Cost-benefit analysis
CBDS-Study*

1/2023

Nordiska ministerrådet

* also known as *Improved cross-border digital services for studying abroad in the Nordic and Baltic Countries*

Content

1 Background and purpose of cost-benefit analysis

" *The mobility of students creates a need for digital solutions that support both the students and the education institutes. Increased student mobility between the Nordic and Baltic countries may also increase the mobility of labour in the future. Completing studies in another Nordic country may encourage students to build their careers outside their home country as well.*

—The baseline study of cross-border data exchange in the Nordic and Baltic countries, final report

Nordic vision as a guideline

– Towards the most integrated region in the world

The Nordic region will become the most sustainable and integrated region in the world in 2030

– The Nordic Prime Ministers,
The Ministers for Nordic Co-operation

The world's smoothest cross-border mobility and daily life through digitalisation

– Finland's Presidency Project 2021–2023

Student data flows with a person whenever wanted and it is always accessible

– CBDS-Study 2021–2024

What is the challenge we are solving?

- People interested in studying abroad in the neighboring countries will expect smooth and flexible digital services before, during and after their study abroad period.

- People should have access to their own *study records** and possibility to transfer them between educational institutions and between countries.

- In order to meet expectations, there is a demand for *digitalized** administrative processes* when applying for studies or in the recognition of prior studies in upper secondary and higher education institutions.

- In a broader context, this initiative contributes to making borderless study, work and life easier in the future.

* Study records refers to data of full degree, course or module that the person has completed in a formal educational institution(s)
** digitalized refers to machine-readable study data in the context of transferring study records
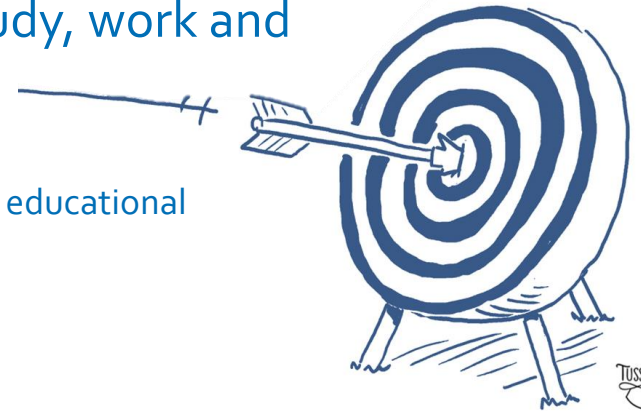
Student mobility between Nordic and Baltic countries

AN EXAMPLE FROM FINLAND

312 453 students in Higher Education

446 598 students in Upper Secondary Education

**The most popular mobility directions in Bachelor level (2020)**

Norway	⟶	Denmark
Finland	⟶	Sweden
Latvia	⟶	Denmark
Estonia	⟶	Finland

Greenland

Iceland

The Faroe Islands

Norway

Sweden

Denmark

Finland

Åland Islands

Estonia

Latvia

Lithuania

Source: In year 2021 www.stat.fi

Source: stats.oecd.org/

University exchanges between Nordic countries in academic year 2019–2020
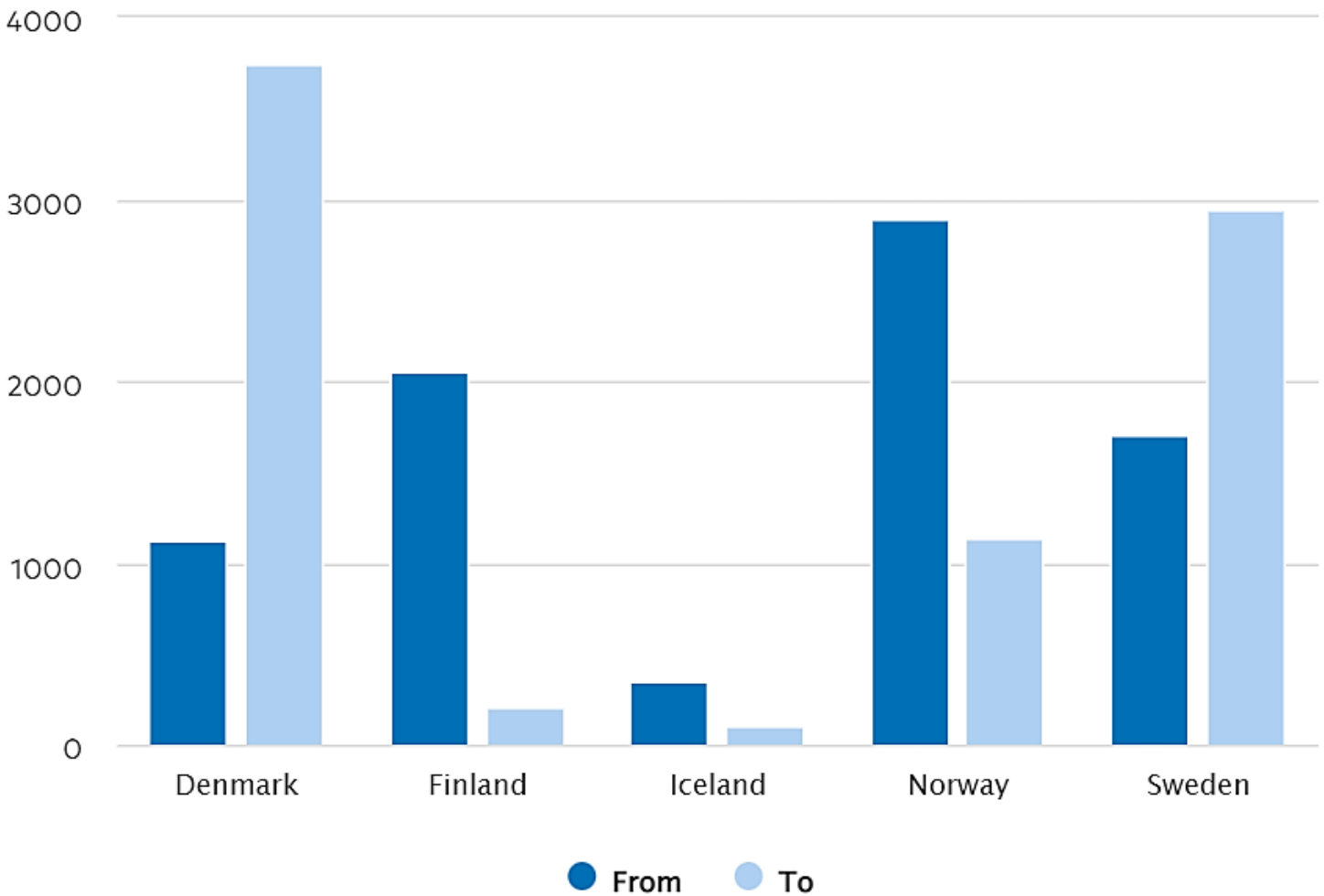
Nordic exchange students studying in upper secondary-level education in another Nordic country

