

# Digitalisation in recognition

A policy paper initiated by the Nordic Council of Ministers to propose ways of exploring the possibilities in digital developments, both in the Nordic region and globally.

THE AD HOC GROUP ON DIGITALISATION IN RECOGNITION

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## About the ad hoc group on digitalisation in recognition

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The Nordic and Baltic countries are among the most digitalised and innovative in the world, according to the Nordic Council of Ministers for Digitalisation<sup>1</sup>. In addition, Denmark, Norway and Sweden all have overarching public digitalisation strategies, and digitalisation processes of various scopes are taking place in many sectors in all Nordic regions.

Current and future developments of digitalisation in the field of recognition of foreign qualifications<sup>2</sup> has the potential to change the way recognition is done, and to increase efficiency and quality in the work taking place in the Nordic Recognition Information Centers (NORRICs).

Through strategic Nordic cooperation in utilizing the developments in the digital field in recognition, the Nordic region has the potential to provide a better user experience, increase the quality of recognition decisions and make the processes more effective. If this potential is reached, the Nordic countries will become pioneers and a showcase in utilizing current and future digital developments in developing recognition practices. This may also promote freedom of movement in the Nordic region, and reduce *gränshinder* – border barriers – in the region.

The Nordic Council of Ministers has therefore invited an expert group to propose ways of exploring the possibilities in digital developments, both in the Nordic region and globally. A key question in the group's mandate is how digitalisation can increase both the efficiency and quality in the work taking place in the NORRIC offices. Results and recommendations are foreseen to be disseminated to Nordic stake-holders at a joint seminar in 2020 collaboration with the ad hoc group on automatic recognition.

### Members of the expert group

#### ENIC-NARIC offices

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- Allan Bruun Pedersen, Danish Agency for Science and Higher Education, Denmark
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#### Universities of Applied Sciences/Professional Higher Education

- Jeppe Gordon Knudsen, University College Copenhagen, Denmark (until 1. April)
- Bjarne Grøn, Via University College, Denmark (from 1. April)

#### Nordic University Cooperation (NUS)

- Christina Nygren-Landgårds, Åbo Akademi University, Finland
- Ole Jørgen Torp, Norwegian University of Life Sciences (NMBU), Norway

#### EMREX

- Geir Vangen, Unit, Norway

#### The Nordic Council of Ministers

- Peder de Thurah Toft

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<sup>1</sup> <https://www.norden.org/en/information/nordic-co-operation-digitalisation>

<sup>2</sup> «A formal acknowledgement by a competent authority of the value of a foreign educational qualification with a view to access to educational and/or employment activities.» Convention on the Recognition of Qualifications concerning Higher Education in the European Region: <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168007f2c7>

## Recognition and digitalisation

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One definition of digitalisation is that «digitalisation is the integration of digital technologies into everyday life by the digitization of everything that can be digitized<sup>3</sup>». In other words, the process of *digitalisation* happens when analogue/physical information is *digitized* – i.e. turned into a digital format that can be easily read and used by a computer<sup>4</sup>, and which opens up for automated processes. However, organizations cannot begin with the intention of digitizing “everything”. The process of digitalisation begins with asking what information can and should be digitized, why, how, based on which standards, by whom, for whom and to what ends. Beyond this, digitalisation has been called “a strategy or process that goes beyond the implementation of technology to imply a deeper, core change to the entire business model and the evolution of work”<sup>5</sup>.

Knowing what users expect is a good starting point:

*...digital government isn't always about the big things for citizens. It's about making the little things better. Citizens want to go to one place to access all their services. They don't want to click a hundred times when one should do. They don't want to visit multiple website and complete multiple forms to receive a service. They certainly don't want inconsistent service levels depending on the channel with which they engage with you.*<sup>6</sup>

This report attempts to define and clarify the beginning elements of a successful digitalisation process. It is meant as a supplement to other initiatives, such as the DigiRec-project and the work of the Nordic Council of Ministers' expert group working on ways to implement a system of automatic recognition within the Nordic region.

