SUDTE

Supporting Universities in the Digital Transformation in Erasmus+

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Comparative Analysis of Functionalities of Digital Tools

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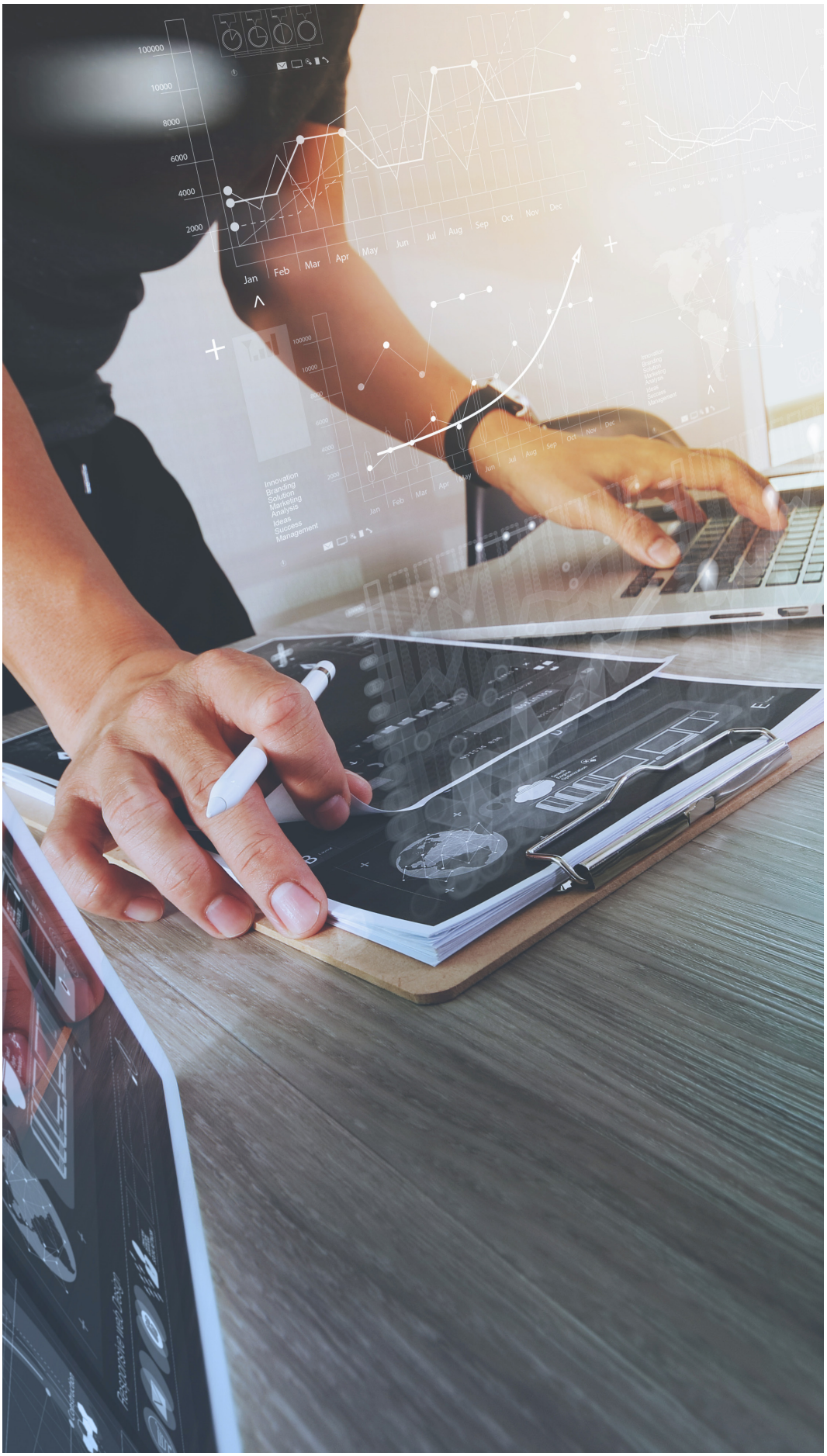
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1. Introduction

The digitalisation is one of the EU›s priorities, has started to show its effects on the digital transformation of the Erasmus Programme.[1] Thanks to Erasmus Without Paper (EWP) European Commission aim to bring Erasmus administration into the 21st century by going digital. EWP is a digital solution for higher education institutions to connect their Erasmus+ mobility management systems so they can manage their mobility students online.[2]

Ensuring a secure and electronic network that enables the electronic exchange of student data between HEIs is an essential part of Erasmus Student Card initiative. Thanks to Erasmus Without Paper Project, the EWP network was made available from late 2018. In order to connect to the network, HEIs can continue using commercial software (like SOP's Mobility-Online and QS Unisolution's MoveON), build a connector to their own in-house system or use the EWP - Erasmus Dashboard. HEIs can choose to adopt one of the three scenarios that fits best for their institutions.[3]

The main principle behind EWP is that as a higher education institution you maintain your existing system for managing student mobility and connect this to the EWP network. When an institution wants to implement paperless erasmus procedures following regardless of any of the three methods mentioned above, practitioners need to understand what services are available by each tool and how, as with the introduction of any new innovation. For example, universities who do not have an in house SIS or 3rd party service provider, they need to consider using cloud based Erasmus-Dashboard. This is a tool designed to support HEIs with the administration of mobility. It allows IROs to manage incoming and outgoing students. However, this platform does not provide some of the basic features that an institution needs for the management of the mobilities such as receiving applications online, document upload and placements. Another obstacle can be encountered when connecting the in-house SIS to the EWP network which requires high ICT skills and knowledge of privacy issues. Finally dealing with the limited number of 3rd party service providers who have the expertise in EWP network, may be too costly.

It is therefore vital to explain and highlight the workings of such complex systems that requires a lot of testing and improvements for the end-users in order to ensure the tools are fit for the purpose. Furthermore, it is debatable that every institution has the same capacity for the IT infrastructure and common data standards for interoperability between their peers. Full interoperability means that all computer systems used by higher education institutions can seamlessly exchange machine-readable data among themselves to manage Erasmus+ inter-institutional agreements and learning agreements. Thus, it is highly crucial to know which tools offer the best result and provide a successful roll-out when facilitating online mobility management infrastructure.

The objective of this report is to enable the HEIs with all their stakeholders such as IROs, department coordinators and students to compare the performance of the three digital tools in achieving paperless Erasmus management. In order to address on the above mentioned needs, the SUDTE (Supporting Universities in Digital Transformation in Erasmus+) project consortium carried out the following 5 step approach illustrated in Figure 1.

1 Kavrar, Cankaya Kurnaz, 2022.
2 https://erasmus-plus.ec.europa.eu/european-student-card-initiative/ewp
3 https://erasmus-plus.ec.europa.eu/european-student-card-initiative/ewp/how-to-join

Figure 1. Stages of Functional Analysis Report

Functional Analysis				
Maintaining the existing technological infrastructure for digital Erasmus Mobility.	Outlining the meanings and use cases of APIs.	Testing the functionalities of the tools for OLA and IIA	Interview with third party providers	Report from a functional review perspective

First of all, participating universities (Selçuk University, University of Vigo, Izmir Institute of Technology, University of Naples Federico II) have maintained their existing mobility management infrastructure to get ready for the digital transition. The consortium partners had the following digital structure to manage Erasmus mobility at their institutions:

- SU has a commercial software called KION
- IZTECH has an in house system
- UNINA has no using software, using excel based management
- UVIGO has a commercial software called MoveOn

In addition to this technical infrastructure alignment procedure, the EWP network system design in connection with Erasmus Mobility documents will be explained to have a clear picture of what is required for this digital transition. Therefore, the meaning and the functions of the APIs in the HEI/API Coverage Matrix available on the EWP Registry page were investigated.

Thirdly, all the partner institutions have tested their tools to make sure they are working interoperable and ready to carry out outgoing student mobility workflows from the beginning to the end. Due to the limitation on the readiness in digital transformation of the programme stakeholders, our report will explore the functionalities of IIA and OLA as of December 2022.

The next, a special consideration was given to the cooperation with 3rd party service providers. The interviews were carried out with KION, ERASMUS PORT, MOVEON and CINECA. In this context, the point of service provider's view will be evaluated in a comparative way and a road map will be proposed for institutions that will be new to the EWP system or have problems connecting to it.

Finally, based on the collected data which covers different aspects of the transformation, the functionality analysis report was prepared to illustrate how three different ways of connecting to the EWP system are functioning. It will enable HEIs to develop and to use their capabilities, to get the most out of the digital opportunities that can enable them to be more efficient than their way of handling mobility management presently permits. This report can also be used to inform developers as the highest tier of support providing practical information on how to successfully incorporate with the digital tools.