	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Denmark	71	105	96	92	121
Finland	158	154	185	201	218
Iceland	32	32	24	12	12
Norway	898	804	710	620	649
Sweden	229	126	120	81	83
In total	*1388*	*1221*	*1135*	*1006*	*1083*

Resource: The Baseline study of cross-border data exchange in the Nordic and Baltic countries, final report
https://pub.norden.org/temanord2021-547/#88554

Nordic exchange students studying in higher education in another Nordic country

	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Denmark	960	1081	1198	1199	1127
Finland	2052	2393	2447	2331	2053
Iceland	580	502	430	374	347
Norway	3418	3193	3043	2948	2895
Sweden	2228	2065	1974	1810	1698
In total	*9238*	*9234*	*9092*	*8662*	*8120*

"

To support student mobility and especially the digital services for citizens studying abroad, there are already projects and plans on the EU level. EMREX, Europass Digital Credentials, and Erasmus Without Paper are examples of international actions that have been implemented to develop digital services for students.

— Baseline study of cross-border data exchange in the Nordic and Baltic countries, final report

Existing Practices

EMREX – an electronic data exchange solution can be used in several ways, for example:

- By mobile students who want a fast, secure and digital transfer of their achievement records from abroad
- By individuals applying for education in other countries
- By individuals who want to share their achievement records with others – future potential employers etc.

EMREX has been in production use since 2017.

1 674 connected institutions

14 000 000 degrees available online

61 556 successful data transfers (2020)

Existing Practices

European Digital Credential is a digital file and one of the Europass tools, issued by the institution where a learner has studied. It describes the learner's qualification, and can also include information on classes, grades, projects and other achievements. The European Digital Credentials system is managed by the European Commission and is free and secure.

In addition to the descriptions of a qualification, CBDS-Study's goal is to promote solutions for cross-border study record data exchange in machine-readable format (e.g. EMREX).

Existing Practices

Erasmus Without Paper (EWP) project focuses on replacing paper-based exchange of information by providing a digital infrastructure for administrative workflow. The European Commission has announced that all higher education institutes that are participating in the Erasmus+ programme are expected to start using the EWP infrastructure for exchange student mobility data administration from 2021. EWP and EMREX use the same data model.

EWP is concentrating on Erasmus+ exchange student data when CBDS-Study is promoting cross-border study record data exchange in general, regardless if a person is an exchange student or is going to study abroad for a module or a full degree.

Source: Erasmus Without Paper | Erasmus Student Network (esn.org)

On-going Projects

The 2018 **Single Digital Gateway Regulation** (SDGR) sets the deadline for the implementation of the **Once Only Technical System** (OOTS) by December 2023. The system connects public administrations, based on the Once Only Principle (OOP), i.e. the principle according to which citizens and businesses provide their data only once to public administrations. This should also be true in cross-border settings. The scope of the OOTS comprises 21 administrative procedures listed in Annex II of the SDGR. Two procedures (#4 and #5) are directly linked to the scope of CBDS-Study.

EMREX has been mentioned as a possible and already existing sectoral solution for cross-border study record data exchange in SDG OOTS. EMREX Members share the opinion that the EMREX and SDG OOP systems could and should co-exist and reinforce each other (<u>read more</u>).