The report first attempts to explain the building blocks of digitalisation with a focus on the recognition of foreign qualifications, which include structured data and standards. It attempts to describe the difference between *data maturity* and *digital maturity*, and describes the three layers of architecture in digitalisation processes. In order to compare the digitalisation efforts of the Nordic ENIC-NARICs, the group has defined digital maturity levels for ENIC-NARICs, with an accompanying digitalisation maturity comparison chart.

The report also lists relevant digital developments in the Nordic setting, as well as international developments that are worth following.

Finally, the report lists a number of recommendations from the group. Combined, this information will make it easier for decision makers, ENIC-NARICs and HEIs to make informed choices about the digitalisation efforts in relation to the recognition of foreign education.

## Relationship to other initiatives within the ENIC-NARIC network

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Two initiatives within the ENIC-NARIC network<sup>7</sup> are of specific interest to this group. One is the DigiRec Project, which explores the connection between digitization of student data and the fair and smooth recognition of foreign qualifications. The other is the Nordic working group on automatic recognition in the Nordic region.

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<sup>3</sup> <https://www.igi-global.com/chapter/ict-a-magic-wand-for-social-change-in-rural-india/135863>

<sup>4</sup> <https://www.collinsdictionary.com/dictionary/english/digitize>

<sup>5</sup> <https://medium.com/@colleenchapco/digitization-digitalisation-and-digital-transformation-whats-the-difference-eff1d002fbdf>

<sup>6</sup> <https://blogs.opentext.com/keep-calm-and-carry-on/>

<sup>7</sup> The European Network of National Information Centres (ENIC Network) and The National Academic Recognition Information Centres (NARIC Network), often known collectively as the ENIC-NARIC network: <https://www.enic-naric.net/welcome-to-the-enic-naric-website.aspx>.

## The DigiRec Project

The Digirec Project focuses on the digitization of data necessary for the recognition process, while the ad hoc group on digitalisation in recognition has chosen to focus on the digitalisation of the recognition process. As such, the two projects complement each other.

The DigiRec project<sup>8</sup>, an Erasmus+ project led by the Dutch organisation for internationalisation in education (NUFFIC), aims to systematically explore the connection between digitization of student data and the fair and smooth recognition of foreign qualifications. The project runs from March 2018 to February 2020. The result of the project will be a white paper for the ENIC-NARIC network. The group aims to create a broader understanding in the networks about the effects of digitization on their work; offer new policy perspectives, practical recommendations and guidelines; and support individual centres and the networks in developing policies.

A draft of the white paper was presented at a conference in Tallin in May 2019. Several members of the Ad hoc group on digitalisation in recognition were present at the conference. As became clear both in the white paper and during the discussions at the conference, levels of digitization and ambitions for future digitization vary greatly. Another useful aspect was the involvement of the HEIs, whose representatives reminded the ENIC-NARIC network that “your input is our output – your output is our input”. Recognition exists within in a “student data ecosystem,” which so far has been analogue or PDF-based. In the future, this ecosystem will most likely become increasingly digital, ie. consist of structured data that can be transmitted electronically and securely from the HEI to the student owning the data, or to external registries or other recipients.

## Nordic Council of Ministers’ expert group on automatic recognition

One of the aims of the Revised Reykjavik Declaration 2016 is that higher education qualifications from the region should be recognised in the other Nordic countries. The Nordic countries will work together in pursuing the goal of adopting systems for automatic recognition<sup>9</sup> of comparable qualifications in higher education in the region.

This is also one of the aims of the European Higher Education Area (EHEA), initiated by the European Commission. EHEA aims at speeding up the process of implementing automatic recognition. It includes automatic recognition of study periods abroad as well as access qualifications to further study in the next level.

