 36 operational programmes (OPs) covered by this system.

Table 1. The cooperation programmes using eMS

| e-Cohesion system title	Electronic Monitoring System (eMS)
Years of operation	7 years (2015-2022)
ESI funds	ERDF
Cooperation Programmes	
IPA CBC Romania – Serbia (2014TC16I5CB002)	IPA CBC Croatia – Serbia (2014TC16I5CB003)
IPA CBC Croatia – Bosnia and Herzegovina - Montenegro(2014TC16I5CB004)	IPA CBC Italy – Albania - Montenegro(2014TC16I5CB008)
Interreg V-B - Adriatic-Ionian(2014TC16M4TN002)	Black Sea Basin ENI CBC (2014TC16M6CB001)
Interreg V-B - Danube(2014TC16M6TN001)	Interreg V-A - Belgium-Germany-The Netherlands (Euregio Maas-Rijn) (2014TC16RFCB001)
Interreg V-A - Austria-Czech Republic(2014TC16RFCB002)	Interreg V-A - Austria–Germany/Bayern(2014TC16RFCB004)
Interreg V-A - Germany/Bayern-Czech Republic(2014TC16RFCB009)	Interreg V-A - Austria-Hungary(2014TC16RFCB010)
Romania-Ukraine ENI CBC (2014TC16M5CB012)	Interreg V-A - Finland-Estonia-Latvia-Sweden (Central Baltic) (2014TC16RFCB014)
Interreg V-A - Germany (Mecklenburg-Vorpommern-Brandenburg) -Poland (2014TC16RFCB019)	Interreg V-A - Romania-Bulgaria (2014TC16RFCB021)
Interreg V-A - Germany-Austria-Switzerland-Liechtenstein (Alpenrhein-Bodensee-Hochrhein) (2014TC16RFCB024)	Interreg V-A - Latvia-Lithuania (2014TC16RFCB027)
Interreg V-A - Slovenia-Croatia (2014TC16RFCB029)	Interreg V-A - Italy-France (Maritime) (2014TC16RFCB033)
Interreg V-A - France-United Kingdom (Manche) (2014TC16RFCB040)	Interreg V-A - United Kingdom-Ireland (Ireland-Northern Ireland-Scotland) (2014TC16RFCB047)
Interreg V-A - Romania-Hungary (2014TC16RFCB049)	Interreg V-A - Estonia-Latvia (2014TC16RFCB050)
Interreg V-A - Slovenia-Hungary (2014TC16RFCB053)	Interreg V-A - Slovenia-Austria (2014TC16RFCB054)
Interact (2014TC16RFIR002)	ESPON (2014TC16RFIR004)
PEACE (IE-UK) (2014TC16RFPC001)	Interreg V-B - Alpine Space (2014TC16RFTN001)
Interreg V-B - Central Europe (2014TC16RFTN003)	Interreg V-B - Northern Periphery and Arctic(2014TC16RFTN004)
Interreg V-B - Northwest Europe (2014TC16RFTN006)	Estonia-Russia ENI CBC (2014TC16M5CB004)
Lithuania-Russia ENI CBC (2014TC16M5CB006)	Romania-Republic of Moldova ENI CBC (2014TC16M5CB011)

Source: PPMI consortium

eMS was chosen not only based on the survey results it achieved regarding functionalities and user-friendliness. There are other e-Cohesion systems supporting information

exchange for Interreg programmes that received higher user satisfaction rates than eMS. **This system was chosen as best practice derives foremost from the underlying process of harmonisation that shaped its development and the unique market position it holds in covering many different programmes implemented by many different member states.**

The following figure depicts eMS in the context of users, funds, and other systems: eMS helps manage programmes and projects funded by ERDF and other funds. Applicants, beneficiaries, and programme authorities have direct access to the system. eMS is directly connected to Keep.eu. In addition, some programmes make use of analytical features provided by business intelligence solutions (standard reports, OLAP (Online Analytical Processing)). Programmes' eMS installations are not directly connected to SFC2014, and eMS data is manually entered into SFC2014 using the SFC Web application.

Figure 1. Structure of eMS
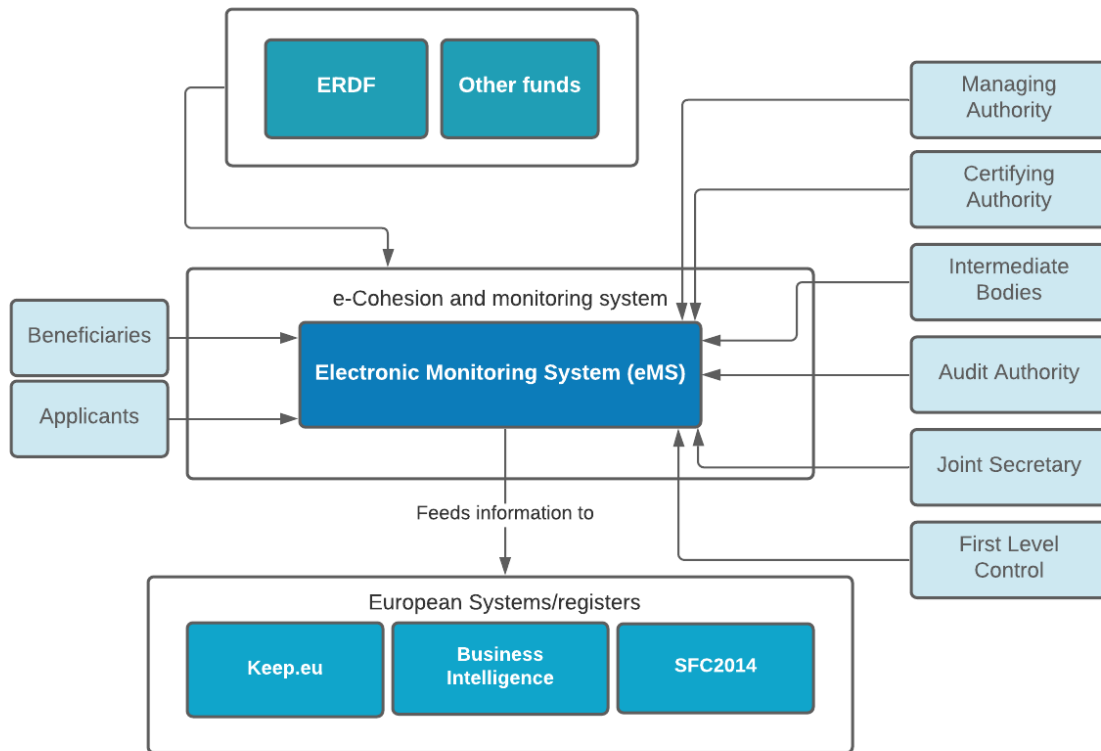
Source: PPMI consortium

For the period 2021-2027, eMS will be replaced by the Joint Electronic Monitoring System (Jems). eMS and its successor have more in common than their names. While Jems represents a start from scratch on the technical level, it represents more of an evolution than a revolution on the conceptual level. Regarding technology, Jems is modernised using Kotlin (a programming language) and Angular (a JavaScript framework), which is considered state of the art.

2. Development and operation of eMS

To understand why there was a need to develop a harmonised system such as eMS, and why it is considered a special case of good practice, we must take a slight detour; an e-Cohesion system is always part of a wider context in which organisational structures, processes, rules, and concept definitions play major roles. Today the market of e-Cohesion systems is, on the one hand, characterised by many e-Cohesion systems that are only used by one or a few OPs. On the other hand, a large share of OPs is supported by only a few e-Cohesion systems. This group of major e-Cohesion systems includes solutions such as Synergie (France), SL-2014 (Poland), and MIS (Greece), each of which supports more than 20 different programmes.