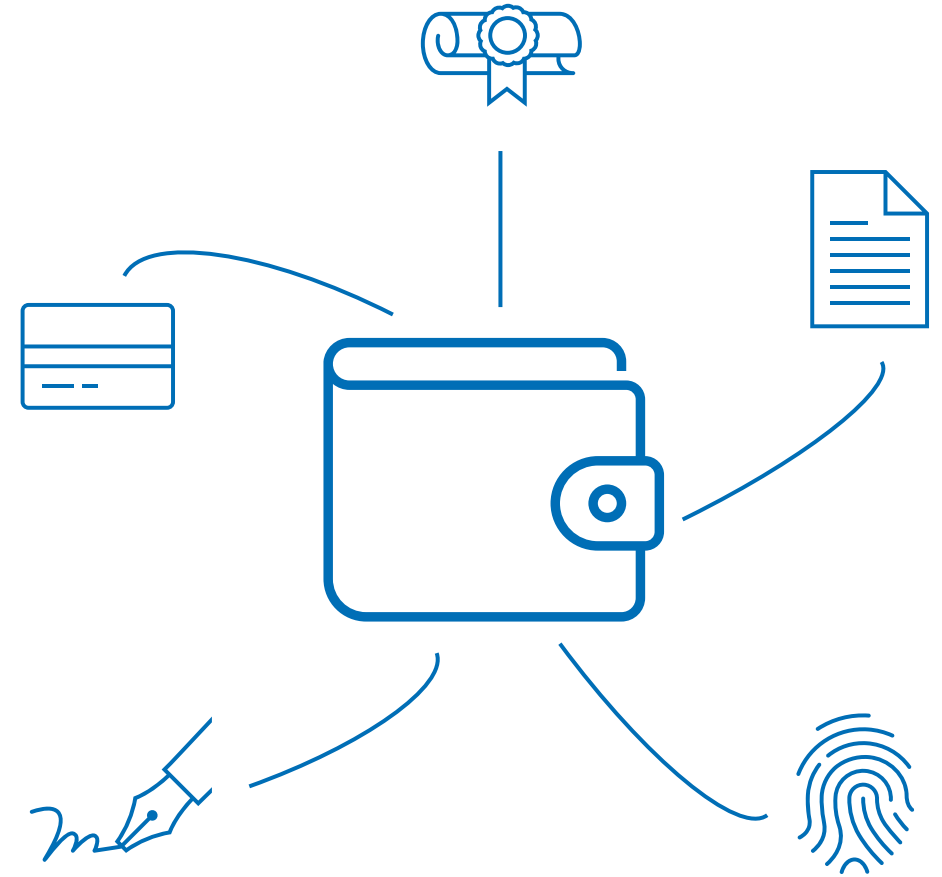**#4 Submitting an initial application for admission to public tertiary education institution**

#5 Requesting academic recognition of diplomas, certificates or other proof of studies or courses.

On-going Projects

European Digital Identity Wallet (EUDI Wallet) will enable every European to have a set of digital identity credentials that are recognized across the EU. These 'wallets' are mobile applications or cloud services that collect and store digital credentials and allow them to be used secretly and securely for numerous government and non-government use cases.

Digital Credentials for Europe (DC4EU) will run a cross-border large-scale pilot on EUDI Wallet compatible digital credentials for learning, such as diplomas and qualifications. DC4EU seeks to connect existing solutions on other protocols, such as EMREX.

2 Requirements

Requirements through European Interoperability Framework

Organizational

- Differences in school systems between countries
- **Motivation for change and willingness to put money and effort into joint solutions varies between countries**
- Existing and outdated organizational processes and structures in countries do not support automated solutions cross-border data exchange
- Autonomous information management inside countries, responsibility is spread and uncertain

Organizational interoperability refers to the way in which public administrations align their business processes, responsibilities and expectations to achieve commonly agreed and mutually beneficial goals

Technical

- **Different levels of digital maturity**
- **Different systems, data models, formats, solutions, database structures**
- Digital **data does not exist** or is not in machine-readable format
- No technical knowledge

Technical interoperability factors cover the applications and infrastructures linking systems and services

Semantic

- Lack of understanding other Nordic and Baltic languages
- Lack of translations
- **Lack of shared vocabulary**
- Lack of agreed formats and standards
- **Lack of descriptive data**
- **Different concepts and meanings**

Semantic interoperability ensures that the precise format and meaning of exchanged data and information is preserved and understood throughout exchanges between parties

Legal

- **Regulations that limit data transfer**
- **Regulations that define ownership of the data**
- Need for changes in legislations
- Different recognition of qualifications

Legal interoperability is about ensuring that organizations operating under different legal frameworks, policies and strategies are able to work together
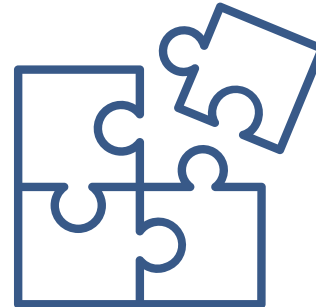
Requirements for cross-border study record data exchange
– Components that enable the smooth data exchange

✓ User identification
✓ Cross-border identity matching

IDENTIFICATION
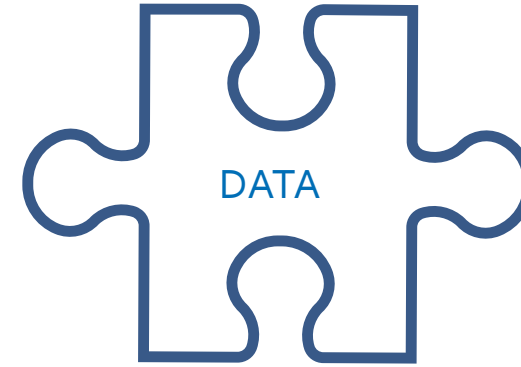
DATA

✓ Centralised or decentralised databases
✓ Interconnected systems for information exchange
✓ Descriptive information (metadata) on study records
✓ Machine-readable data

Full interoperability

TRANSFER

✓ Data transfer solution e.g. EMREX, SDG OOTS, EUDI Wallet

STANDARDS

✓ Data model
✓ Terms
✓ Vocabularies
✓ Metadata

Current State of Data (HEIs)