2. Key Features of Digital Tools in Erasmus Programme

The Erasmus+ mobility for studies entails a whole set of processes that facilitate such mobility. Oftentimes in this process communication is needed between the sending (or home) HEI and the receiving (or host) HEI. In general, one can describe the mobility flow as follows (sometimes steps are repeated/ordered somewhat differently):

1. HEIs need to sign an Erasmus+ institutional agreement;

2. Sending HEI nominates the student at the receiving HEI;

3. Learning agreement needs to be worked out and signed by three parties (student, sending HEI, receiving HEI) before departure;

4. Student arrives at the receiving HEI and receiving HEI needs to confirm the date of arrival;

5. Learning agreement might change. If so, it needs to be signed by three parties (student, sending HEI, receiving HEI);

6. Student departs from the receiving HEI and receiving HEI needs to confirm the date of departure;

7. Receiving HEI sends TOR to sending HEI

For each of the steps that require communication (or data exchanges) between the sending HEI and the receiving HEI EWP comes into play. The processes above are translated into technical so-called APIs (Application Programming Interface) that facilitate system-to-system communication, allowing users to manage their part of the process in their own system and use the EWP network whenever confirmation/approval/signatures are needed from the partner. In doing so EWP replaces paper-based workflows by digital ones.

2.1. Connecting EWP Network/APIs

API stands for Advanced Programming Interfaces, i.e., services (mentioned on GitHub) that can be used by network participants to exchange data. A current list of APIs available under the EWP is available at https://developers.erasmuswithoutpaper.eu. To briefly mention how it works here, EWP Network has a Development environment (DEV) and a Production Environment (PROD). It can be used to test environments, but a number of contracts must be signed.

The list of network-supported services (APIs) known to higher education institutions is available in the «HEI/API Coverage Matrix» on the EWP Registry page. The Registry APIs is the one of the important services of the EWP. The Registry API is implemented by the Registry. It is used to gather information about services delivered in the network by the hosts connected to it. The Registry offers a catalogue file with all the binding information obtained

from the registered manifest files.[4] In this study, it is aimed to prepare a guide especially for IRO employees who do not have technical knowledge on complex IT issues. According to this study, the detailed information offers the Primary Network APIs, General Purpose APIs, IIAs, IIAs Approval, OMobilities OMobility LAs , IMobilities IMobility ToRs were obtained by partner institutions. In Addition, the meaning of the APIs in the HEI/API Coverage Matrix, and what functions they have are summarized.[5]

Table 1: EWP REGISTRY (HEI/API Coverage Matrix)

1. Primary Network APIs (State of the Network Connection)		
API	**Definition**	**Functions**
Discovery	It is the first API that the partner developer needs to implement in order to become a basic member of the Erasmus Without Paper Network. Each host which wants to post the supported APIs should implement the Discovery API (manifest file) and send the URL of this file to the Registry.	Discovery manifest files serve to announce which HEIs your system covers, which features (APIs) you have implemented, and which credentials your clients are going to use when fetching the data from the EWP.
Echo	EWP Echo API might seem trivial in itself, but it requires EWP developers to design and test the authentication and security framework which they will use throughout the development of all the other EWP features.	To be able to send the data via the Network, the host should implement at least basic network security protocols (more advanced ones will be needed for the exchange of data with more security demanding partners). It is RECOMMENDED for all developers to implement it (and keep it updated) at least in their development EWP Hosts, to avoid potential problems in the future. It also familiarizes developers with the way EWP APIs are documented (many important parts are documented in XSD files!).

4 file:///Users/g/Downloads/WP%202%20Functionality%20of%20the%20EWP%20Network%20(1).pdf

5 The detailed information about APIs can be found on the Project web site: https://sudte.iyte.edu.tr/wp-content/uploads/sites/234/2022/01/Explanations-in-HEI-API-Coverage-Matrix.pdf

Table 1: EWP REGISTRY (HEI/API Coverage Matrix)

2. General Purpose APIs (Getting acquainted with each other)		
inst.	Institutions API allows sharing of details about the organisation. Institutional API will make possible to access data which is also usually accessible to the anonymous public by other channels. The data includes structure of the organizational units, contact person, address, Erasmus code, web site address, logo and fact sheets with information directed towards incoming students. Lates Realese of Institutions API is version 2.2.0	When Institutional APIs implemented by the host, it allows external clients to retrieve general information on institutions either covered, or otherwise known, by this host. The data about the institution and the fact sheets for incoming students will be delivered to the partner via EWP Institutions API. It is recommend for server implementers to also provide some basic information on all external institutions which they refer to (by their SCHAC IDs) in other EWP APIs.
Ounits	The concept of known organizational Units API is exactly the same as the concept of known institutions. Organizational Units API allows sharing of details about the organization and getting relevant information about other network participants. The data includes faculties, departments, divisions of the organisation. Lates release of Institutions API is version 2.2.1.	Organizational Units API can be used to get data about the units. The information about organisational units will be delivered to the partner via EWP Organizational Unit API. When Organizational Units API implemented by the host, it allows external clients to retrieve general information such as units, faculties, departments, and divisions on selected organizational either covered, or otherwise known by this host. It responds with similar type of information as Institutions API does, but on a lower level. Each unit is identified by two values such as ID of the institution, and the ID of the organizational unit within the institution.
Courses	This document describes the Courses API. This API is not directly related to EWP mobility APIs, but it might help with building user-friendly mobility client software. It allows other HEIs to access information on courses and other learning opportunities conducted in this institution. This API is named "Courses API", but what it really serves are entities called "Learning Opportunities. Server implementers may choose to expose any number of Learning Opportunities via the Courses API.	Thanks to the Courses API, the courses of the student who move between the sending institution and the receiving institution will be matched. The courses which higher education institutions offer to incoming students from the partner institutions can be matched via Courses API on EWP platforms. This process was causing a workload that took quite a bit of time in paper-based operation. Thanks to Courses API, information about students' courses and matching process can be realized in a secure data processing environment. If you are not interested in courses of your partners or do not plan to post your educational offer on the net, you may skip these APIs.

Table 1: EWP REGISTRY (HEI/API Coverage Matrix)

2. General Purpose APIs (Getting acquainted with each other)		
Course Replic.	This API can be implemented by any HEI, even it is does not take part in EWP mobility process. Once implemented, it allows the clients to replicate the catalogue of courses conducted on this HEI. This in turn allows the clients to design rich course searching user experience. As it has been explained in the Courses API Course is just one of the types of learning opportunity. This API may expose all types of learning opportunities, not only courses.	Once you implement this API, you effectively allow your requesters to download the entire listing of your programmes and courses, and keep it synchronized later on. This is probably a good idea from a business viewpoint (because your HEIs' course catalogues will be easier discovered in external systems), but it's necessarily so good an idea for your servers. Depending on EWP's popularity and the number of LOS objects in your system, implementing this particular API MAY introduce a significant load on your servers - primarily via the Courses API, not this one (especially if you decide to make these two APIs available anonymously). This API (as well as the Courses API), provides data which is also usually accessible to the anonymous public by other channels. Keep in mind, that this functionality is not essential for EWP's mobility workflow, and you are free to "skip" this API if you're afraid of performance issues. It is also perfectly okay to first make it available, and then change your mind later (if it proves troublesome).
3. Interinstitutional Agreements API		
IIAs API	This API allows partners to compare their copies of interinstitutional Erasmus+ mobility agreements with each other, which makes it easier to spot errors. This API is complementary with the Interinstitutional Agreements Approval API where HEIs can approve agreements they exchange via the IIAs API.	The most important feature to understand about this solution, is that HEIs are not required to neither serve nor use this API. This API is not part of the primary mobility flow modelled in EWP. You can still exchange information on Nominations and Learning Agreements without implementing this API. It serves only as a helper API to spot differences between IIAs. If you choose to implement it, then you should probably implement it after all the other APIs. If we expose our agreements to the other partner via an API, then the partner will be able to compare the contents more easily, and possibly find differences in an automated way. In the future, when new agreements are forged, it might also enable the partner to copy the agreement's data directly from one computer system to another, without the need of typing it by hand.
	This API allows HEIs to approve agreements sent by their partners in the Interinstitutional Agreements API.	Data on the terms of agreement that needs to be approved by both partners is part of this API. The approval is done in the IIAs Approval API.