Figure 2. Types of systems used for Interreg programmes
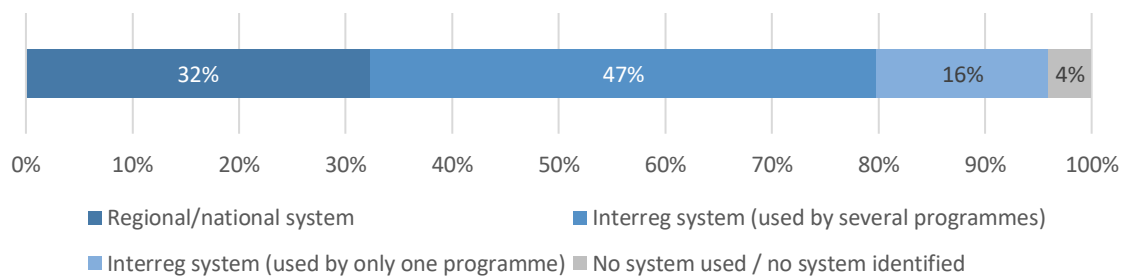
Source: PPMI consortium

However, when we look at the category of Interreg programmes, the situation is slightly different. A small number of programmes use no e-Cohesion system (or for which we could not identify one). Then we have a group of around 32% of Interreg programmes that use systems that are also used by national/regional programmes (Synergie, MIS (Greece), SL2014). The biggest group of Interreg programmes (47%) use e-Cohesion systems that were specifically developed for Interreg programmes, such as eMS (which itself is used by 36 OPs) and Interreg+ (used by four programmes). 16% of programmes use individually developed Interreg systems only used for one Interreg programme. In the context of regional/national programmes, the share of individually developed systems (a system only used for one programme) is nearly 25%.

One relevant factor is that Interreg programmes usually have a smaller budget than their national/regional counterparts. Thus, they often lack the necessary funds to develop and maintain programme-specific IT solutions. **Despite the challenges that Interreg programmes face** (financing sources, authorities and beneficiaries from different countries, different languages, currencies, cultures, and legal frameworks, as well as a rather large number of partners per project), **there is a widespread willingness for programme-crossing cooperation and harmonisation of concepts and tools**. Both factors promote the use of a community system. **eMS thus holds a unique position for implementing harmonised approaches and using synergies.**

2.1. European and national legal framework

In developing the legal provisions of e-Cohesion, the European Commission (EC) also considered the option to provide a common IT system for all member states and programmes to support information exchange between beneficiaries and programme authorities. eTrustEx – a tool used to support document exchange between DG Competition and external stakeholders, should have served as a basis. However, the EC concluded that such a project was not feasible considering the required time and effort. Existing rules, processes, structures, and IT support differed too much between member states.

Additionally, such a project would have interfered with ongoing developments in the member states' information exchange and IT monitoring systems. Nevertheless, having systematically analysed use cases of information exchange and possible approaches, the EC's feasibility study helped create a common understanding of requirements and triggered other initiatives.

When it was decided that the EC would not provide one common IT system to support information exchange between beneficiaries and authorities, **Interact[1] developed the idea to provide a common instrument for Interreg programmes to cover e-Cohesion and transactional monitoring-related requirement**s. Among Interreg programmes – specifically the smaller ones – many did not have any integrated monitoring system in operation nor tools to support electronic data exchange between beneficiaries and authorities. In addition, quite a few larger Interreg programmes were not satisfied with their current IT systems to support programme implementation. Thus, there was a clear need for an e-Cohesion system to manage Interreg programmes. Eventually, Interact decided to develop eMS. The aim was to support information exchange between applicants, beneficiaries and programme authorities and further transactional data processing related to verifications, financial management and the recording and storing of analytical information needed for audits, monitoring, and evaluation.

eMS thus represents a direct outcome of the e-Cohesion initiative. Another important trigger was the harmonisation and implementation tool (HIT) initiative, launched in 2014 by Interact. The HIT initiative aimed to harmonise and simplify concepts and tools across programmes to reduce ambiguities and enhance efficiency. The HIT initiative addressed the issue that concepts like 'contribution', 'co-financing' or 'progress report' are often defined slightly differently across programmes. In addition, the content of tools like application forms and financing reports often differs between different programmes. These inconsistencies were regarded as inefficient, making information exchanges and aggregations across programmes difficult. eMS thus embodies the application of definitions and tools put forward by HIT in an e-Cohesion/monitoring system.

2.2. Operational aspects of introducing and developing the system

Interact started the eMS development project by gathering a group of four Interreg programmes that wanted to contribute to the project. As part of the project team, they represented the perspective of the system's users. The four programmes that constitute the eMS core group include North-West Europe, Central Europe, Central Baltic, and Austria-Hungary. Together with Interact, the core group transformed the HIT templates into an appropriate information model considering the different elements (project, application, progress report, etc.), properties, and relations. HIT excluded definitions of processes and structures. Therefore, dynamic aspects such as use cases, the workflow, detailed sequences of actions, roles, and access rights still needed to be defined by the eMS project team. The resulting specifications were later implemented by the software development company contracted for the programming.

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[1]Interact is one of the four ERDF funded interregional cooperation programmes in the 2014-2020 programming period. Interact supports territorial cooperation programmes with free of charge services in areas such as knowledge exchange and standardisation of processes.

Table 2. Actors involved in the development and maintenance of eMS (project team)

eMS core group	Interact	Software development company
The eMS core group represents the user perspective and helps clarify requirements, and did large parts of the testing.	Interact is the owner of the system and is responsible for the development and maintenance, provides a helpdesk and project management, and organises user group meetings.	An externally contracted software development company is responsible for the programming of eMS.

Source: PPMI consortium

It is important to mention that Interact does not centrally host eMS. Every programme hosts its own eMS instance provides user training, helpdesk services and additional documentation. Interact's central helpdesk mainly offers technical support for issues on the programme level.

Interreg programmes operate in different member states using different languages and have different organisational structures, processes, and requirements. This underlines that **harmonising and simplifying concepts and tools demands a significant amount of effort**. The HIT initiative addressed this problem by analysing, synthesising, proposing, discussing, and negotiating processes with several Interreg programmes. HIT defines mandatory and optional information fields as well as business rules.

HIT largely excluded aspects of harmonisation of processes and structures of programme implementation, as differences in the division of tasks and hierarchy levels and the combination and order of activities were not within the scope of HIT. However, clear definitions of processes and user privileges were a vital prerequisite for eMS development – as they are to the development of any transactional IT system. The specifications of processes, roles and privileges were elaborated by the eMS core group.

The eMS development process was rather conventional. HIT definitions were transformed into extensive and detailed specifications, which were in the next step implemented into software artefacts. This linear approach was also the result of tight deadlines. In 2014 the development was signed, and in 2015 the first version – supporting the setup of programmes and calls and the application phase of projects – was deployed. Subsequent eMS versions integrated additional features that supported different project implementation activities – e.g., the creation, submission and verification of progress reports and financial management.

The approach has always been to develop a community system that could also be used by other programmes, even though the eMS core group covered only four different programmes. The aim was to keep the structure and functioning as open and generic as possible so that other programmes could join the user group in the future. The development of eMS was continuous as new programmes with new ideas, specific needs, and expectations joined the eMS user group. Moreover, the ongoing programme implementation process revealed additional necessities that were not identified beforehand. **Additional requirements were frequently implemented as additional privileges and configuration settings that programmes could activate or deactivate for certain calls or the entire programme**.

Change requests, which target the development of new features, are initiated by the programmes using eMS and their additional requirements. Interact then considers the utility of the feature for other programmes, its feasibility, and its influence on the existing eMS business logic. Afterwards, Interact discusses the utility of the feature and its priority with

the eMS core group members. If the request is positively assessed by the core group, the necessary adaptations and extensions are implemented according to the priority of the request. In addition to change requests managed by Interact, the eMS community differentiates between two types of programme-specific adaptations and extensions: Plugins and changes to the core system. Plugins provide additional features without changing the existing eMS source code. The scope of eMS plugins is limited to validation checks, overviews, reporting and analysis. In contrast to plugins, changes to the core system constitute changes to the eMS source code. The new eMS version published by Interact is based on an updated version of the source code. While plugins do not influence existing eMS business logic and can be added or changed without interfering with the eMS versioning process, changes to the core system (i.e., adaptations to the eMS source code) that Interact does not accept the need to be re-integrated with every new eMS version by programmes themselves. Whenever Interact publishes a new version of eMS source code (embodying a new eMS version), adaptations to the source code made by individual programmes need to be integrated into the new version of eMS source code – if these programmes want to benefit from new eMS versions.