The definition of automatic recognition used by the Expert group on automatic recognition:

*Automatic mutual recognition of a qualification: Holders of an officially recognised qualification from a Nordic country, which gives general access to studies at the next level in the home country, must have access to apply for admission to a higher education programme at the next level in any other Nordic country, without having to go through any separate recognition procedure. This shall not prejudice the right of a higher education institution or the competent authorities to set specific evaluation and admission criteria for a specific programme. It does not prejudice the right to check, if the qualification is authentic and, in case of an upper secondary education and training qualification, if it gives access to higher education in the country of origin. In this sense automatic recognition deals with accepting the level of the qualification and its access to the next level as defined by the national authorities/institutions in the home country*

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<sup>8</sup> <https://www.nuffic.nl/en/subjects/digirec/>

<sup>9</sup> This definition of automatic recognition must not be confused with automatic recognition of professional qualifications for the seven so-called sectoral professions: nurses, midwives, doctors, dentists, pharmacists, architects and veterinary surgeons, as laid down in the Directive 2005/36/EC on the recognition of professional qualifications: [https://ec.europa.eu/growth/single-market/services/free-movement-professionals/qualifications-recognition/automatic\\_en](https://ec.europa.eu/growth/single-market/services/free-movement-professionals/qualifications-recognition/automatic_en).

*In the terminology of the Bologna Pathfinder Group automatic recognition is also about smoother recognition procedures in order to make educational qualifications portable across country borders limiting the bureaucracy to a minimum. This procedural aspect of automatic recognition will also be discussed in this report.<sup>10</sup>*

Nordic Council of Ministers' expert group on automatic recognition submitted a draft policy report to Nordic Council of Ministers in November 2019. NORRIC heads have agreed to plan for joint seminar in 2020 for the Automatic Recognition group and the Ad hoc group on Digitalisation and Recognition.

Automatic recognition must be differentiated from automatized recognition processes. Automatic recognition can take place independently of digitalisation and automatization processes. However, digitalisation of recognition processes may support efforts to implement automatic recognition. By using various digital solutions, automatic recognition statements may be tailored to the owner of the qualification, and may also introduce layers of security and trust. One possible example of this is when and if individuals are able to share the data on their qualifications directly from various registries. For this to be feasible, we need technical solutions that can be trusted by individuals and by the receiving bodies. For HEIs the process of handling applications is smoother when they receive reliable data directly from other HEIs; the process of e.g. determining eligibility can be automatized.

## Blueprint for the future: architecture, data and putting it all together

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Far too often, discussions about digitization and digitalisation in organizations begin with specific formats or technologies. However, in order to be successful, organizations must look beyond specific technologies (e.g. Blockchain) or formats (e.g. PDFs). They must look wider.

When considering digitalisation and the recognition of foreign qualifications, there are some important building blocks in the form of architecture and quality of data that need to be in place. The next chapters will try to illustrate this.

### Information and technology: architecture

When considering digitalisation of the recognition of foreign qualifications, we are in reality looking at a set-up consisting of technology, data and the people who use the data. In other words we are talking about architecture.

In this chapter we are separating architecture into three parts: business, information and technology architecture. Business architecture describes the goals with your business, your processes in the context of that you know what you are doing every day. Information architecture describes information needed to carry out your business, and technology architecture is a specification of the technology used to support your business processes

Below, we have used the recognition process to exemplify these three parts of architecture.

#### Part 1: Business architecture

Business architecture describes the purpose of the business, what the goals are, what processes are involved, policies, stakeholders etc. If we were to describe a business architecture for recognition, it would include the purpose of doing recognition, the parties involved, legal frameworks and the work processes used. While creating a business architecture that encompasses the entire "world" of recognition would be a time-consuming task that would involve representatives from many organizations

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<sup>10</sup> From the draft report: Automatic recognition in the Nordic Region.

and parts of the world, ENIC-NARICs might consider describing a business architecture for their own activities.

## Part 2: Information architecture

Information architecture describes the information needed to carry out your business, data models and structures, data sources etc. Information architecture may be the most important layer for organizations to consider, yet it is often overlooked by those who are new to digitalisation.

Information architecture for the recognition process includes the data needed for doing recognition, the sources of these data, information produced during the recognition process and how to organize the data. These are the familiar “inputs and outputs” of the recognition process: diplomas, transcripts, diploma supplements, quality assurance information, the ID of the applicant, recognition statements, and so on.