Table 1: EWP REGISTRY (HEI/API Coverage Matrix)

4. Outgoing Mobility		
Outgoing Mobilities API (Advanced Programming Interfaces)	This API is implemented by the sending institution. It allows the receiving HEI to read, write and enumerate mobilities stored on the sending HEI's servers.	Negotiations on the list of nominations (sending institutions nominate students for outgoing mobility) are carried out via the EWP network using the Outgoing Mobilities API. The sending institution exchanges a list of nominated students with the receiving institution to get the approval via Outgoing Mobilities API. Note that the number of students and their study fields should be compliant with the cooperation conditions from the Interinstitutional Agreement (IIA). Currently this API describes mobilities of one type only - Student Mobilities for Studies (SMS). This API handles data which is considered private. Server implementers are allowed to forbid less-secure methods of authentication and encryption for this API.
Outgoing Mobility Learning Agreements API	This API is implemented by the sending institution. It allows the receiving HEI to read and accept Learning Agreements stored on the sending HEI's servers and propose changes to them.	Negotiations on the courses should be carried out via the EWP Network, leading to a list of courses approved by all the parties. If the HEI implements both the Outgoing Mobilities API and the Outgoing Mobility Learning Agreements API, then it must ensure that every learning agreement object will have the same identifier as the corresponding outgoing mobility object served by the Outgoing Mobilities API. In the context of the Erasmus Dashboard, HEIs can also deal with learning agreements via the Online Learning Agreement (OLA) tool. This API is based on the new LA template that will be formally published by the European Commission with the first call of the Erasmus+ program 2021-2027. Also, this API handles data which is considered private, so server implementers are allowed to forbid less-secure methods of authentication and encryption for this API

Table 1: EWP REGISTRY (HEI/API Coverage Matrix)

4. Outgoing Mobility		
Outgoing Mobility CNR API	This API is implemented by the receiving institution if it wants to be notified whenever mobilities kept on their partner institutions' servers are changed.	Some APIs have related CNRs (Change Notification Requests). A CNR is used for letting partner institutions know that the Outgoing mobility objects have changed into related system and that the partner (if interested in the changes) should request the changes by calling the corresponding APIs. CNRs do not carry data, they are simple change notifications (like SMSs sent from one system to the other). Requests MUST be made with HTTP POST method. Servers MAY reject all other request methods. This API does not expose any sensitive data, it only notifies the server that it should reload portions of its data. For this reason, it is recommended for server implementers to not be overly strict on security methods they require.
Outgoing Mobility Learning Agreement CNR API	This API is implemented by the receiving institution. Every modify and/or changes about the students' learning agreement kept on partner institutions' servers creating a notify.	This API supports one function, by which a receiving HEI can communicate a list of identifiers of Outgoing Mobility objects for which Learning Agreement have been recently updated or created. The CNRs allow all partners to wait for a notification and then pull the data.
5. Incoming mobilities APIs		
Incoming mobilities API	This API is implemented by the receiving institution. It allows the sending HEI to read the receiving HEI's information related to the sending HEIs' outgoing mobilities. (From the receiving HEI's perspective, these are the incoming mobilities.)	The API contains one endpoint that allows the client to retrieve information on specific incoming mobilities from the receiving HEI. Requests must include a list containing the identifiers of the mobilities which the client wants to retrieve information on. Currently, the API describes one type of mobilities only: Student Mobilities for Studies (SMS). It is noted in the Git repository that more types MAY be added in the future. Server implementers choose which security methods they support by declaring them in their Manifest API entry.

Table 1: EWP REGISTRY (HEI/API Coverage Matrix)

5. Incoming mobilities APIs		
Incoming Mobility CNR API	This API is implemented by the sending institution if it wants to be notified whenever incoming mobilities kept on their partner institutions' servers are changed. CNR stands for "Change Notification Receiver".	The API supports one function, by which a receiving HEI can communicate a list of identifiers of Outgoing Mobility objects that have been recently updated on its side. Server implementers choose which security methods they support by declaring them in their Manifest API entry. Since the API does not expose any sensitive data (it only notifies the server that it should reload portions of its data), it is advised that the security methods be not too demanding. It is not guaranteed that all notifications will be delivered promptly, and some notifications may not be delivered at all (e.g., due to implementation errors on the calling institution's server). The sending HEI should periodically verify if its copies are up to date.
6. Incoming Mobility ToRs		
Incoming Mobility ToRs API	This API is implemented by the receiving institution. It allows the sending institution to retrieve Transcripts of Records issued by the receiving institution for a given set of mobility IDs.	The API defines two operations: get and index. The get endpoint allows the client (usually the sending HEI) to retrieve Transcripts of Records for specific Incoming Mobilities from the receiving HEI. The index endpoint allows the sending institution to access a list of all mobility IDs for which the receiving institution has already attached corresponding ToRs, and which the caller can read (via the get endpoint). Implementers choose which security methods they support by declaring them in their Manifest API entry. The API handles data, which is considered private, and so implementers are allowed to forbid less-secure methods of authentication and encryption.
Incoming Mobility ToR CNR API	This API is implemented by the sending institution if it wants to be notified whenever Transcript of Records served by the receiving institution are changed. CNR stands for "Change Notification Receiver".	The API supports one function, by which a receiving HEI can communicate a list of identifiers of Outgoing Mobility objects for which Transcripts of Records have been recently updated (or created) on the caller's side. Server implementers choose which security methods they support by declaring them in their Manifest API entry. Since the API does not expose any sensitive data (it only notifies the server that it should reload portions of its data), it is advised that the security methods be not too demanding. It is not guaranteed that all notifications will be delivered promptly, and some notifications may not be delivered at all (e.g., due to implementation errors on the calling institution's server). The sending HEI should periodically verify if its copies are up to date.

As can be seen from the table that different APIs have different use cases for the management of Erasmus Mobilities prescribed by the Erasmus Programme guide. The order of implementation of the APIs have been organised in accordance with the traditional paper-based means of Erasmus mobility management from simple to more complex functions. That basically begins with the introduction of the HEIs and its units, followed by IIAs and OLAs and ends up with TORs. Although the courses API are located at the very beginning in the order, the HEIs do not have to implement them at this stage to be able to manage Erasmus Mobilities. They will later on be integrated to the whole process for the purpose of selecting courses for OLAs and digital recognition and so on which requires more complex and timely input work as it is with the current processes.

The architecture for the digital transformation in Erasmus Mobilities seems to be ready and defined with these APIs and support is given by different platforms such as GitHub and EWP Wiki. However, when it comes to put them in the practice, there are several difficulties from technical point of view to business processes. In this context, the HEIs are not required to integrate all the EWP APIs at once that would otherwise end up with failure in the implementation of the ESCI. Thus, the European Commission has set out the deadlines for digital transformation which considers this API order mentioned above.

Even though the mandatory deadlines have been extended a few times for technical reasons, at the time this report is being prepared (2021-2022 academic year) the integration of IIAs and OLAs were still in progress by the majority of the HEIs in this transition period. Therefore, the SUDTE project consortium partners were to be only able to integrate and test the IIA and OLA APIs with their updated digital mobility management system.

When a HEI signs up to the Erasmus+ Dashboard, it will automatically connect the institution to the EWP Network with the available APIs. As of March 2023, the EWP Coverage Matrix has the following functions for the E+ Dashboard Users.

Table 2: Sample E+ Dashboard User Coverage Matrix

Primary Network APIs		General Purpose APIs					IIAs			IIAs Approval		OMobilities		OMobility LAs		IMobilities		IMobility ToRs		Other APIs
discov.	echo	inst.	ounits	courses	course replic.	file	ver.	CNR	fact.	ver.	CNR	ver.	CNR	ver.	CNR	ver.	CNR	ver.	CNR	
6.0.0		2.1.0	2.1.0				6.2.0.	2.0.3.	1.1.0.	1.1.0.	1.1.0.			1.2.0.	1.1.0.					

As can be seen from the table, version numbers have been indicated under different APIs that will allow a dashboard user HEI to:

- become a basic member of the Erasmus Without Paper Network (discov API),
- share structure of the organizational units, contact person, address, Erasmus code, web site address, logo and fact sheets with information directed towards incoming students (inst. API),
- share of details about the organization and getting relevant information about other network participants (ounits),
- compare their copies of interinstitutional Erasmus+ mobility agreements with each other, which makes it easier to spot errors (IIAs)

- approve agreements they exchange via the IIAs API (IIA Approval)

- to read, write and enumerate mobilities stored on the sending HEI›s servers for sending institution and read and accept Learning Agreements stored on the sending HEI›s servers and propose changes to them for receiving institution (OMobility LAs)

- to keep every modify and/or changes about the students' learning agreement on partner institutions› servers creating a notification.

Table 3: Sample In-House System User Coverage Matrix

Primary Network APIs		General Purpose APIs					IIAs			IIAs Approval		OMobilities		OMobility LAs		IMobilities		IMobility ToRs		Other APIs
discov.	echo	inst.	ounits	courses	course replic.	file	ver.	CNR	fact.	ver.	CNR	ver.	CNR	ver.	CNR	ver.	CNR	ver.	CNR	
6.0.0 6.0.0	2.0.1. 2.0.1.	2.2.0	2.1.1	0.7.1.			6.2.0.	2.0.3.	1.1.0.	1.0.0.	1.0.0.	1.0.0.	1.0.0.	1.2.0.	1.1.0.	1.0.0.	1.0.0.	1.0.0.	1.0.0.	

Table 4: Sample 3rd Party Service User Coverage Matrix

Primary Network APIs		General Purpose APIs					IIAs			IIAs Approval		OMobilities		OMobility LAs		IMobilities		IMobility ToRs		Other APIs
discov.	echo	inst.	ounits	courses	course replic.	file	ver.	CNR	fact.	ver.	CNR	ver.	CNR	ver.	CNR	ver.	CNR	ver.	CNR	
6.0.0	2.0.1.	2.1.0	2.1.1				6.2.0.	2.0.3.	1.0.0.	1.1.0.	1.1.0.	1.0.0.	1.0.0.	1.2.0.	1.1.0.	1.0.0.	1.0.0.			

This figure can be different for In-House system and/or 3rd party service users illustrated by the tables above. The meaning of the APIs will not be explained here. They can be investigated from the Table 1.