3. Key features of eMS

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

Table 3. Main activity in eMS for each major user group

Type of user	Main activity in the system
Applicants / Beneficiaries	Applicants use eMS to create and submit applications. Beneficiaries have the role of Lead Partner or Partner. 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	The FLCs are, in some cases, centrally organised (one FLC for the entire programme) and, in other cases, decentrally organised (e.g., one FLC per member state or even one FLC per partner). FLCs can be public authorities or private auditors. The task of the FLC is to check the eligibility of the costs that partners submit during the project implementation phase. They do so by checking cost-related information in progress reports. The FLC hereby uses verification documents (invoices, contracts, timesheets) that can be uploaded to eMS. The use of this upload feature is optional. FLC-certified costs are transmitted to the Lead Partner for further processing.
Intermediate Bodies (IBs)	IBs carry out tasks such as handling day-to-day project management, delegated by the MA.
Managing Authority (MA) / Joint Secretary (JS)	The MAs of the different OPs use eMS to exchange information with applicants and beneficiaries and further transactional processes of financial management, verification- and programme-related monitoring. Tasks that include information exchange with applicants/beneficiaries include eligibility and quality checks of the application and verification of progress reports. Operational tasks of MAs are frequently delegated to a Joint Secretary.
Certifying Authority (CA)	The CA uses eMS to certify expenses and payment requests to the EC. The CA requests information for a specific time, and the system automatically generates the requested financial data. During the process of certification, the CA checks expenses. Financial corrections are made (withdrawals and recoveries) in case of irregular expenses.

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[2] European Union, 2013. Regulation (EU) No 1303/2013 Of the European Parliament and of the Council of 17 December 2013.

[3] European Commission, 2014. 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.

[4] European Commission. 2017. Questions & Answers on e-Cohesion Programming period 2014-2020 (ERDF, Cohesion Fund and ESF), EGESIF_17-0006-00, 06/04/2017.

Audit Authority (AA)	To support project-related audits, the AA receives read-only access to eMS.

## 3.1. Key principles

The principle of **only once encoding** is the central e-Cohesion minimum requirement that shaped e-Cohesion systems. The only once encoding principle requires that beneficiaries should not be asked for information they already submitted. Instead, e-Cohesion systems should re-use structured data that was gathered before. Possible sources include already submitted information and external databases such as government registers. In the following, we distinguish information previously entered into the e-Cohesion system (i.e., in previous steps) from information from external systems.

The only once encoding principle is realised by not asking for information twice or through pre-filled forms. eMS fulfils the only once encoding principle by re-using information in progress reports and change requests that were previously entered during the application. The application defines project-related data such as partners, work packages, financing rates and schedules that are then re-used in later steps of the project implementation.

Figure 3. Flows of pre-filled information
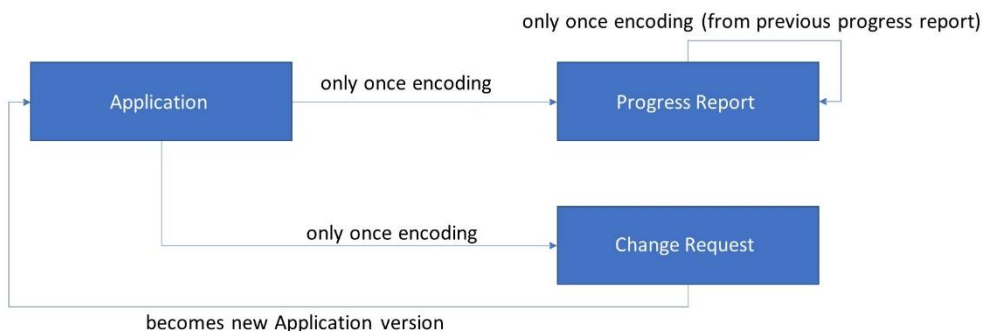
Source: PPMI consortium

Defined partners and work packages later appear as selectable options in interactive controls such as drop-down lists[5]. This prevents the need to enter the information twice and minimises the risk of inconsistencies. Financing rates and schedules that were defined in the application phase are used as a reference during later steps of the project implementation, i.e., financing rates defined in the application support the automatic calculation of financing amounts in the progress report, and schedules defined in the application are subject to validation of progress reports. On the level of applications, during a change request, only the relevant information needs to be adapted; the rest is left as is. In addition to application-related information, entries from previous progress reports are also used in later steps. In such cases, existing information is processed and completed instead

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[5]A drop-down list is a visual control element which allows users to select an item from a list.

of re-entered more than once. Accumulated numbers in financial progress reports show, for example, what has been achieved so far.

Figure 4. Re-used and pre-filled information in eMS
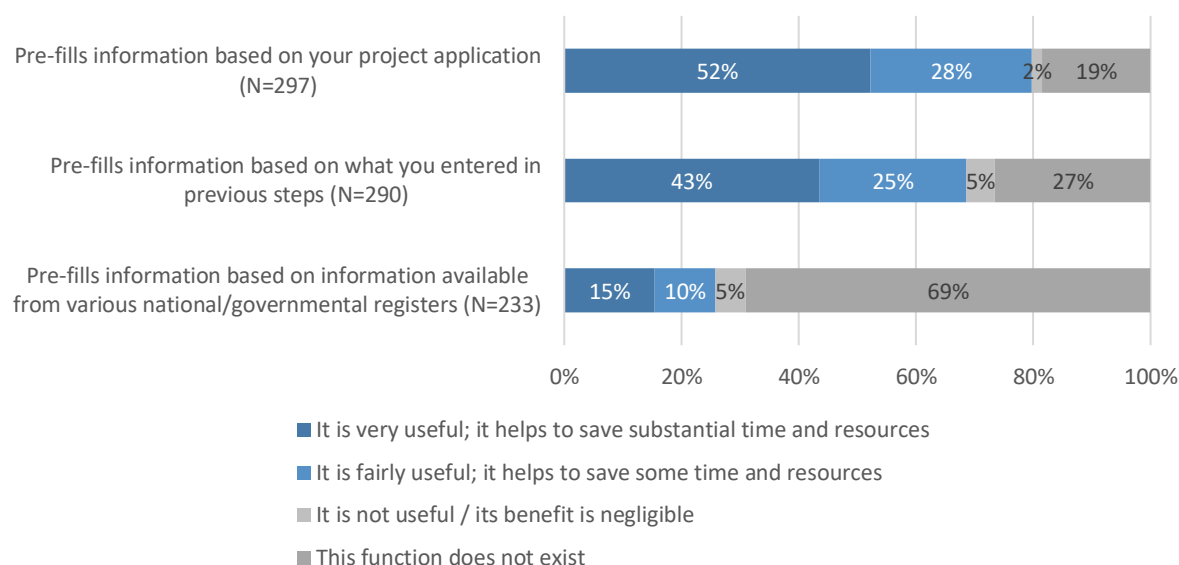
In the context of the case study, the second key principle of e-Cohesion systems, **interoperability,** is regarded from two perspectives: organisational collaboration and technical connectivity. From the perspective of organisational collaboration between different stakeholders engaged in programme implementation, namely applicants, beneficiaries, and authorities, eMS provides e-Cohesion-related features as an integrated part of a full-fledged transactional monitoring system. eMS supports different project selection and implementation steps and provides all involved roles with access to integrated data and necessary functionalities to fulfil their tasks. **Crossing process boundaries, all data processed and exchanged between applicants/beneficiaries and authorities is recorded and stored in one integrated database and is thus directly visible for institutional users that have the necessary privileges.**

Secondly, we regard the term interoperability from the perspective of technical connectivity between different software systems. As already mentioned, eMS enables data exchanges between applicants, beneficiaries, and programme authorities as an integrated part of a full-fledged transactional monitoring system. There is no conceptual or technical distinction between the front office accessible to applicants and beneficiaries and the back-office that supports authorities' work. The submission of information between beneficiaries and authorities consists of actions that are seamlessly integrated with project selection and implementation processes. Actions of information submission merely consist of a change of status of the respective information object (e.g., application or progress report). Such a status change often leads to a change of access rights of the different user roles involved.