Country	Centralised/decentralised register for study records	Interconnected systems for information exchange	Descriptive information	Machine-readable data
Denmark	Multiple systems	Unclear	No	Unclear
The Faroe Islands	No centralised system	Not connected	Unclear	None
Greenland	No centralised system	Not connected	**Maintained**	None
Estonia	EHIS (Eesti Hariduse In-fosüsteem)	**Interconnected systems**	**Maintained**	**Yes**
Finland	Virta database	**Interconnected systems**	No	**Yes**
The Åland Islands	No centralised system	Not connected	Unclear	**Yes**
Iceland	No centralised system	Not connected	No	None
Latvia	State Education information system (Valsts izglītības in-formācijas sistēma)	**Interconnected systems**	No	Yes
Lithuania	Student register (Studentų registras)	**Interconnected systems**	**Maintained**	**Yes**
Norway	The Common Student System (Felles student-system)	**Interconnected systems**	**Maintained**	**Yes**
Sweden	Ladok	**Interconnected systems**	No, under development	**Yes**

Current State of Data (Upper Secondary)

Country	Centralised/decentralised register for study records	Interconnected systems for information exchange	Descriptive information	Machine-readable data
Denmark	Eksamens-databasen	Interconnected systems	No	Yes
The Faroe Islands	-	-	-	-
Greenland	No centralised system	Not connected	Unclear	Unclear
Estonia	EHIS (Eesti Hariduse Infosüsteem)	Interconnected systems	Maintained	Yes
Finland	Koski database	Interconnected systems	Maintained	Yes
The Åland Islands	No centralised system	Not connected	No	Yes
Iceland	INNA	Interconnected systems	No	Yes
Latvia	State Information System (Valsts izglītības informācijas sistēma)	Interconnected systems	Maintained	Yes
Lithuania	Pupil register (Mokinių registras)	Interconnected systems	Maintained	Yes
Norway	NVB (Nasjonal vitnemåls-database)	Interconnected systems	Maintained	Yes
Sweden	Beda database (Nationella Betygs-databasen)	Interconnected systems	No	Yes

3

Benefits

"

The range of benefits from improved interoperability and public sector cooperation is extensive: There is an obvious reduction in cost, time, energy and unnecessary administrative burden for citizens, businesses and the public sector itself.

— *Interoperable Europe Act*

Benefits of smooth digital services in student mobility

€ The learner saves time

€ The working time of the study administration and teaching staff is saved

€ The working time of the officials responsible for recognition of qualifications is saved

🙂 The learner's customer experience of digital service (transferring study records) is more pleasant

🙂 Faster process of recognition of prior learning among educational institutions and universities using the EMREX data transfer solution

🙂 Speeding up the process of recognition of qualifications

🙂 Strengthening of international networks and cooperation

Additional aspects to benefits

- The most significant benefits will be gained by the institutions using study record data in their processes e.g. recognition of prior learning

- When the study record data is transferred between systems in a machine-readable format without manual work (copy-paste or entering data manually)
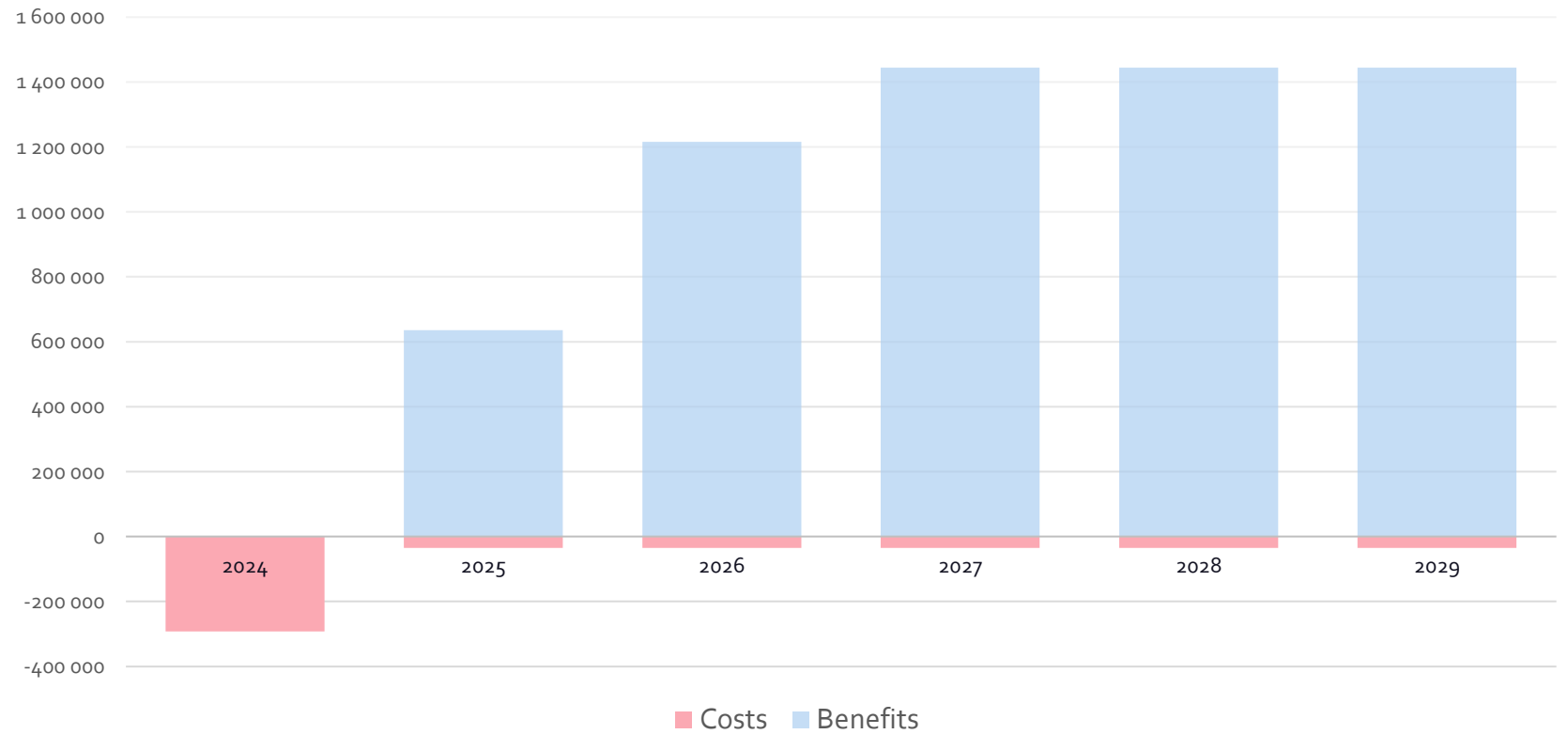
  ➡ data is more correct and reliable