2.2. Erasmus Mobility Documents

The digitalisation of Erasmus Programme is centred around the Erasmus Without Paper Network. It's a digital platform for higher education institutions which simplifies the management of student mobility by enabling universities to exchange electronically mobility data in a secure and streamlined manner.

The overall objective of supporting digital transformation of Erasmus mobility procedures via EWP is to replace the processes where PDF or paper documents are signed, or e-mails are sent by a digital process of approval of such documents. In doing so, data is exchanged in a structured way and in a machine-readable format and approved in a digital manner by both partners.

The scope of the digital tools in EWP network is quite wide: (https://erasmuswithoutpaper.eu/news/functionality-ewp-network-business-perspective). The main Erasmus student mobility documents include the followings:

- Interinstitutional Agreements (IIA)
- Nominations
- Learning agreements
- Home/Host Transcripts of Records

Before analysing the functionalities, the above-mentioned procedures and will be explained what they are and how they will be objected on the EWP network.

2.3. Interinstitutional Agreements (IIA):

Inter-institutional agreements (IIAs) in the context of Erasmus+ can be concluded between two (or more) higher education institutions (HEIs). The legal value of IIAs is limited but they are a prerequisite for certain Erasmus+ activities (student mobility for studies including blended mobility, and staff mobility for teaching). The content (referred to as terms of the agreement in the official template) need to be approved by both parties before such exchanges can take place. All the fields and conditions that need to be included in the IIAs were defined by the European Commission. More information about the mandatory business requirements of IIAs can be found on https://github.com/erasmus-without-paper/ewp-specs-api-iias

2.4. Nominations:

Interinstitutional agreement processes must be established in order to provide a legal basis between the two institutions under the Erasmus Mobility for Studies (SMS). Then, the information of the student who will spend mobility at the host institution for a semester or an academic year is sent to the host institution. This information basically includes the student›s name, surname, field of study, semester, study level and contact information. In addition to these, extra information such as emergency relatives, date of birth, passport number, etc. may be requested. In short, the nomination is the stage where the students who will carry out the mobility are officially notified by the sending institution a certain period before the mobility starts. The sending institution exchanges a list of nominated students with the receiving institution to get the approval. The number of students and their study fields should be compliant with the cooperation conditions from the Interinstitutional Agreement. Negotiations on the list of nominations are carried out via the EWP network using the Outgoing Mobilities API. The Incoming Mobilities API is implemented by the receiving Institution. It allows the sending HEI to read the data of the receiving HEI that contains information related to the outgoing mobilities of the sending institution.

The EWP process starts when the sending institution notifies the receiving institution about the nominations. In the past, limited information could be provided in table format in the mail environment, but thanks to the EWP network, it has been possible to access the detailed information of the beneficiary in 5 different categories and to inform the counterparty. In this way, you speed up the process, minimize the error rate, reduce the workload, and monitor the process live. The objectives of the nomination on EWP network are:

- greater degree of IRO control
- option to pre-fill LA
- student receives automatic notification
- but (for the time being)
- they can also create their own LA
- When the nomination is either accepted or rejected, it is possible to send notification to the partner.

Negotiations on the list of nominations are carried out via the EWP network.

2.5. Learning Agreements (LA):

A nominated student needs a detailed study programme for the agreed mobility period. A LA lists the courses which a student should take at the receiving institution. These courses, after being approved by the student, a coordinator from the sending institution and a responsible person from the receiving institution, become requirements that need to be fulfilled for the mobility to be successful.

An agreement between the sending/home and receiving/host Higher Education Institution (HEI) and the participating individuals, defining the aims and content of the mobility period in order to ensure its relevance and quality. It has obligations to guarantee academic procedure for all the parties of the mobility that provides transparency. It is also the basis for recognition of the period abroad by the sending organisation. (Erasmus+ Programme guide 2021). Official guidelines can be found here.

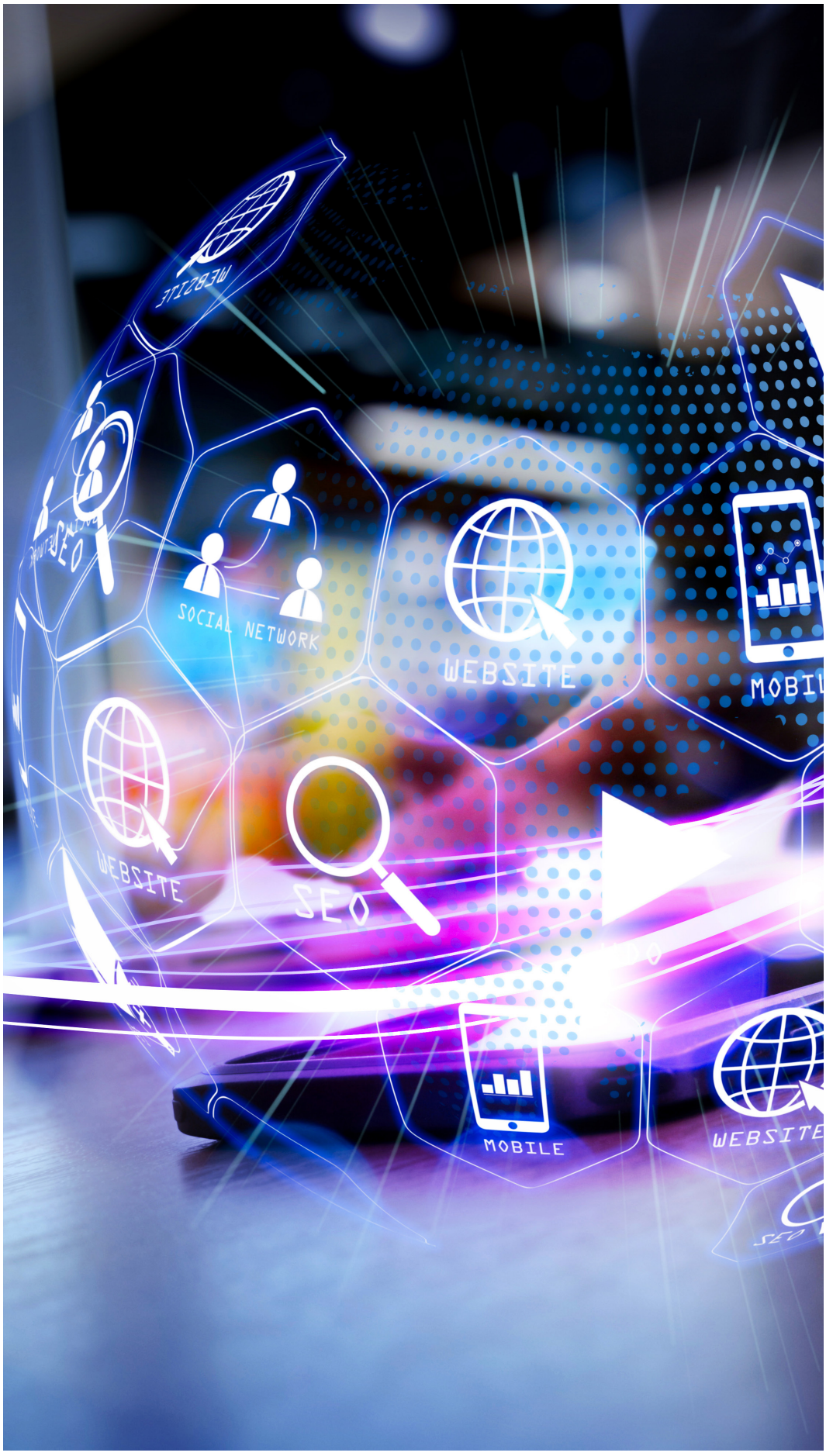
The objectives on the EWP are as follows:

- Improve quality of mobility experience (students)
- Improve the nature of the work carried out by IROs, by making it less repetitive (coordinators/HEIs)
- Decrease administrative costs (HEIs/nation state)
- Increase participation in Erasmus+ (Europe)
- Replace a paper-based workflow by a digital approval process;
- Provide an overview of learning agreements and its status;
- Increase transparency about the learning agreement and its changes for all parties involved;
- Improve recognition processes.

2.6. Transcript of Records:

The Transcript of Records provides an up-to-date record of students' progress in their studies: the educational components they have taken, the number of ECTS credits they have achieved, and the grades they have been awarded (definition ECTS users› guide)

Transcript of Records allows the sending/host institution to retrieve Transcripts of Records issued by the sending /receiving institution for a given set of mobility identifiers.


SOCIAL NETWORK
WEBSITE
MOBILE
WEBSITE
SEO
MOBILE
WEBSITE

3. Testing the Digital Tools on the EWP Network

From the moment that the EU Commission announced, **"EWP Standards will become mandatory"**, the HEIs have been searching for the means of going digital in managing Erasmus mobilities. Issues in question include interoperability, data privacy, available services, ICT skills, technical infrastructure and so on.