Table 4. External systems connected to eMS

External System	Short Description	Exchanged Data	Decrease Of Administrative Burden
KEEP	KEEP.eu is a platform that allows users to access information on Interreg programmes, projects, and partners.	eMS uses an interface solution to automatically submit project and partner-related information to KEEP.	Information for KEEP is automatically provided/does not have to be manually extracted and transferred.
Currency calculation	The European Commission operates a website that publishes currency rates.	eMS uses an interface solution to automatically calculate amounts declared in other currencies into Euros.	Beneficiaries do not have to calculate currencies manually. Financial controllers have less work in checking the values.

Source: PPMI Consortium

Different programmes connected their eMS installation to different software systems for different purposes. In this respect, business intelligence tools such as BIRT to analyse and report eMS data are important.[6] In these examples, business intelligence tools are connected to the eMS database. In other cases, an external tool supporting project management-related tasks combines eMS data with additional project-related information, such as completed steps and information on users and timestamps. Because many different programmes use eMS, each covering beneficiaries from different member states, the connection to external government registers does not play a major role. eMS does not provide standard interfaces for realising such connections. Because connections to external national government registers are only applicable to a part of beneficiaries located in the respective member state, such solutions would always only be relevant to a part of the beneficiaries of a programme. eMS does not use the automatic interface solution provided by SFC2014 either. Compared to the effort required for the development and maintenance, the number of transactions and the amount of data exchanged within each transaction did not seem to qualify for the introduction of an automatic interface solution. eMS does provide **a standard connection to Keep.eu** to publish project and partner-related information. In addition, eMS integrates a functionality that automatically calculates currency rates, using a connection to a service provided by the European Commission. These connections operate in the background without beneficiaries noticing them.

3.2.   Key processes

eMS aims to support the whole project life-cycle, **including the project application phase, during which projects are selected and approved**. Additional programme implementation processes – as the submission of EC payment claims and management of withdrawals and recoveries – are likewise considered. eMS supports the application phase from the beginning: as soon as the applicant has received the login credentials, they can start creating the project and filling out the application form. Completed, checked, and submitted by the applicant, the application is checked by different authorities (JS, MA). Before its approval, the application form can be sent back to the applicant if something is wrong, missing, or needs further clarification. In our survey, most beneficiaries responded that they could only apply using eMS (more than 90%).

After the approval of the project, the applicant receives the grant letter. At this point in the workflow, programmes opt for different approaches: applicants can print out and upload the signed letter or/and send it (additionally) by post. Independently from eMS, **they could also**

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[6] BIRT is a Business Intelligence tool that is widely used in the eMS community.

use qualified electronic signatures to replace the necessity of a hand-written signature. After the grant letter's approval and transmission, applicants become beneficiaries, and the roles of Lead Partner and Partner are assigned to the different users. In addition, the First Level Control (FLC) is assigned to the project. In general – and according to HIT – Interreg programmes distinguish the role of Lead Partners and Partners. Lead Partners manage the application, change requests and progress reports on the project level. Partners provide information regarding the work packages to which they contribute. Partners submit information related to costs, financing, and physical project realisation during the implementation phase. The role of Lead Partner also covers all privileges and duties of the Partner role.

The FLC represents an intermediate body that checks and controls cost-related information submitted by project partners during the implementation of the project. Project partners periodically create and submit progress reports. Partners collect information on expenses and send them to the FLC. After its verification by the FLC, the expense-related information is sent to the Lead Partner. Based on the FLC-verified partner progress reports, including his own, the Lead Partner synthesises the information about the financial and physical progress of the project and submits the completed and checked project progress report to the JS/MA. A progress report synthesises information related to costs, financing, and indicators connected to a certain period on the project level.

Figure 5. Extent to which beneficiaries use eMS for key processes
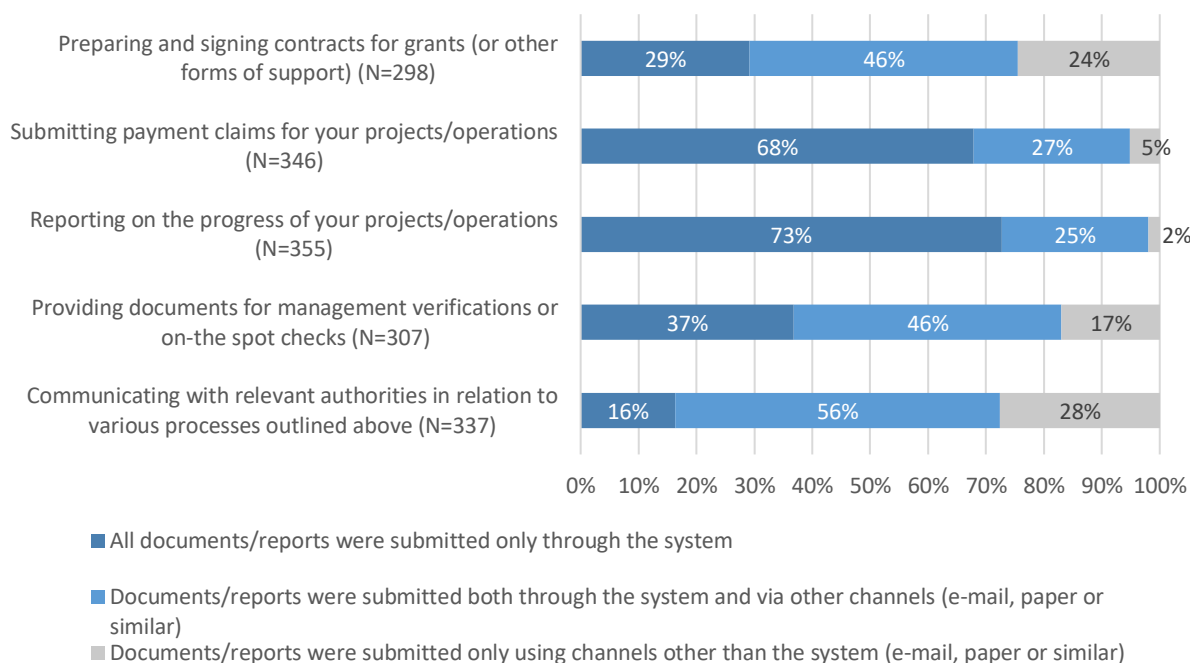
Source: PPMI Consortium – Beneficiary survey - Question 12: "When implementing your project/operation, to what extent did you use the indicated electronic data exchange system for the following processes:"

In addition, change requests are initiated by the Lead Partner. **The process of a change request, which considers changes to the original application during the project implementation, is fully supported by eMS**. As soon as the MA approves the change request, a new application version with the new settings is created, archiving the old version. Cost and financing-related information, the payment claim, forms an integrated element of the progress report both on Partner and Lead Partner level. Thus, from the perspective of beneficiaries, the creation and submission of payment claims and progress reports are covered by the same process. **In our survey, most beneficiaries responded that they exclusively used eMS to submit progress reports and payment claims**. However, a

quarter of beneficiaries responded that they use both eMS and other channels. One reason for this is that **some programmes do not allow beneficiaries to upload verification documents**.[7]

In general, **the support for exchanging information in the context of verifications and on-the-spot checks is less complete** than in the case of progress reports. Only 37% of beneficiaries responded that they were using eMS (and no other channels) for this purpose. Firstly, as mentioned before, some programmes do not offer beneficiaries the possibility to upload verification documents. Secondly, audits and on-the-spot checks are less standardised processes than submitting progress reports and applications. 17% of all responding beneficiaries answered they were only using channels other than eMS to exchange information/documents relating to verifications and on the spot checks. **It is even less common to use eMS for ad hoc communication.** On the one hand, 28% of responding beneficiaries answered they would only use other means (email, paper or similar). On the other, 16% responded that they would only use eMS for communication. Thus, **ad hoc communication between beneficiaries and authorities is scarcely standardised and takes place outside eMS most of the time**.