€
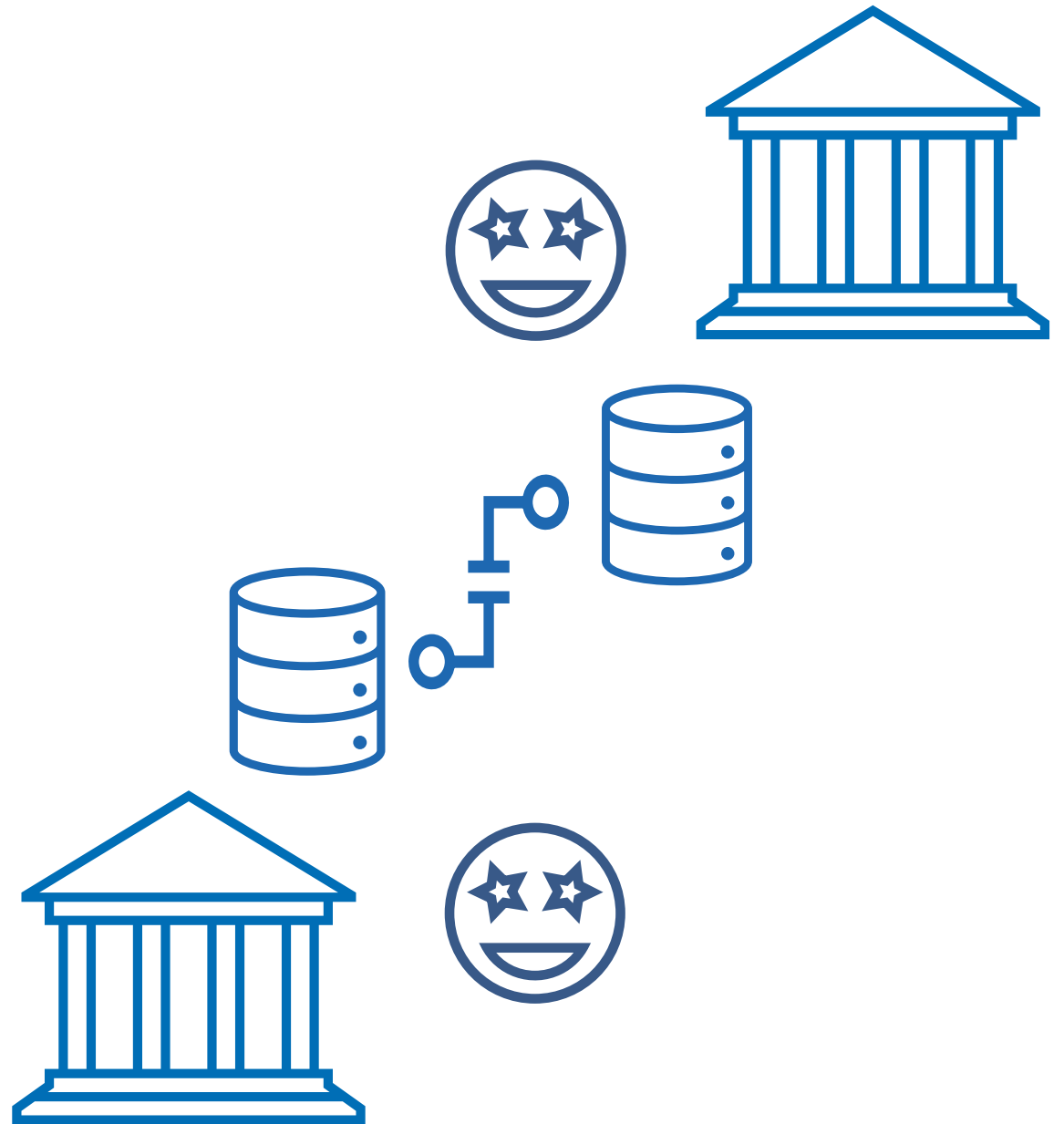
A rough example of potential profitability when implementing EMREX to use data from all higher education institutions of a country. In this example, cutover is in the beginning of year 2025.