Full interoperability means that all computer systems used by higher education institutions can seamlessly exchange machine-readable data among themselves to manage Erasmus+ inter-institutional agreements and learning agreements. According to European Commission this is one of the top priorities for the Erasmus Without Paper (EWP) Network by the end of 2022. In summer 2022, the European Commission and the Erasmus Without paper Consortium initiated an Interoperability Reinforcement Plan with the aim to tackle issues reported by stakeholders and achieve full interoperability of inter-institutional agreements and learning agreements by the end of the year. Many higher education institutions have already made tremendous efforts and huge progress towards this goal. However, there are still several functionalities that need to be tested and corrected covering all available types of digital connections. It is therefore highly crucial to know which digital tools offer the best result and provide a successful roll-out when facilitating digital Erasmus infrastructure.

3.1. Methodology

Testing the digital tools allows to explore the potential and outline the efficiencies of the tools as well as compare their performance. The Erasmus Dashboard (also known as the Erasmus Without Paper Dashboard) is tool available to all Higher Education Institutions in Europe and was designed specifically for institutions that are currently not using any digital solution to manage their Erasmus+ mobility management. 3rd Party Service Provider can be deployed and is customizable, making it easier for the international office staff to update online portals, forms, dashboards, or reports. If you are using your own in-house built mobility management software, connecting it with the Erasmus Without Paper Network will allow you to communicate with other systems, so that you can send and receive student information as data into your system.

Since the HEIs can choose to adopt one of the three scenarios that fits best for their institutions including in-house system, Erasmus Dashboard, and commercial software, it is necessary to systematically test the interoperability of the digital tools covering all the three scenarios. So that the no users will be left behind. To achieve this, the SUDTE consortium partner institutions have completed the necessary technical infrastructure in their institution to test the digital tools with the following composition:

- Selcuk University connected its 3rd party commercial software to the EWP Network
- IYTE connected its in house system to the EWP Network
- UNINA connected the E+ Dashboard to the EWP Network
- UVIGO connected its 3rd party software to the EWP Network

The next step was to train responsible international relations officers to handle the functioning of recently implemented EWP ready Erasmus Mobility management software. In the case of 3rd party software users, this

has been done by the provider. For the in-house system, IT personnel were responsible for trainings. Finally, for the dashboard users, online sources prepared by the EUF were used. Making computer systems exchange context-sensitive data is a formidable challenge. It requires an entire community of diverse technical stakeholders and international relations officers to work closely together.

The practical work in testing the implemented digital tools was shaped around that the Consortium partners send and receive 1 IIA and 1 OLA each other successfully. (E.g. UVIGO will have 3 IIAs and 3 OLAs via EWP at the end). In order to test IIAs and OLA, two following documents prepared:

a) A real case IIA scenario showing all the required entries when preparing an agreement.

b) An excel sheets prepared to allow step by step testing.

After all the conditions and preparations were ready, the workshop meetings were organized between two institutions at a time with the participation of IRO staff via online meeting platforms. In some cases, the IT staff of each institution joined the tests. While one staff were carrying out the procedures, the progresses were reported by another staff using the above-mentioned documentations prepared in advance.

3.2. Managing Interinstitutional Agreements (IIAs) on EWP Network

Digital transformation of the paper based IIA requires dealing with very important information such as institutional units, number of students and area of study. Each input should be carefully communicated between the partner institution., As it is the perquisite step in the EWP platform to manage Erasmus mobilities it is vital to have a proper system workings sharing and approving IIAs. To begin with, partner A creates the agreement in its system and shares it via EWP. Partner B, who received the IIA data, would either:

a) Agree and approve the IIA;

b) Ask partner A via email to make changes and share a new version via EWP;

c) Suggest changes by modifying the agreement and sharing it via EWP.

An IIA is concluded (= valid for mobility) once it is approved by both partners via the approval API. From the EWP perspective only after the approval by both parties the agreement can be considered to be final and valid for mobilities.

Whether or not an agreement is signed electronically before or after approving, is up to the internal rules, regulations, and processes at both institutions. Based on this overall flow of IIA, the examination of the full interoperability in managing IIAs was designed in three steps:

First Step: Following information will be used as an agreement scenario during the testing procedure:

1. Academic Year: 2022-2023/ 2027-2028

2. Department: Business Administration

3. ISCED Code: 0410

4. Degree of Study: Bachelor degree

5. Number of Mobility and Total Months per year: 2*5:10

Second Step; In order to test the editing functionality of the IIA on EWP, the following changes should be made by the University B.

Number of Mobility and Total Months per year will be changed from **2*5:10 to 3*5:15**

Finally, After changes, Agreement will be accepted by the both parties and the procedure will be completed.

An excel sheet containing important functionalities was prepared. It was used as a guide to standardise each testing procedure with different institutions. However, more functionalities were examined during the tests. After following these steps, all partner institutions have filled in the excel sheets noting the important feedbacks.

Table 5: Excel Draft for Testing the IIAs

No	Sending	Receiving	UNI.A finds UNI.B in EWP network	UNI.A sees the departments of UNI.B	UNI.A sees the contact person at UNI.B	UNI.A creates and approves IIA, UNI.B receives IIA	UNI.B suggests changes, UNI.A can see the changes suggested	UNI.B approves IIA, UNI.A can see the approval
1.	KION	Dashboard	YES	NO	NO	YES	NO	NO
2.	Dash	KION	YES	YES	NO	YES	NO	NO
If the test was not successful, can you provide a feedback? (e.g. Log, date of ouccurance, error message etc.)					No contact person seen		No modifications could be made	Error message received

3.3. Managing Learning Agreements (LAs) on EWP Network

The LAs can be considered as the main document for the students as it has information about the courses, credits, academic recognition that are divided into three terms namely before, during and after the mobility. Therefore, the digital transformation of the paper based LA requires more steps than other mobility documents. The mandatory business requirements of Erasmus+ Learning Agreements can be found on https://github.com/erasmus-without-paper/ewp-specs-api-omobility-las.

The testing of OLA includes the functionalities like update requests, notifications, signatures, editing and so on by the approval of all three parties. In order to cover most of the functionalities from the business perspective point of view, the following questions have been prepared;

Is your use of the system included in an authentication network?

Did you receive confirmation for registration?

Does your system require you to validate/register department coordinator?

Do you keep the contact information of the department coordinator up to date on the system?

Does it cause a problem when the email of the department coordinator fills in by students?

Are you able to intervene to the system when the information of the department coordinator entered incorrectly by students?

Do you see the OLA on the system as soon as the student created a new one?

Do you receive any automatic notifications from the system when OLA signed by student or department coordinator?

Is the system flexible for making changes when the department coordinator is not able to sign the OLA?

Do you see which department coordinator was assigned to sign OLA?

When an OLA was declined by the sender/receiver institution, do the parties receive notification?

Can it be seen from the system the reason why an OLA has been declined?

Does the system allow you to interfere with OLA?

Do your partners ready to sign OLA on the system?

After OLA signed by department coordinator of the host institution,

Do you see the completed OLA on the system?

Are you able to send an e mail to students from the service providers?

Do you find easy to check your outgoing or Incoming students OLA using the available filtering options?

Did you find the competence centre functional when you had a problem with the system?

Same as the IIA excel draft, the following table has been prepared including the above-mentioned question:

Table 6: Excel Draft for Testing OLAs

	A	B	C	D	E	F	G	H
1	*No*	*Sending UNI.A*	*System*	*Receiving UNI.B*	*System*	*Is your use of the system included in an authentication network?*	*Did you receive confirmation for registration?*	*Does your system require you to validate/register department coordinator?*
2	1.	SELCUK selcuk.edu.tr	KION	UNINA unina.it	Dashboard			
3	2.							
4	3.							

I	J	K	L	M	N
Do you keep the contact information of the department coordinator up to date on the system?	*Does it cause a problem when the email of the department coordinator fill in by students ?*	*Are you able to intervene to the system when the information of the department coordinator entered incorrectly by students?*	*Do you see the OLA on the system as soon as the student created a new one?*	*Do you receive any automatic notifications from the system when OLA signed by student or department coordinator ?*	*Is the system flexible for making changes when the department coordinator is not able to sign the OLA?*

O	P	Q	R	S	T	U	V	W
Do you see which department coordinator was assigned to sign OLA?	*When an OLA was declined by the sender/receiver institution, do the parties receive notification?*	*Can it be seen from the system the reason why an OLA has been declined*	*Does the system allow you to interfere with OLA?*	*Do your partners ready to sign OLA on the system?*	*After OLA signed by department coordinator of the host institution, Do you see the completed OLA on the system?*	*Are you able to send an e mail to students from the service providers?*	*Do you find easy to check your outgoing or Incoming students OLA using the available filtering options?*	*Did you find the competence center functional when you had a problem with the system?*

3.4. Results and Findings

The test of IIA manager modules of the three different digital tools was the first communication step between the partner institution to find out interoperability. As explained before, consortium members have completed the tests at different dates and multiple times. The summary of the IIAs test results is shown in the table below.