3.3. Key functionalities

eMS provides e-Cohesion-related functionalities to improve information exchange between beneficiaries and authorities, minimise errors, and reduce administrative burden. Indeed, **eMS provides automatic calculations and validations** in many ways. The automatic calculation is applied to the target and actual indicators, costs, and financing values. For example, progress reports show already realised indicator values accumulated from previous reports. Also, **simplified cost options (SCOs) and currency rates are automatically calculated.** Validation controls are provided on three different levels. Firstly, users with **the role administrator can specify properties like the maximum number of characters of a field and/or if it is mandatory**. Secondly, adaptable check **plugins are triggered to check the correctness of an application form or a progress report**. These check plugins consider relations between the content of different fields and programme-specific settings. Thirdly, there are also hardcoded **validation checks predefined by HIT** and cannot be changed by programmes.

According to their role and privileges, **users can track the status of documents they are working with**. For Lead Partners, the level of processing of a submitted progress report is visible, i.e. whether it has reached the JS, the MA or already the CA. Authorities have reading access to observe the content even before the document is transferred to their area of responsibility in which they proceed with their tasks (checking, correcting, commenting etc.). **All users receive a message by email whenever a document is transferred to their area of responsibility**, and they need to act. Whenever a change request is approved, a new application version is created. It is always possible for users to access previous versions of the application. In addition, eMS provides a feature to compare different application versions to consider the actual changes. **All users also have read-only access to all previously created, submitted, and fully processed progress reports**.

In general, eMS depicts information objects such as projects, partners and cost lines (invoices, expenses) in tables. Users can search for specific items by entering a search text into a column filter box. Users can also decide which columns should be visible by selecting and deselecting specific columns. **eMS supports multiple languages simultaneously**, and new language versions of the user interface can be easily added. Programmes can

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[7] Many programmes using eMS allow beneficiaries to upload unstructured verification documents in the context of submitting the progress report whilst other programmes that do not provide this option for beneficiaries.

also define the explanatory content of **tooltips** that appear when the user hovers over a control. In addition, **procurements and related contracts can be managed and connected to eligible expenses**. As mentioned, **eMS allows the upload of verification and other supporting documents as unstructured data** (pdf and other office files) at different sections (e.g. project and invoice). The maximum size for uploaded documents is defined by the respective prgramme authorities, and therefore varies.**Beneficiaries can export cost-related information from their accounting system into an excel file and upload the content into an eMS expenditure list** – doing so, they prevent the necessity to enter the same information manually into eMS.

3.4.   Key data security requirements

According to the minimum requirements defined by the EC, **eMS uses a simple login name and password combination to manage the authentication of users**. Nevertheless, eMS provides an interface to integrate a **qualified electronic signature** (eIDAS), but according to Interact, no programme uses this function. However, some programmes use a third-party tool to sign documents (e.g., contracts) uploaded into eMS. User actions are logged to create an audit trail, and old document versions are archived.

eMS uses database encryption for sensitive information, and the communication between clients and the webserver is SSL secured. Further security measures, e.g., to ensure compliance with DIN ISO 27001 and the level of availability, form part of the responsibilities of the programmes that use and host an eMS instance. eMS has also been the subject of many different audits. These include one initial audit that confirmed eMS compliance with minimal requirements launched by Interact and multiple systems and IT audits addressing the separate eMS instances operated by OPs. The audits found that eMS **complies with functional and non-functional data security and privacy requirements.**

4. Usefulness and performance of eMS

The following sections focus on the effects eMS had on the programmes using it. Starting with the overall usefulness and performance, looking at financial impacts and specific characteristics that derive from the position of a community system, we also consider beneficiaries' views on cost and benefits regarding certain processes and their evaluation of impacts. Secondly, we look at certain drawbacks and possible reasons for those. Finally, we focus on aspects of user-friendliness and beneficiaries' evaluation and comments.

4.1. Overall usefulness and performance

The development of a programme-specific solution generates costs and causes risks. Interact estimates that the cost savings for the programme authorities of cooperation programme when using eMS instead of an individually developed, national system are more than half a million euros.[8] These cost savings are especially important for smaller Interreg programmes that do not have the financial resources for other approaches. Programmes using eMS must cover operational service costs, such as hosting, maintenance, support, training, and adaptations.

eMS provides a wide spectrum of customisable properties, including multiple languages, currencies, funding rates, funding sources, priorities, thematic objectives, indicators, privileges, roles and processes. Because of the large group of cooperation programmes using eMS, the development team strongly emphasised customizability. In addition, programmes using eMS benefit from a large scale of additional services that Interact provides, such as:

- a helpdesk to manage incidents and user requests that cannot be resolved by the decentralised helpdesk of the JS/MA
- documentation and training material, including technical and userdocumentation
- training videos
- a web-based collaboration platform that programmes can use to exchange ideas and discuss eMS -related issues and resolutions.

Beneficiaries responding to our survey confirmed the usefulness of eMS and its support of the application and implementation phases. 85% agree that benefits outweigh costs regarding the handling of applications. This number increases to 88% when it comes to handling progress reports. However, it decreases to 70% when it comes to the support of verifications and on-the-spot-checks.

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[8] EPCR, 2019. Case-based Impact Evaluation of the Interact Programme 2014–2020. University of Strathclyde.

Figure 6. Beneficiary survey results on benefits vs. costs of key processes

Process	Strongly agree, benefits exceed costs	Agree, benefits exceed costs	Disagree, benefits do not exceed costs	Strongly disagree, benefits do not exceed costs	The system does not support this process
Creating, submitting or modifying applications for funding (N=293)	41%	44%	7%	4%	3%
Creating, submitting or modifying payment claims (N=247)	28%	44%	10%	2%	16%
Creating, submitting or modifying progress reports (N=343)	41%	47%	9%	2%	1%
Processing contracts for grants (or other forms of support) (N=318)	39%	44%	10%	4%	3%
Submitting documents relating to management verifications on-the-spot checks (N=276)	28%	42%	12%	3%	15%

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:"
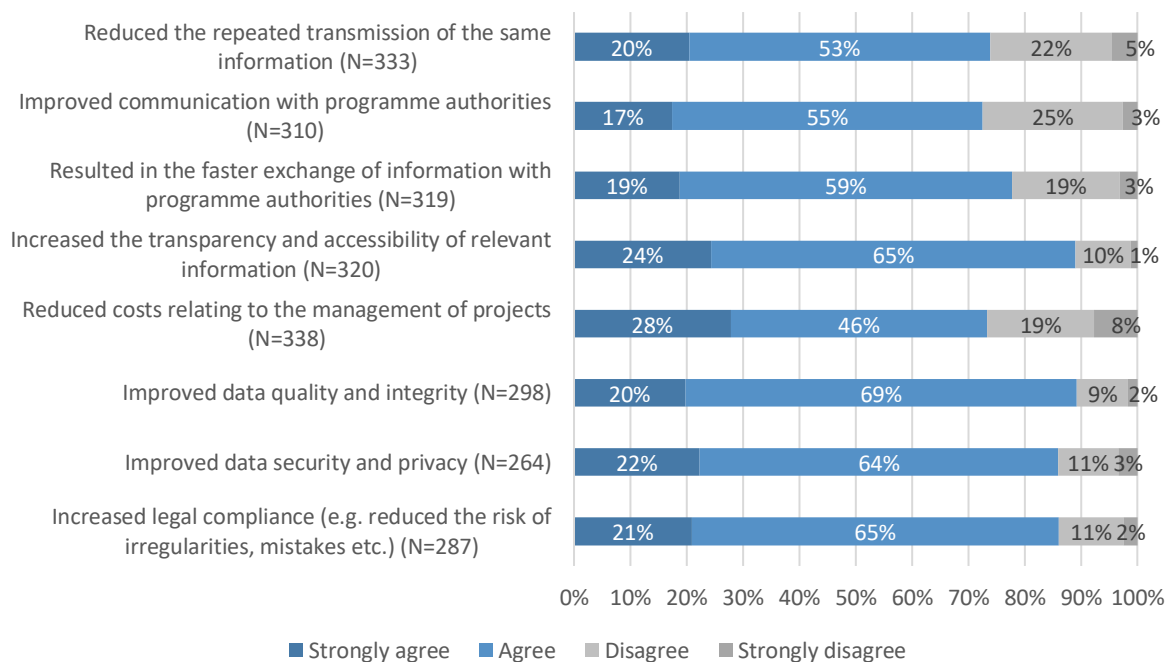
Beneficiaries that took part in our survey widely confirmed that using eMS positively impacts key aspects of operational processes. Specifically, respondents appreciate transparency and accessibility of relevant information and data quality improvements. A big part of beneficiaries (86%) also agrees that data security and compliance improvements were realised. A smaller share of beneficiaries agrees that improvements in communication (72%) and reductions of repeated information transmission (73%) were achieved.