The calculation is based on the estimated savings on working time of study administration staff. The calculation is using Finnish payrate, estimation of savings, and Norwegian number of data transfers via EMREX.
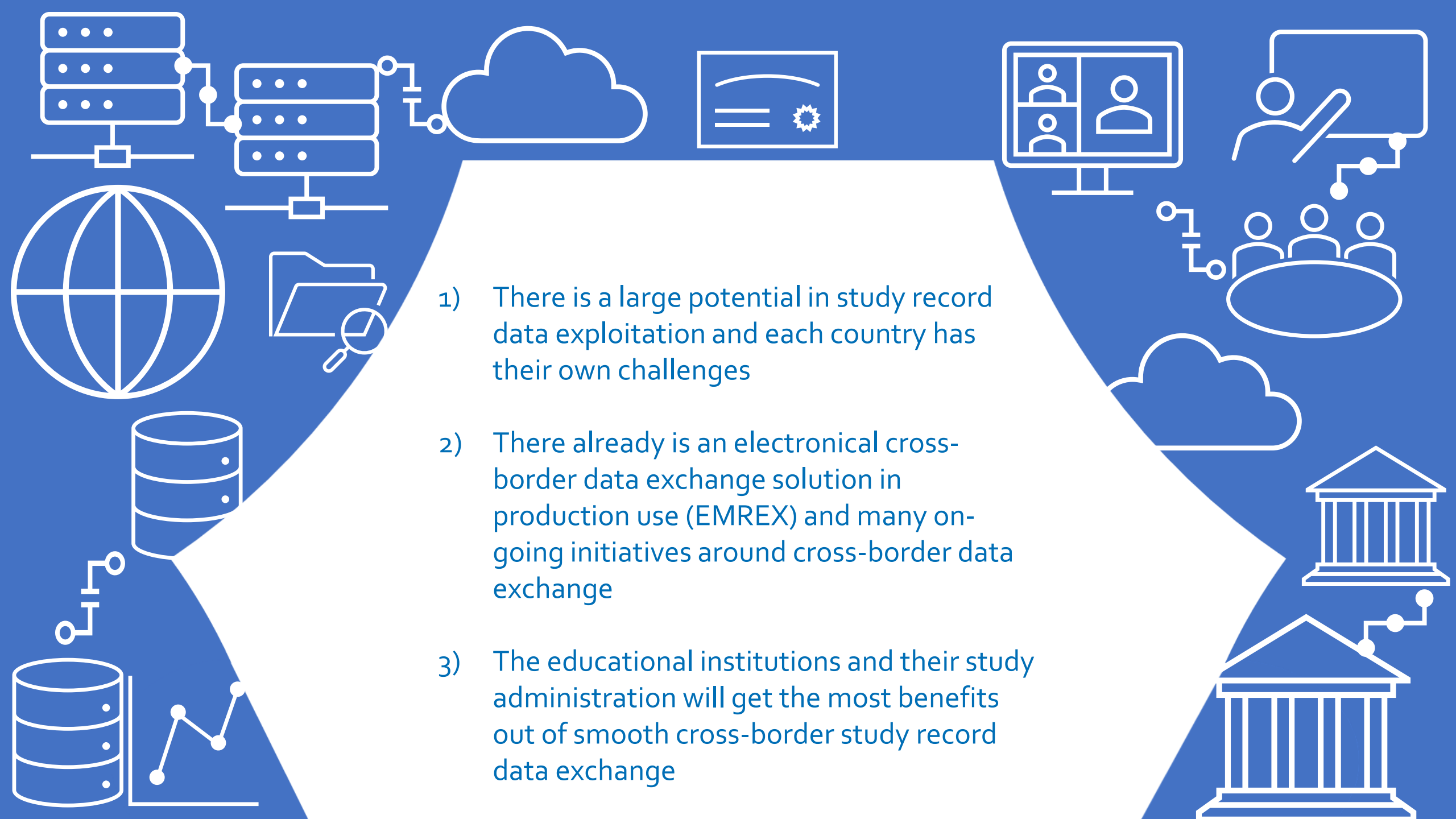
COSTS AND BENEFITS ON AN ANNUAL BASIS

Bar chart showing Costs (pink) and Benefits (light blue) for years 2024–2029. Y-axis ranges from -400 000 to 1 600 000.

Legend: ■ Costs ■ Benefits

4 Summary and recommendations

1) There is a large potential in study record data exploitation and each country has their own challenges

2) There already is an electronical cross-border data exchange solution in production use (EMREX) and many on-going initiatives around cross-border data exchange

3) The educational institutions and their study administration will get the most benefits out of smooth cross-border study record data exchange

#1 RECOMMENDATION
Identification

- Currently, all countries have digital identification tools of their own and a uniform solution would benefit the development of joint digital solutions for European.

- Actively follow the latest development in the field of identification solutions in your country and neighboring areas.