Table 7: IIA Test Results

No	Sending	Receiving	UNI.A finds UNI.B in EWP network	UNI.A sees the departments of UNI.B	UNI.A sees the contact person at UNI.B	UNI.A creates and approves IIA, UNI.B receives IIA	UNI.B suggests changes, UNI.A can see the changes suggested	UNI.B approves IIA, UNI.A can see the approval
Test 1	3rd Party	Dashboard	YES	NO	NO	YES	NO	NO
	Dashboard	3rd Party	YES	YES	NO	YES	NO	YES
Test 2	3rd Party	In House	YES	NO	NO	YES	YES	NO
	In House	3rd Party	YES	YES	YES	YES	YES	YES
Test 3	Dashboard	In House	YES	YES	YES	YES	YES	YES
	In House	Dashboard	YES	NO	NO	YES	YES	YES

As can be seen from the table, there are «yes» or «no» answers to the predetermined questions in different test groups for each digital tool. These answers do not show the final results, but only express the stage that the users have achieved as of the date of the test. The failures encountered while performing the tests required the technical personnel responsible for the relevant digital tool to be contacted. After the relevant corrections and updates were made, the unfinished tests were repeated. In some cases, the testing procedure ended as soon as it started due to technical issues. The process that tested the communication of three different tools used in the digital transformation of the Erasmus program with each other proceeded in this way. Various examples of this during the testing phase are presented below:

The first IIA test procedure was initiated by Selcuk University to test the interoperability between the two 3rd party service providers software and the agreement **has not been successfully completed.** Selcuk could see the UVIGO itself and its department but **the contact persons at UVIGO did not appear** even though they existed in the Moveon database. Then without selecting the contact person, SU created and submitted an IIA.

Then UVIGO received the agreement but neither made a modification nor approved the agreement as it is. An error notification received. This issue was solved later on. The system was working correctly but the users of the system did not follow the required procedures. This was found out by the KION IT team.

Another test between 3rd Party and In-House was carried out on the 24th of February, 2023. This time the OLA procedure that was initiated by the In-House was successfully completed. However, there was a problem when 3rd Party was the creator. An unexpected error message received about the servers. The technical team commented that this could be due to the dates which were either in different format or absent in the server. As can be inferred from this case that even a minor error like the date format could cause a failure in whole OLA procedure. This is something that can be easily fixed up but at the time of testing we must record it as an incomplete OLA.

At the end we have successfully completed IIAs on EWP network with all three partners. For the OLA, the tests between the 3rd party and dashboard and 3rd party and in house were successful, however it was not possible to achieve a complete OLA between in House and dashboard. Due to the fact that dashboard users are not within the testing environment, the institution implemented the in-house system was only able to carry out the test with the institutions who are exists in this environment. This does not mean that the tools are not ready. It is just one of the technical difficulties that digital transformation brings about to the institutions.

The errors encountered during the testing procedures have been communicated to the concerned technical team. This allowed the IT staff to address the issues and improve the system workings. Since the EWP engineering team continuously update the system, the error leading to the unsuccessful test results may have been solved now. Therefore, the test results here are not conclusive.

Although, the EWP environment allows all three ways of connection, in practice there are universities who decided not to continue with their existing system due to some difficulties. For HEIs who receive services from a 3rd party service provider, the EWP connection costs are quite high. Since they are depended on the service provider to align with the changing EWP requirements, they must incur what amount is requested by them. On the other hand, the in-house development of EwP software is a serious challenge and its sustainability cannot be guaranteed.

At the end, what is required is that all three connection methods can communicate with each other in order to carry out the Erasmus mobility processes (IIA preparation, OLA making and so on) paperless. Therefore, HEIs should consider in choosing the right course of action by exploring the potential and the efficiencies of the tools.

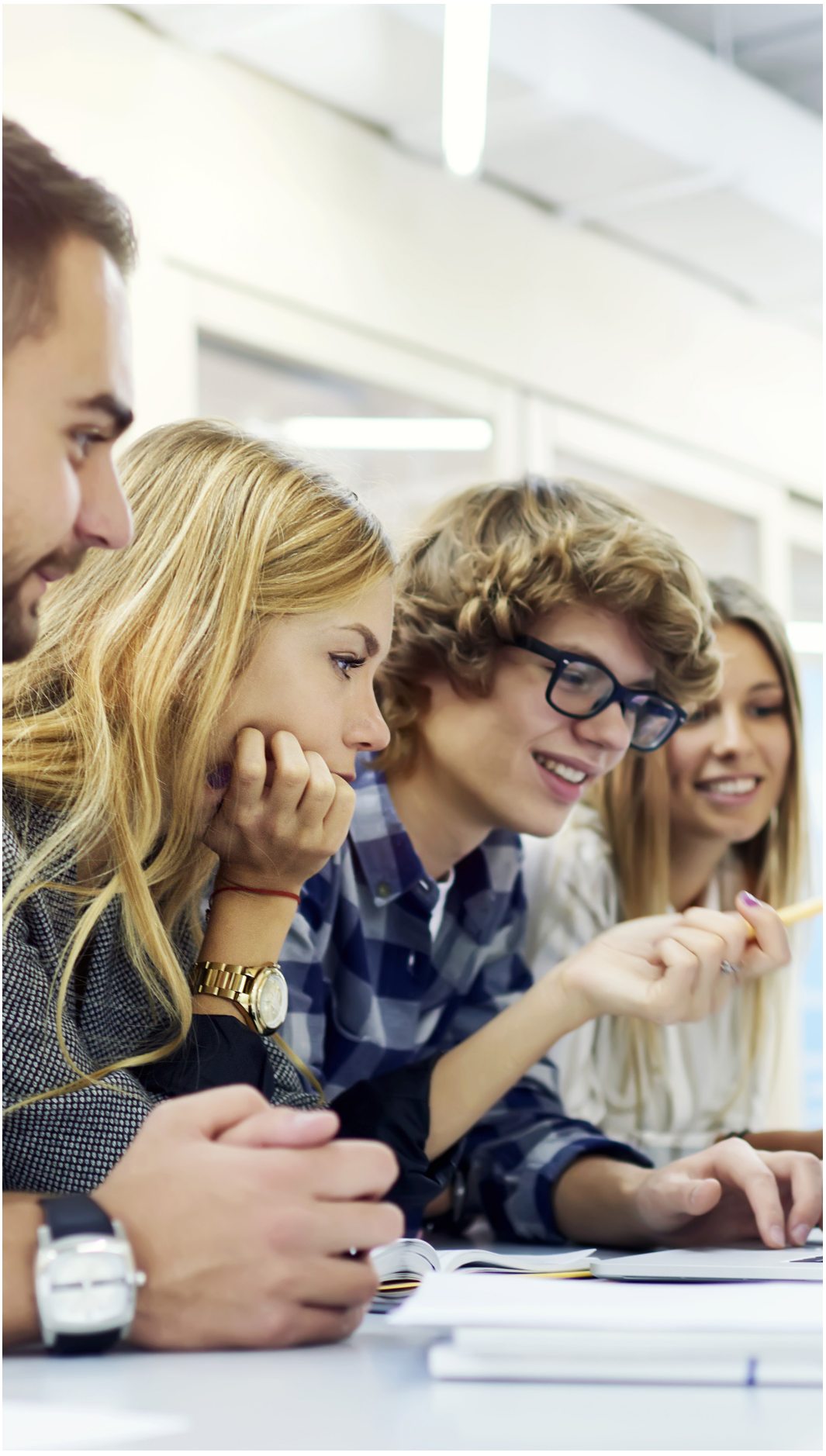
The In-House and 3rd Party software are designed by the professionals in accordance with the needs of the individual HEIs. Therefore, the observations are more or less the similar in terms of evaluation of the functionalities and are subject to the frequent updates. On the other hand, E+ Dashboard is designed on the basis of the needs of HEIs as a whole. Therefore, it is not possible to personalise the menus and the functionalities as it is the case for the other two digital solutions. As a result of the IIA and OLA tests carried out within the framework of the project, upsides and downsides of the In-House, commercial software and Erasmus+ Dashboard that were carefully noted by the consortium are summarised in the table below.

	E+ Dashboard	In House	3rd Party
Upsides	• The approach to the platform is generally user-friendly • it also connects to the Erasmus+ Mobile App the ability to "get started quickly" since the dashboard is "cloud-based", meaning no installation or configuration is required. • The replacement of paper-based workflows with a digital one. • The use of a free public infrastructure	• Allows the transfer data to/ from Erasmus Mobility Application system • Changes in the official IIA template is followed by the 3rd party provider Handles agreements with several subject area codes inside one and the same cooperation condition • User-Friendly Interface • Handles agreements with several subject area codes inside one and the same cooperation condition	• Good notification system to inform when there is a communication error • When modified an IIA, the changes are easy to identify • Existing links with the University databases such as SIS and Unit Tree • Pre-defined user accounts • History record feature that allows tracking the flow of the changes at the IIA
Downsides	• Retreiving data is required in case of IIA from a third party provider • Searching for an institution in the EWP network can be problematic • No Division between departments in case of OLA • No personalisation can be made • No integration with the institution SIS • Limited functions for managing E+ mobilities provided	• The in-house development of EwP software is a serious challenge • No owner of the EwP software in the institution has been defined • Newly added feature cant be tested in production environment in the future? • its sustainability cannot be guaranteed • lack of complete specification with explanations and examples in EwP repositories	• No notification system to inform about changes, updates, etc. • Follow-up of sent/received IIAs not simple to carry out. • In case there is any difference between a sent IIA and a received IIA, the connection is not possible. So we would need to start a different one. • It is not easy to know when IIAs are signed since there is no such categorization on the system.