Figure 7. Impacts of eMS introduction

Impact	Strongly agree	Agree	Disagree	Strongly disagree
Reduced the repeated transmission of the same information (N=333)	20%	53%	22%	5%
Improved communication with programme authorities (N=310)	17%	55%	25%	3%
Resulted in the faster exchange of information with programme authorities (N=319)	19%	59%	19%	3%
Increased the transparency and accessibility of relevant information (N=320)	24%	65%	10%	1%
Reduced costs relating to the management of projects (N=338)	28%	46%	19%	8%
Improved data quality and integrity (N=298)	20%	69%	9%	2%
Improved data security and privacy (N=264)	22%	64%	11%	3%
Increased legal compliance (e.g. reduced the risk of irregularities, mistakes etc.) (N=287)	21%	65%	11%	2%

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:"

4.2.   Drawbacks to usefulness and performance

Drawbacks of eMS are frequently connected to programme-specific requirements. Implementing programme-specific requirements causes complexity, while the non-consideration often causes malfunctioning workflows on the programme level. As eMS aimed to support a wider range of programmes, a wider range of requirements must be considered. This situation differs from systems that merely support one programme or are implemented in the same organisational context (same management authority, management and control system, language, and/or same member state). This approach necessarily leads to compromises.

On the one hand, eMS often implements programme-specific requirements such as call settings and privileges. This approach often leads to dependencies with existing business logic, complexity, and bugs. The resulting complexity was the main reason for the decision to start from scratch for the new period 2021-2027 and draw from lessons learnt for the Jems development.

On the other hand, there are limits to eMS customisability; the existing eMS plugin functionality is restricted to validation, overviews, analysis, and reporting. It is not possible to add new information fields or data changing functionalities without changing the core of eMS. And changes to the core of eMS cause the above-mentioned increase of complexity.

In addition to programme-specific requirements, other issues that do not derive from eMS' position as a community system affect all users (including beneficiaries), such as:

- eMS does not persistently store total amounts of financing on the most detailed level. Calculated values that are not stored in the database need to be recalculated whenever needed. This causes rounding issues when data is on-the-fly recalculated slightly differently for different overviews and standard reports.

- When calculating financing for a progress report, eMS does not consider what has been financed in previous progress reports. This causes unexpected results whenever financing rates change for partners, which is always the case when a new financing source is assigned during project implementation. For the CA, this causes the necessity to maintain extra excel sheets that appropriately recalculate financing. Partners with changing financing sources or for which financing rates change for other reasons face the inconvenience that eMS shows financing amounts that differ from the amounts they receive.

- eMS does not consider a unique partner ID on a project-crossing level. Data on partner organisations active in different projects is redundantly recorded and stored for identification, aggregation and reporting of information. This impedes an easy identification, aggregation, and integrated analysis of partner-related information on a project-crossing level. A unique partner ID would also benefit partners managing different projects.

- eMS does not provide a feature to manage staff cost-related information, e.g., on employment contracts, hourly rates, and timesheets effectively, despite the fact that project staff costs play a major role in a lot of Interreg projects. Information on calculated hourly rates and work schedules is often redundantly recorded and stored, which causes double work and the risk of inconsistencies.

- eMS does not provide a feature to signal combinations of double dates, invoice numbers and similar invoice amounts. With partner reports being checked, adapted, and sent back and forth between partners and FLCs, there runs a risk of double entries of the same invoice.

Still, many of the remarks on eMS' weaknesses from the beneficiary survey also consider issues that have little to do with eMS itself but result from the non-use of available features

or programme-specific rules, structures, and processes. In many cases, eMS does provide the respective features. However, they are not used in the context of certain programmes. An adaption of eMS configuration, such as a defined process or rule, would bring the change here.

Box 1. Beneficiary quotes on weaknesses of eMS[9]

Handling of verification documents

- *"All personnel documents and invoices must be sent in the original and paper form."*
- *"The possibility to upload larger document files (I need to split them into many folders to upload, but it takes much time and might be confusing."*

Excel upload for expenses

- *"Typing each invoice in the system manually is very time-consuming and not effective at all. Each institution can provide export from the accounting system and send it to controllers. Unfortunately, eMS requires to type all this information from the accounting manually."*
- *"The fact that we cannot import financial data from an excel file makes the work of entering each financial data extremely long and painful."*

Performance and stability

- *"The response time and stability of the system is not adequate and works extremely slow during times of high traffic. It requires further improvement."*
- *"It got blocked many times during the reporting periods"*

Rounding and calculation

- *"The number rounding is different in the eMS system than e.g., in Excel."*
- *"Rounding problem that appears in different sections of the system"*

User-friendliness

- *"Lack of training - lack of update of the information - lack of clarity of the information displayed."*
- *"Various financial formulas were highly unclear. Good explanations were missing."*

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?"

As seen in Box 1, quite a few beneficiaries using eMS commented (in response to the open-ended question on weaknesses provided in our survey) that they could not upload verification documents and transfer these to the FLC. Instead, they must transfer these documents by email or post. While eMS allows the upload and transmission of verification documents, all programmes do not use the upload feature. According to the results of our interviews, there are three main reasons why some programmes do not use the feature:

- Concerns regarding the necessary disk space as some verification documents are large.
- Concerns regarding the legal validity of digitised verification documents.
- As some programmes had already started project implementation without using eMS, they did not want to confuse by adapting the existing process.

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[9] Quotes have been corrected and condensed for spelling and grammatical mistakes to enhance clarity.

Several **beneficiaries** also commented in the survey that they **could not upload certain file types (e.g., PNG)** or that there were **restrictions regarding the size of those files**. Both properties can be adapted individually by OPs using eMS. There were also complaints from beneficiaries about a missing interface to connect accounting systems and that information on every individual invoice had to be inserted manually instead. However, eMS does provide a feature to import bulk invoices via Excel files that programmes can activate.
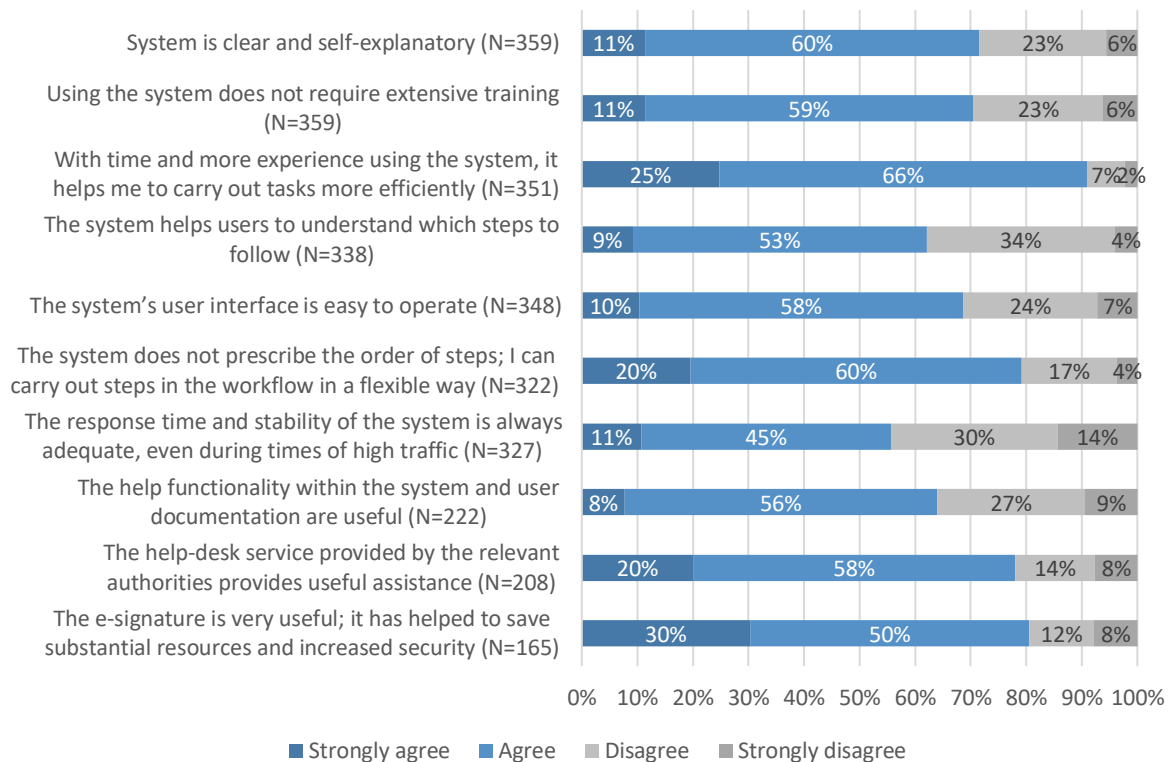
Respondents also criticised that **eMS does not offer an integrated feature to replace the handwritten signature for legally binding documents**, such as contracts, confirmations, and declarations. By restricting access using just username and password, eMS uses a simple electronic signature. According to the rules of certain programmes and in line with EC provisions, this form of authentication is sufficient to enable legally valid information exchange within a closed user group. For other programmes and member states, this is not legally sufficient to replace handwritten signatures. Therefore, these programmes opt to sign documents using a qualified electronic signature independently from eMS. The legally valid exchange of digitised documents is more demanding across borders than within one single member state. In this context, eIDAS provides a standard to enable legally binding electronic transactions between different member states, which is currently under consideration for implementation in Jems.