## Part 3: Technology architecture

When digitalisation is discussed in organizations, one often skips to what is essentially technology architecture, without paying enough attention to business and information architecture. Technology architecture is a specification of the technology used to support your business processes. Whether an organization develops their own systems, or uses commercial solutions, the important thing is that the system chosen supports the work done in that organization. In terms of the recognition process, this would include how to handle input, throughput and output of information, technology to automate processes, storing data and securing information.

There are several standards that can be used in *any* business area, including standards for storing data, exchanging data, cloud services, artificial intelligence, block chain, platforms, digital signatures/cryptology, and so on.

Technology architecture tends to change over time, sometimes abruptly, as new technology is introduced and old technology left behind. Information architecture, on the other hand, are more likely to remain unchanged over time.

## Data maturity levels

In order to have the possibility to automate the recognition process we need to produce and have access to high quality data that can reflect the way we are working with the recognition process.

In 2007 a group called RS3G was founded as a cooperative effort between suppliers of software implementers and stakeholders in the EHEA. With partners from all over Europa and US, this became an incubator for later projects and initiatives like ELMO, EMREX, Erasmus Without Paper and the Groningen Declaration Network. One of the results of this cooperation was a definition of the levels of data maturity, ranged from lowest to highest:

- Data maturity level 1: An image of the document, for instance a PDF
- Data maturity level 2: Structured data
- Data maturity level 3: Standard compliant structured data
- Data maturity level 4: Comparable data

The different data maturity levels open up for different opportunities when it comes to the digitalisation of the recognition process, artificial intelligence (AI) and automation, sharing of data, using data for statistics and performance management.

Data maturity level 1: an image of the document

When moving from the first to the last level of data maturity, introducing an image of a document (e.g. a PDF) enables a digital flow of data. This also makes it possible to include security mechanisms such as digital signatures, encryptions etc. Exchanging data is faster than in a paper world, and it is possible to add trust to the document to prevent fraud. However, images of documents require a lot of storage space. They may also prove difficult to manage and protect with legacy systems – i.e., their formats are likely to

become obsolete, and eventually there may not be technology available to view or process such files (much like photos on old cell phones or films on videotape).

At the lowest level of digitalisation, the image of the document still needs to be processed “manually” – albeit on a screen instead of in its physical paper form. Currently, there is capture software available that can retrieve data from a scanned image. However, the resulting “jumble” of data is of limited use, unless we move on to the next data maturity level.

#### Data maturity level 2: Structured data

To enable better support with less manual registration, structured data need to be introduced to the process. With this we move away from the document itself and focus on the *content* of the document, exchanging the information as separate data elements.

One way to visualize structured data is as a table of rows and columns containing related information. The benefit of structured data is that it is labelled, describing its attributes and relationships with other data. This data structure is easily searchable, using a human or algorithmically generated query<sup>11</sup>.

The challenge with this level is that even though the data is structured, it may not be structured according to commonly agreed upon formats or standards.

#### Data maturity level 3: Standard compliant structured data

To achieve the possibility to import and export data related to the recognition process and to increase data quality, standards for describing the structural data are introduced. At this level, the parties delivering data and consuming data agrees on how this data structure should be implemented. All parties following the standard will be able to exchange data between them, and the data from many delivering institutions can be handled the same way in the receiving systems.

Parties must agree on the structure of the data, what kind of data should be included in the exchange, how it should be formatted, what should be mandatory, what kind of data document format (xml, json etc). This is often a highly formal process that may take years to accomplish.

The challenge at this level is that it may still be difficult to recognize and compare data from different sources.

#### Data maturity level 4: Comparable data

On the highest level of data maturity, comparable data is added. In addition to agreeing on the format of the data, one introduces standards for the data itself. Examples of standard data in the education sector are EQF-levels, Isced-F-codes and ECTS-credits. The more standardized data you introduce to the process, the more rules can be made to automate the handling of these data. This will also prepare the organization for the use of Artificial Intelligence (AI) and predictive analysis in the process.

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<sup>11</sup> <https://lawtomated.com/structured-data-vs-unstructured-data-what-are-they-and-why-care/>

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Figure 1: The illustration shows data that is structured, standard compliant and comparable. Source: UNIT.