In addition to above mentioned upsides and downsides, in house and commercial software are flexible to features requests and can offer user friendly solution to varying degrees. For example, with a full-featured Erasmus+ software, HEIs will be able to easily accept applications online for each mobility and manage and process all related procedures and phases for those applications. Some other features of the in house and 3rd party software are listed below:

- Pre-defined Data
- Error Correction and Undo Option
- Reminders and Alert Services
- Robust Statistics and Reporting Tools
- Theme Customisation
- Automatic Backups
- All modules for all parties and users
- Fast support services

The features mentioned here may be a priority area of some of the HEIs that would like to receive these kinds of services from a 3rd party service provider. However, it is questionable that all the 3rd Party Service Providers who are in the industry providing IT solution to the universities in Erasmus mobility management are ready to offer them together with the EWP integration. Since one of the important stakeholders of the ESCI of the EU Commission is commercial IT companies, it would be useful to find out their readiness, experiences, and recommendations about the digital transformation of Erasmus mobilities. In the next section, four 3rd party service providers who are important actors from Italy, Turkey and Spain will be investigated.



4. Interviews with Third Party Providers

4.1. Purpose and Scope

Higher education institutions aim at a smooth and well-coordinated digital transformation process in accordance with the EWP networking requirements. The experience, expectations and suggestions of 3rd Party Service Providers, which is an important stakeholder in this process and provide services to higher education institutions in various forms and levels, are vital in realizing a healthy digital transformation process. In the process of connecting to the EWP network, the new digital channel of mobility management, which is one of the main obligations in the new Erasmus+ Program, the services provided by 3rd PPs include the services such as OLA, IIAs, TOR, etc., which are the stages of connecting to the EWP network. The prerequisite for these services is based on initiating certain requirements and procedures for 3rd Party Service Providers to connect to the EWP network together with the EUF, the main coordinator of the EWP Project, thereafter the higher education institutions complete the legal applications. There are some problems arising from administrative, technical and institutional reasons in connecting to the EWP network and there are disruptions in the data exchange of universities in the digital ecosystem.

The aims of this study are to reveal the issues such as the problems experienced by 3rd Party Service Providers in the process of connecting to the EWP network in a multidimensional way; the technical requirements for the EWP connection, the expectations and responsibilities of higher education institutions, the execution of the EWP transformation process and the expectations of the 3rd Party Service Providers at this point and the responsibilities of the National Agencies in the process of connecting to the EWP network. In this context, 3rd Party Service Providers Cineca (Italy) and MoveOn (Spain), whose opinions were asked, already have intensive experience in the process as they are stakeholders in the EWP Project. ErasmusJET and Kion companies, whose opinions were asked in the study and serving many higher education institutions in Turkey were included in the scope of the study as other 3rd Party Service Providers that signed the EWP cooperation agreement and developed EWP-APIs for their customers. A detailed comparison of the experiences of these service providers in the EWP digital transformation process will also be very useful in terms of the higher education institutions that want to be included in the EWP network. To reach a comparative conclusion in the study, 16 different questions were created in 4 different question groups to reveal the experiences of the four different above mentioned 3rd Party Service Providers gained especially in different countries and higher education institutions. While preparing the questions, the opinions of all project partners were taken and the draft that emerged after working together on the questions was reviewed once again by considering the digitalization levels of the countries. In the study, the questions, prepared by using the semi-structured interview technique, were addressed to 4 different 3rd Party Service Providers serving higher education institutions in Turkey, Spain and Italy. At stage of answering the questions, it was requested from 3rd Party Service Providers that the questions should be answered by the responsible person or experts for the EWP transformation process and open-ended questions, providing them some flexibility, were asked or explanations were given to these experts during the interview. Even though 3rd Party Service Providers have sufficient knowledge about the process, they were informed about the subject before the questions were asked and the importance of answering the questions sincerely was reminded.

4.2. Research Group

Within the scope of the study, 4 different 3rd Party Service Providers serving in Spain, Italy and Turkey which are the own countries of the SUDTE Project partners, were reached and their opinions were taken.

These service providers:

- **Türkiye: Kion**
- **Türkiye: ErasmusJET**
- **Italy: Cineca**
- **Spain: MoveOn**

Sharing of some details about the 3rd Party Service Providers mentioned above is crucial in order to understand the analysis that was carried out and to make the revealed data as a result of the comparison meaningful. Knowing the some details such as the profiles of the universities that was served by the interviewed 3rd Party Service Providers, EWP connection levels and processes, the method used in mobility management process, the tools and technologies and the employee profiles; will facilitate a comparative analysis.

- **Kion:** About 60 higher education institutions with different concepts and capacities in Turkey use KION software for mobility management. Besides software service, the company provides services to many higher education institutions in the digital transformation process of EWP. KION, declared as an authorized 3rd Party Service Provider by EUF for making EWP connection, also provides services for the integration of universities to the EduGain project, which was designed as an authentication and authorization infrastructure for higher education institutions as an extension of the EWP network, as well as OLA and IIA›s connections.

- **ErasmusJET:** ErasmusJET, providing software services on Erasmus mobility management to many higher education institutions in Turkey, simultaneously carries out the EWP integration process of these institutions. ErasmusJET, which has integrated 15 different higher education institutions into the EWP network so far, has become the second 3rd Party Service Provider authorized by EUF for EWP connection in Turkey. ErasmusJET also develops many tools and applications as an ecosystem to be used by its HEIs and the Erasmus community. A digital Erasmus ecosystem developed with HEIs specific needs in mind. ErasmusJET prime aim is to provide high quality, efficient, trouble-free, and user-friendly solutions by keeping HEIs satisfaction in the forefront.

- **Cineca:** Cineca is a non-profit Consortium, made up of 102 Italian national institutions: Universities, Italian Research Institutions and the Italian Ministries of Universities and Education. Cineca, which provides services at various levels to a total of 67 universities in Italy, including large, medium, and small, also has a very strong structure in terms of infrastructure and personnel profile. It develops advanced Information Technology applications and services, acting like a trait-d›union between the academic world, the sphere of pure research and the world of industry and Public Administration. As a stakeholder of the EWP Project, Cineca has a decision-making position and extensive experience in the digitalization of Erasmus Mobilities and connecting to EWP Network.

- **MoveON:** MoveON is a data and insights-based SaaS platform for international offices of higher education institutions, invested in improving their mobility processes and tracking international partnerships more efficiently. It offers HEI's to administer their mobility programs more easily and grow student participation. MoveON also reduces risks associated with

compliance and emergency management. As a stakeholder of the EWP Project, MoveON has a decision-making position and extensive experience in the digitalization of Erasmus Mobilities and connecting to EWP Network. The company, which provides services to higher education institutions in many countries throughout Europe, closely monitors the digitalization processes in higher education with online courses, webinars, and international conferences.

4.3. Findings

4.3.1. Kion

Kion stated that its software was ready to connect to the EWP network at the OLA and IIAs stages and it integrated some higher education institutions into the network. For Kion, the most important and most common problem arising from higher education institutions in the digitalization process has been to find the technical and administrative staff responsible for the digital transformation process. This answer shows that there is a serious lack of coordination in the EWP digital transformation process taking place in higher education institutions. Kion states that a healthy data transfer will be made without any problem between different data provider mechanisms participating in the EWP network. In this context, it firmly expresses the opinion that EWP network will ensure healthy data transfer between different systems. Kion leans towards the logic that Erasmus App, developed within the scope of a project, provides the opportunity for students to carry out the Erasmus processes from a single point but expresses the uncertainty of how this process will be in practice. Kion emphasizes that in this process where digital transformation is experienced, the EWP management should conduct regular meetings with both 3rd Party Service Providers and the National Agencies that are decision-makers and implementers at the national level.

4.3.2. ErasmusJet

ErasmusJET expounded on the difficulties experienced in the digital transformation process. According to the firm, the main sources of problems in connecting to the EWP network are remarked as deficiencies in the level of digital literacy, difficulty in communicating with IT departments and incredible slowness in administrative and bureaucratic procedures, which is quite contrary to the logic of digitalization. ErasmusJET has preferred to carry out studies aiming to increase the knowledge and skill levels of the higher education institutions that it has served in the EWP digital transformation process. In this context, starting from the logic of the EWP network, the company provided data sharing by making one-to-one tests; explained the connection stages; developed various visual materials and filled the knowledge deficiencies in process of the institutions that the company served. ErasmusJET carried out a well-planned study to connect to the EWP network and transfer data between institutions and reported these studies in detail. The company prepared a new software and portal called ‹› EWP Test Tracker›› in order that the tests could be followed more accurately by higher education institutions.

ErasmusJET has a very critical point of view on the Erasmus App, which enables the integration of students into the ErasmusJET EWP network. ErasmusJET stated that the effects of an application process›s results carried out through the Erasmus App on software providers, universities, countries, and students should be better examined. The company also expressed that the institutions and their stakeholders responsible for the Erasmus app did not take the criticisms on this matter seriously and they were far from a solution-generating approach. According to ErasmusJET, since there is no roadmap, technical or information document published or announced by the responsible stakeholders regarding the Erasmus App, it is not possible to make a statement on the subject.