4.3. User-friendliness and user satisfaction

The user-friendliness of eMS needs to be differentiated by the different programmes it supports. There is a lot of variation, with beneficiaries of certain programmes indicating the user-friendliness of eMS as very high (compared to individually developed systems). This shows **the importance of the services that cooperation programmes provide and the use of available features.** The results also depend on situational factors and how eMS user-friendliness is compared. It is important to consider the starting point and the system or tools that programmes used in previous periods.

Overall, the beneficiaries we surveyed **expressed high satisfaction** with most aspects related to the system's functioning, with an average level of agreement of 72% (strongly agree or agree).

Figure 8. eMS user-friendliness

Statement	Strongly agree	Agree	Disagree	Strongly disagree
System is clear and self-explanatory (N=359)	11%	60%	23%	6%
Using the system does not require extensive training (N=359)	11%	59%	23%	6%
With time and more experience using the system, it helps me to carry out tasks more efficiently (N=351)	25%	66%	7%	2%
The system helps users to understand which steps to follow (N=338)	9%	53%	34%	4%
The system's user interface is easy to operate (N=348)	10%	58%	24%	7%
The system does not prescribe the order of steps; I can carry out steps in the workflow in a flexible way (N=322)	20%	60%	17%	4%
The response time and stability of the system is always adequate, even during times of high traffic (N=327)	11%	45%	30%	14%
The help functionality within the system and user documentation are useful (N=222)	8%	56%	27%	9%
The help-desk service provided by the relevant authorities provides useful assistance (N=208)	20%	58%	14%	8%
The e-signature is very useful; it has helped to save substantial resources and increased security (N=165)	30%	50%	12%	8%

■ Strongly agree ■ Agree ■ Disagree ■ Strongly disagree

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:"

To gain some more perspective on user satisfaction, we asked respondents in the beneficiary survey to describe the good practices of the system (open-ended question). Many of these are related to functionalities that enhance user-friendliness, e.g., interactive forms such as automatic validation and calculations, pre-filled forms, dashboards providing overviews, etc.

Box 2. Beneficiary quotes on good practices of eMS[10]

Validation and automatic calculation

- *"Budget items (its automated calculation for each partner and distribution between lines and periods of the budget) are very good."*

- *"Automatic calculations (ie planned cost, remaining budget, effective funding, etc.). Integrated automatic controls (validation checks), such as checking missing or incorrect data, fields left blank, etc"*

Pre-filled forms

- *"The data recovery functions of the previous receivables (Execution List of Excel) and pre-filling data make it possible to simplify our work.*

- *"Pre-filled forms according to the application form really helps with submitting the progress reports"*

Transparency and data integration

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[10] Quotes have been corrected and condensed for spelling and grammatical mistakes to enhance clarity.

> - *"Dashboard providing overviews (i.e., project living tables) are useful to double-check our project dashboard we use internally. Good also to have access anytime to the projects' official documents."*
>
> - *"The overall overview of all partners data, especially real time access to their reports as well as the certificates from FLC, validation of data by system"*
>
> **User-friendliness and flexibility**
>
> - *"System is really easy to operate. All reporting project documents can be submitted in the system, there is no need to send any documents through other communication channels."*
> - *"The system does not prescribe the order of steps, [it is] flexible."*

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?"

There are, however, some aspects that negatively affect eMS' user-friendliness, which is overall quite high. Compared with other, very user-friendly systems included in this case study sample, eMS' user-friendliness is lacking. We discuss these aspects below:

A lack of self-descriptiveness: 71% of responding beneficiaries valued the degree of self-descriptiveness of the system as sufficient. For some systems, this figure is above 80%. 70% agreed with the statement that no training was necessary. eMS users are sometimes not kept informed about the status of the workflow and available steps to follow. According to the survey results, most beneficiaries do not use the system more than a few times per month, which affects the necessary degree of self-descriptiveness.

Complex structure: Only 68% of responding beneficiaries valued the user interface as easy to operate. For some other e-cohesion systems, this figure is above 85%. The general structure of the user interface is rather complex, the navigation is tedious (e.g., between application and progress report), and patterns of interaction are not always consistently implemented.

Low response time: The performance and stability of the system are valued as low. Only 56% of responding beneficiaries valued performance and stability as sufficient. Because of eMS' complexity and the technology used demands rather high server capacities.

The lack of eMS user-friendliness isn't merely caused by problems within the presentation layer, i.e., the design of the user interface. The complexity of the underlying business logic, existing bugs, and a lack of efficiency also play a role. **Nevertheless, 91% of responding beneficiaries confirmed that eMS supported them in realising their tasks more efficiently.**

5.   Good practices, challenges and lessons learnt

This section presents a synthesis of the good practices and lessons learnt of eMS uncovered through this case study. The aim is to provide effective solutions for other member states and identify the pitfalls and mistakes that may occur when implementing e-Cohesion systems. 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

The reoccurring themes of this case study are standardisation and flexibility, two competing objectives that need to be reconciled. Apart from programmes with highly harmonised structures, processes, and rules, standardisation and flexibility play important roles in developing and operating every e-Cohesion system. It is often the case that internally, programmes must handle specific requirements, frequently appearing on the level of intermediate bodies. Therefore, the following good practices and lessons learnt can be transferred to a wide range of other, not only Interreg, programmes.

The eMS project team addressed the question of standardisation and flexibility by following two main strategies:

1. Harmonisation and simplification
2. Openness for extensions and customisations

According to members of Interact and other interviewees, **the main advantage of using eMS is not so much seen in the software itself but in the exchange of ideas, the creation of a common understanding and shared knowledge of best practice approaches**. These are seen as the main advantages from which OPs using eMS benefit. The underlying force is the HIT-driven strategy of harmonisation and simplification. Collaboration is regarded as one of the core competencies of Interreg programmes, and the discussion, questioning, and scrutinising of conventional practices often lead to simplifications.

Unfortunately, the possibilities of harmonisation are not without their limits. On the one hand, eMS plugins offer the possibility to add validation, adapt overviews and add standard reports, and use the data in a wide range of business intelligence tools. Plugins do not interfere with existing eMS business logic and can be easily exchanged and shared between programmes. On the other hand, it is impossible to add additional fields or business logic or change the workflow or user privileges with the help of eMS plugins alone. eMS implements these requirements by offering customisable properties such as call settings and the flexible assignment of privileges to roles.