- A permanent and unique identifier for each person to enable cross-border identity matching.
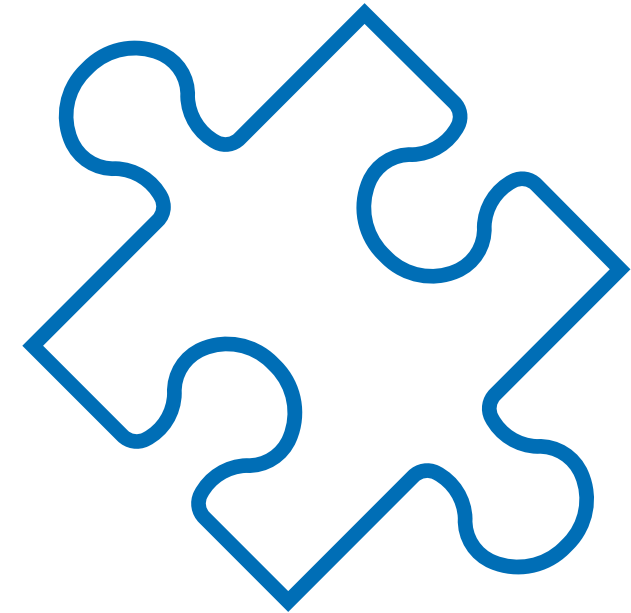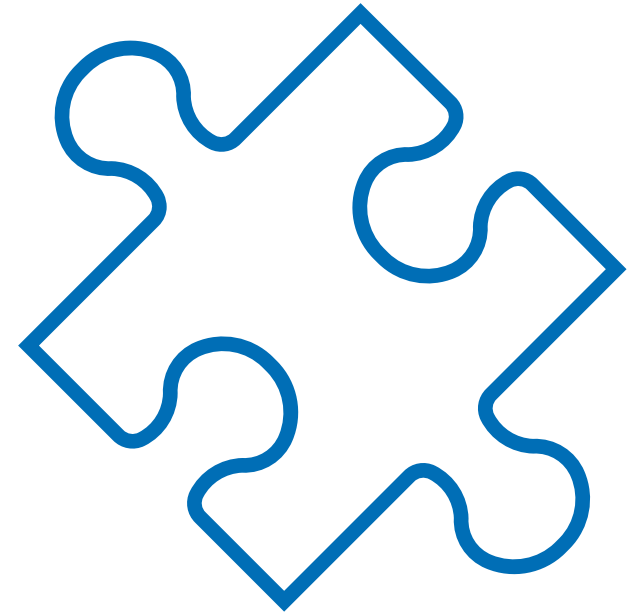
#2 RECOMMENDATION
Centralised database(s) for study records

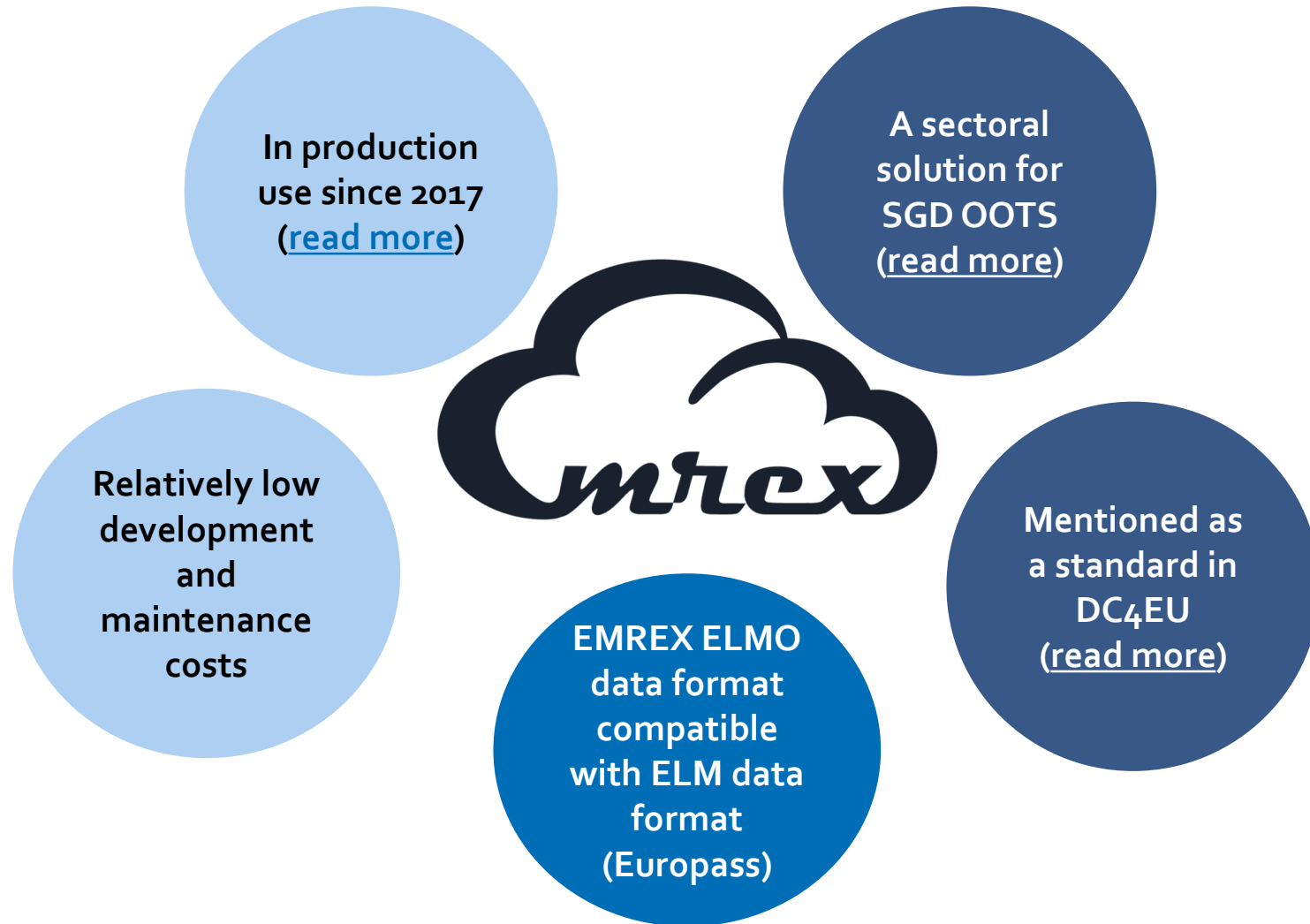A centralised database for study records enables

- A learner to have an overview to his/her all study record data at a glance
- A larger amount of data in use when implementing EMREX compared to implementing EMREX to a database of one higher education institution

An organisation-to-organisation study record data transfer is also possible via EMREX even though it is not the most optimal choice out of cost-benefit perspective.