While ErasmusJET stated that the EWP management should be more transparent, it also expressed that there were no IT experts in project management and these people should be appointed to the EWP technical management. The service provider did not hesitate to express the opinion that the technical management consisting only of university professors with academic and theoretical knowledge, could not improve the functioning of the EWP and conduct it in a healthy way. Also, the company also expressed its criticism that EWP technical management did not take into account the EWP API Technical Problems Report published by ErasmusJET and stated that it would be useful to consider this report.

4.3.3. Cineca

Cineca stated that in the EWP digital transformation process, it fulfilled the requirements in accordance with the calendar announced by the Commission and carried out a healthy digital transformation process. With this statement, Cineca differed significantly from other 3rd Party Service Providers and expressed that it did not encounter any problems regarding the difficulties they encountered during the EWP digital transformation process. It is remarkable that during the EWP digital transformation process that Cineca has been carrying out smoothly, it has not experienced any problems arising from institutional or higher education institutions. Also, Cineca stated that the universities that it provided services would be able to use the EWP network with all its aspects and without any problems in 2022. In this framework, it is seen that the service provider has followed a planned process management in technical and strategic aspects. Cineca stated that after the integration of the universities that it served into the EWP ecosystem, it would exchange data with different universities in a healthy and safely manner. The company also expressed that member universities connected to the EWP network would be able to integrate into the basic operation of EWP through various APIs without difficulty. In addition, Cineca stated that the EWP digital transformation process established a standard among universities, provided a secure environment and integration into the system in terms of data transfer also provided a standard for universities. The 3rd Party Service Providers› criticisms of Erasmus+ App are not meaningful for Cineca. Unlike the other three service providers, Cineca expresses that thanks to the Erasmus+ App, more data about the process can be obtained, so that further improvements can be made regarding the Erasmus+ mobility management process.

Cineca officials clearly stated that the views of the 3rd Party Service Providers should be taken more in the EWP digital transformation process, and these taken views should be implemented by the EWP management. Also, Cineca, who stated that EWP information packages should be updated more frequently in terms of EWP management, emphasized that network-related features were quiet good, but sometimes there were serious difficulties in understanding some features and it was necessary to explain them in a simpler language.

4.3.4. MoveON

In the EWP digital transformation process for Move ON, at the centre of the problems arising from universities is the fact that EWP planning was made without considering the special situations of universities. In this context, it was explained with examples that some stages in the process defined by EWP may not be suitable for a particular university. MoveON stated that a common point of view should be defined at the beginning to have a central coordination in the EWP digital transformation process; to avoid technical problems and to implement faster. MoveON provided the universities it served with general introductions and trainings related to updates about the EWP digital

transformation process. The company, which especially organizes free demos and trainings, provided trainings to its customers with updates on OLAs and IIAs. MoveON stated that the increasing number of universities participating in the EWP network did not pose a threat to their business and planning. It is an important technical detail for the company that they did not experience any systematic problems despite the increasing customer density throughout Europe in this process.

MoveON having a positive point of view about students› using the Erasmus+ App as a central entry point to the program, MoveON stated that students› experiences about the application should also be common among various 3rd Party Service Providers. The company underlined that thus it would help students who benefited from the Erasmus+ program from many different universities and countries. MoveON also believes that the Erasmus+ App will be a common experience for students; help to avoid too much confusion and; therefore, ensure the better adoption among students. MoveON stated that EWP management should interact regularly with the participation of all stakeholders so that the views and needs of 3rd Party Service Providers can be adequately considered and a body is needed to help tackling the governance and compliance issues in the EWP network. MoveON expressing that there was a clear inconsistency between the EWP transformation process and higher education reality as a 3rd Party Service Provider, has also underlined that the European Student Identifier is mandatory for OLA, ıt is not used by universities.

Table 8 : Some Highlights from the Service Providers

	State of Readiness	Perceived problem areas	Recommendation
KION	OLA and IIAs stages	Finding the technical and administrative staff responsible for the digital transformation process uncertainty in the processes	Meetings should organize both 3rd Party Service Providers and the National Agencies
ERASMUSJET		Deficiencies in the level of digital literacy, difficulty in communicating with IT departments and incredible slowness in administrative and bureaucratic procedures	EWP management should be more transparent, IT experts should be appointment EWP technical management
CINECA	All stages will be ready in 2022	It has not experienced any problems	3rd Party Service Providers should be taken more in the EWP digital transformation process
MOVEON	OLA and IIAs stages	EWP planning was made without taking into account the special situations of universities	EWP management should interact regularly with the participation of all stakeholders

5. Discussion and Conclusion

In order to highlight what services are available by each tool and how, they can make a function-based decision for other HEIs, three different tools (E+ Dashboard, Commercial Service Providers and In-House Software) were tested by the SUDTE partner institutions. The expected result of this study is to help HEIs in;

1) Understanding the relationships between different tools

2) Identification the missing functions

3) Reporting the upsides and downsides of the procedures

This functionality analysis report is envisaged HEIs to compare the performance of the three digital tools in achieving paperless Erasmus management. There are two different distinctive aspects when choosing the right course of action in connecting EWP network for the HEIs. First, there is the mandatory procedures set by the EU Commission for Erasmus Charter holder institutions. To comply with the ESCI requirements, E+ Dashboard is ready to offer free of charge functionalities but to the limited degree. Second, there are the HEIs who have been investing to manage their Erasmus mobilities by either 3rd party commercial service or in house system over the years. It is not easy for them to give up all the existing advantages of the institutionalised mobility management systems. That can include from receiving online application to automatic recognition that E+ Dashboard does not have. Therefore, the decision makers of the HEIs need to consider these two aspects.

During the implementation processes we were also able to find out which institution got started quickly. UNINA, a dashboard user, was the first institution that connected to the EWP Network without any hustle which is followed by Selçuk and Vigo Universities, implementing 3rd Party commercial software and IZTECH with its in house system. No matter how many APIs a HEI has implemented, it has no use until the partner institution are ready to communicate on the other side. The reason behind the slow acceleration of the EWP integration procedures can be explained considering this. If E+ Dashboard was the only platform for the EWP connection, the HEIs would be aligned with the latest functionalities.

The EWP Dashboard provides HEIs with the functionality needed to manage the mobility processes of Erasmus+ as well as to connect to their partners via Erasmus Without Paper. One of the distinctive benefits of the Dashboard is the connection to the Erasmus+ Mobile App, allowing interaction with the incoming and outgoing students directly via the App along with other services which are relevant for higher education institutions. One can add institution-specific information in the mobility journey in the Erasmus+ App alongside with information about deals, events, and useful tips. Finally, the long-term sustainability of the E+ Dashboard is guaranteed with the ESCI initiative by European Commission.

The answers obtained from the interviews with 3rd Party Service Providers can help EWP stakeholders in overcoming the challenges in terms of seeing the operation, strategy, stakeholders, threats, and opportunities of EWP digital transformation process. This intellectual Output (IO2), which includes the reporting and analysis of data obtained from the interview performed with experts from 3rd Party service Providers, also contains important data and findings in terms of EWP management.

• It is seen that 3rd Party Service Providers, whose opinions were taken within the scope of the research, are willing and structurally prepared for integration into the EWP network.

• 3rd Party Service Providers, who read the integration into the EWP network as a political and strategic process beyond a technical stage, stated that National Agencies should also take a greater part in this process.

• According to the explanations of the participants, in terms of 3rd Party Service Providers serving higher education institutions in different countries; the standards and regulations required in the process of integration into the EWP network, offer the opportunity to provide a general standard for all international student mobilities.

• In terms of 3rd Party Service Providers, there was a lack of coordination within the higher education institutions that they served during the integration process into the EWP network.

• While 3rd Party Service Providers stated that Erasmus+ App had a dimension facilitating the workload of students and increasing their participation in the process, there was also a general critical attitude resulted from the technical features of the application and systemic reasons.

• Failure to comply with the announced timetable in terms of other 3rd Party Service Providers except for one; has damaged the EWP transformation process of higher education institutions and caused a loss of motivation.

• All 3rd Party Service Providers participating in the research stated that 3rd Party Service Providers should be included in the EWP management and their suggestions and criticisms should be considered.

• Although there are partial similarities at the basic level in terms of the trainings offered by the 3rd Party Service Providers to higher education institutions, different training processes were carried out in accordance with the policy of the service provider in general.

All 3rd Party Service Providers participating in the research stated that it was possible to share data over different systems via the EWP network and they also expressed that they did not have any doubts or concerns about this issue.

Even though, the main principle of the EWP suggests maintaining institution's existing system to connect to the EWP network, in practice, the process of integrating the three different systems into institutions in a fully functional manner differs. While it is as easy as signing up to an online platform for the E+ Dashboard to be ready for use, in house systems require the IT staff and IRO staff of the organization to work harder together. For 3rd party service users, connection to the EWP may be seen rather more effortless, however it is financially more costly than others taking its purchasing and annual service fee into account. These differences, on the other hand, include various application advantages and disadvantages once the integration is completed.

6. References

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