The development of the next generation community system, called Joint Electronic Monitoring System (Jems), will further use good eMS practices and lessons learnt.

Jems is stripped of many programme-specific options. The strategy is to keep Jems less open for programme-specific adaptations while at the same time integrating programmes more strongly into the development process. At the same time, Interact emphasises that Jems architecture is more open to realising plugin solutions than eMS. It has not been decided yet which domains the development of flexible plugin solutions will be made possible. Solutions for plugins will be realised according to identified and formulated flexibility needs of the Jems user group. The priority of a flexibility requirement depends on the number of programmes that have it, its urgency and technical feasibility. Possible future

candidates include payments and financing, additional application fields, the integration of a qualified electronic signature, and interfaces to external systems (e.g., SFC).

For the current development of Jems, Interact opts for an agile approach characterised by a high degree of user involvement. Members of the core group represent the perspective of future users within the project team, define requirements that describe wanted features, discuss the implemented results with Interact and the developer and do large parts of the testing. Programmes interested in the development of Jems are invited to take part in sprint review meetings every two weeks. Recently developed features and adaptations are presented and discussed during each sprint review meeting. These meetings are highly appreciated by programme authorities and regularly attended by participants representing more than 40 programmes.

A big part of the users, name beneficiaries and financial controllers (FLCs) wasn't sufficiently involved in eMS' development. Because of the short timeframe and budget restrictions, effectiveness and compliance were primarily focused at the expense of other aspects of user experience, such as efficiency, user-friendliness and sustainability. **The Jems project team learnt from the shortcomings, with current beneficiaries and financial controllers actively involved in the development process.**

In contrast to the development of Jems, at the time when eMS was developed there was no previous reference point (as eMS represents for Jems). When the support for the application phase was developed, information objects of the implementation phase, like the progress report, weren't clearly defined yet. This led to dependencies (e.g., between application and progress report) or implications of change requests initially not having been correctly considered. **The Jems project team has set up a road map that outlines the entire project scope considering dependencies. Also, the HIT initiative for 2021-2027 (HIT 2.0) focused on existing dependencies between different information objects (foremost between application and progress report).**

The development of Jems additionally addresses some of the eMS' functional shortcomings. The partner entity is extended with an attribute that can hold a unified beneficiary ID. This provides the possibility to aggregate and present partner-related information (budgets, financing, indicators) in a project-crossing manner. In addition, Jems offers authority users direct access to the audit log. This allows business users to check user logins and actions without asking an IT expert with knowledge of SQL. Jems provides better support to handle Simplified Cost Options (SCOs). Furthermore, properties such as access rights and the status-dependent visibility of fields can be configured without programming. Jems will also provide overviews with information that can be directly taken over into SFC. However, whether Jems will use the SFC automatic interface solution has not been decided yet. In this respect, the relation between benefits (mainly depending on the number of executed transactions and the amount of data per transaction) and costs for development and maintenance needs to be considered.

At the time of writing, 45 programmes have already signed the Jems licence agreement. Compared to the number of programmes using eMS, this already represents an increase of 25%. There are still quite a few Interreg programmes that have not decided yet which e-cohesion and monitoring system they will use in the new period.

5.2.   Barriers, challenges, and lessons learnt

For the upcoming period, it is expected that eMS lessons learnt will facilitate and support the development and operation of the next generation community system and make use of its additional potential. There are, however, some barriers and challenges that need to be considered.

Unlike the situation when eMS was first developed, the group of programmes using Jems is large from the beginning. Consequently, coordination and addressing the growing number of issues on time are more demanding. Growing user expectations exist regarding user-friendliness and programme-specific requirements. The adaptation, development and deployment of subsequent features need to be prioritised.

Finding a balance between standardisation and flexibility remains a challenge. On the one hand, this demands harmonisation, the unification of concepts, processes, structures and rules, the identification of best practices and the willingness to compromise; it is foremost a task for programmes using Jems. On the other hand, it demands flexibility, providing useable solutions to support remaining programme-specific requirements, which is foremost a task for developers.

5.3.   Summary

Creating and operating a community system is a continuous work in progress. It is not finalised in one step, nor does it follow a predictable path. It is implemented in continuously improved concrete solutions that provide practical use. eMS started this process with a more powerful result than most expected. Being already used by a third of all Interreg programmes, the development and operation of eMS have been a huge step forward to demonstrate that the development and operation of a community system are possible. It serves as a good practice example for other programmes or programmes whose contexts are characterised by divergent situational factors.

The development of eMS foremost focused on the general support of all processes (effectiveness) and compliance with legal provisions. Less emphasis was put on achieving equally high degrees of user-friendliness and process throughputs (efficiency), aspects that Jems development (the e-cohesion and monitoring system developed by Interact in view of the 2021-2027 programming period) considers with more emphasis. Even though eMS, compared to other solutions developed for individual programmes, does not offer the highest degree of usability, it offers a high degree of usability for the highest number of programmes. It would have been difficult or even financially impossible for some of these programmes to follow another approach. It provided vital lessons on the importance of reconciling standardisation and flexibility. The eMS project team followed several key strategies: harmonisation, simplification, and openness for extensions and customisations.

With already 45 programmes having signed the Jems license agreement, it becomes clear that more and more Interreg programmes realise the benefits of using a community system. In the new period (2021-2027), first calls for projects have started using Jems and, considering aspects like self-descriptiveness, performance and efficiency, the received feedback from beneficiaries is very positive.

Box 3. Summary of eMS good practice examples

> **Good practice examples showcased by eMS/community system**

- The community system provides programmes with a free of charge fully functional e-Cohesion and transactional monitoring system. This leads to a significant decrease in development, operation, and maintenance costs. It also leads to a reduction of risks considering compliance with legal requirements and meeting other project objectives.

- Programmes using the community system benefit from best practice approaches and possible exchange of experiences with other programmes. Within the beneficiary and authority organisations, there is a growing workforce of skilled staff members as more and more Interreg programmes make use of the system.

- The community system is tailored to the needs of Interreg programmes, addressing crucial requirements considering aspects such as translation, currency calculation and integration of many project partners. The community system aims to support different programmes and offers a wide range of options to address programme-specific requirements.

Source: PPMI Consortium

Annex

List of interviewees

No.	Institution	Type of interview	Date of the interview
1	Interact Vienna	Technical perspective	3 December 2021
2	Interact Vienna	Technical perspective	3 December 2021
3	Interact Vienna	Technical perspective	3 December 2021
4	City of Vienna	Policy perspective	7 December 2021
5	City of Vienna	Policy perspective	7 December 2021
6	Ministry of Economy of Mecklenburg-Western Pomerania	Institutional user perspective	8 December 2021
7	Ministry of Economy of Bavaria	Institutional user perspective	8 December 2021
8	Regional Council of Southwest Finland	Institutional user perspective	10 December 2021
9	Labocea, Brest	Beneficiary perspective	14 January 2022
10	Emschergenossenschaft / Lippeverband, Essen	Beneficiary perspective	18 January 2022
11	Flux 50, Brussels	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

EPCR, 2019. Case-based Impact Evaluation of the Interact Programme 2014–2020. University of Strathclyde.

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

European Commission, 2014. 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

European Commission. 2017. Questions & Answers on e-Cohesion Programming period 2014-2020 (ERDF, Cohesion Fund and ESF), EGESIF_17-0006-00, 06/04/2017

European Commission, 2020. eGovernment Benchmark 2020 - eGovernment that works for the people. Available at: https://ec.europa.eu/digital-single-market/en/news/egovernment-benchmark-2020-egovernment-works-people

European Union, 2013. Regulation (EU) No 1303/2013 Of the European Parliament and of the Council of 17 December 2013

European Union, 2021. 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.

Interact. Manual, based on eMS v. 3_2.1. Available at: https://www.interact-eu.net/

Pucher, J., Naylon, I. and Tödtling-Schönhofer, H., 2016. Research for REGI Committee - E-Cohesion, Metis Gmbh. Available at: https://www.europarl.europa.eu/RegData/etudes/STUD/2016/573442/IPOL_STU(2016)573442_EN.pdf