#3 RECOMMENDATION
EMREX as a standard solution for transfer

In production use since 2017 ([read more](#))

A sectoral solution for SGD OOTS ([read more](#))

Relatively low development and maintenance costs

EMREX ELMO data format compatible with ELM data format (Europass)

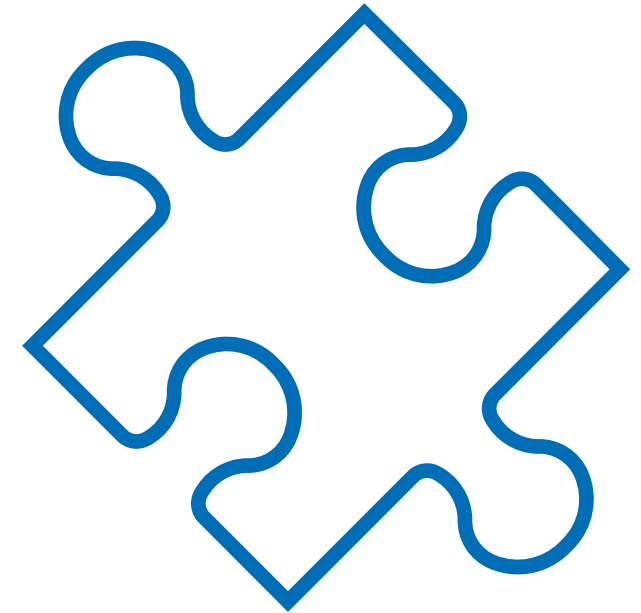Mentioned as a standard in DC4EU ([read more](#))

#4 RECOMMENDATION
Descriptive information available

Descriptive information of study records is

- available for processing recognition of prior learning and student admission
- in English or can be translated by using e.g. machine translation tools
- based on a shared vocabulary

Piloting Scenarios & Suggestions

STUDY RECORDS
Transfer of study records

Data: Machine-readable
Transfer: EMREX
Other: User identification

Pilot case: A student shares required study data to target institution's system by using EMREX.

Piloting countries or institutions:
XX, YY, ZZ

ENRICHED STUDY DATA
Descriptive information for processing recognition of prior learning and student admission

Data: Text-based descriptions of degree or course level learning objectives or content
Transfer: EMREX
Other: User identification

Pilot case: Descriptive data is integrated in the dataset of study records, as student shares required study data to target institution's system by using EMREX.

FULL INTEROPERABILITY
The recommendations of European Interoperability Framework have been put into practice

Data and transfer: Interoperable co-existing standards and common semantic basic understanding
Other: A permanent and unique identifier for each person enables cross-border identity matching.

Digital transfer of study data covers the needs of upper secondary level, higher education, and continuous learning in student mobility.

Study data is enriched with descriptive information. Shared vocabulary and translations are in use.

Thank you!

Additional information:

World's Smoothest Cross-Border Mobility and Daily Life Through Digitalisation

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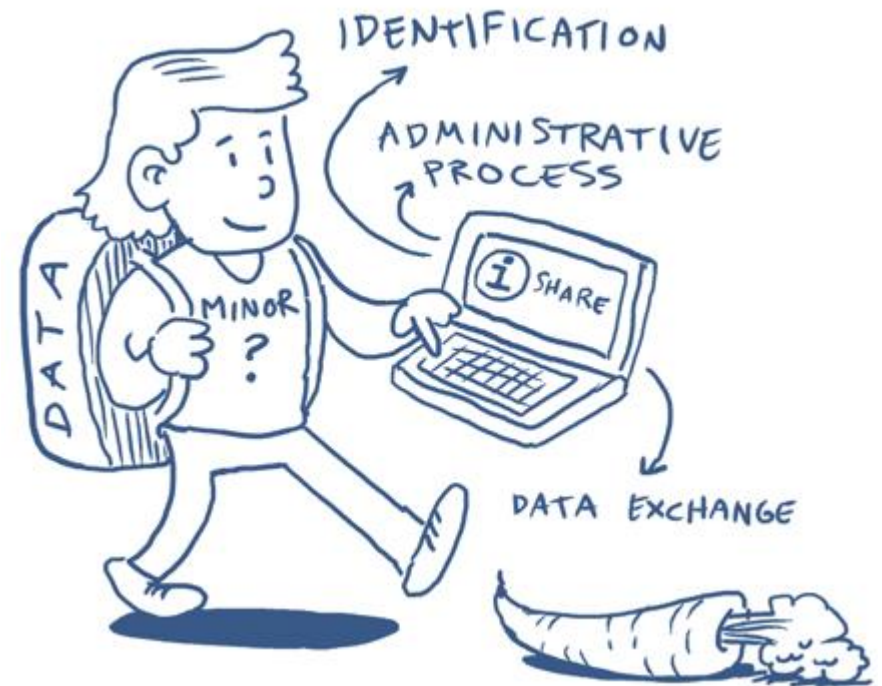E-mail: firstname.lastname(at)oph.fi

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