## Understanding your own data: terminology and standardization

### The importance of terminology

As we have seen, the digitalisation of recognition processes requires data that is structured, standard compliant and comparable. In order to achieve this, organizations must understand their own data before it can be processed by a system, shared with others, used for statistical purposes or even artificial intelligence/automation. This brings us to terminology. Every field works with terminology with specific meanings within the context of that particular field, but that may also exist beyond the field, perhaps with different semantic or legal definitions. Hence, terminology work, whereby organizations create lists of definitions of their own terms, has been named an essential precursor to digitalisation<sup>12</sup>. The important thing is not necessarily to harmonize terms and expressions, but to map, define, coordinate and make differences (intended and unintended) visible.

### Standardization

A standard is the documentation of a product, a rule, a guideline or a definition. Standardization is the process of coming to an agreement on a standard. Building a formal standard is time consuming, involved parties ideally coming together to discuss the specifications. The standardization process within the standardization bodies normally takes 3-4 years to accomplish.

Some specifications have emerged from outside the standardization bodies and have been adopted in the development communities. An example is ELMO, which is a data format for learning opportunities, building upon a formal European standard data model, and adopted by EMREX and Erasmus Without Paper (discussed below). This kind of specifications is often referred to as ad-hoc standards, because they are commonly used, but not approved by an official standardization body through a standard process.

A number of standardization bodies exists, international and national ones. Some of these are general standardization bodies like ISO<sup>13</sup> and CEN<sup>14</sup>, each developing and defining a great variety of standards. Others are more specific to a certain business, like IMS global<sup>15</sup> and PESC<sup>16</sup> are for education. Any system developed must be able to accept several different standards, such as EMREX, Europass, PESC, etc.

<sup>12</sup> <https://forenking.brreg.no/hvordan-unngar-vi-babelsk-forvirring-i-offentlig-sektor/>

<sup>13</sup> <https://www.iso.org/home.html>

<sup>14</sup> <https://www.cen.eu/Pages/default.aspx>

<sup>15</sup> <https://www.imsglobal.org/>

<sup>16</sup> <https://www.pesc.org/home.html>

A convention like the Lisbon Recognition Convention has elements of both a data set/term list and of a standard built-in, describing basic guidelines for doing recognition.

### Putting it all together: Digitalisation maturity levels

In addition to *data* maturity levels, many different models for *digital* maturity levels in organizations or society at large have been suggested, including many that specifically address e-government digital maturity levels. Although the names of the models and their different maturity stages may differ, almost all these models for digital maturity levels include the following stages<sup>17</sup>:

1. A stage related to the availability of the portal in the Web
2. A stage where the citizens can interact with governments
3. A stage where the citizens can transact with governments
4. An advanced stage that covers advanced features such as information sharing between agencies

In order to compare the digitalisation efforts of the Nordic ENIC-NARICs, the group saw the need to describe digital maturity levels both in terms of data maturity, and in broader terms of digitalisation in society, as these may apply for ENIC-NARICs. This report proposes the following model for digital maturity levels for ENIC-NARICs:

0. Analogue with basic computer support
1. Analogue/digital hybrid
2. Digital with mostly manual processes
3. Digital with limited use of structured data, standardization and automatization
4. Digital with extensive use of structured data, standardization and automatization

These levels are further described in the Digitalisation maturity levels comparison chart for ENIC-NARICs (see below). The chart is intended to make it easier for ENIC-NARICs to find their current level, and assess some of the changes, benefits and risks associated with subsequent levels of digital maturity.

The chart begins with a level zero (“Analogue with basic computer support”) to indicate a “baseline” that for many ENIC-NARICs was the situation until not that long ago. The chart describes input (application forms and documentation), throughput (case processing) and output (decisions) at each increasing digitalization maturity level, and includes opportunities and challenges/risks for each level. The lines between levels are stippled, as an organization may employ elements from several levels at once. At any time, those who apply for recognition may also include persons with older qualifications, and hence there is a variety in the documents presented: some may be available to us as structured data, others have hand written parchments. Progress from one level to another can take different forms.

The chart also includes a level four (“Digital with extensive use of structured data, standardization and automatization”), in which structured data from external sources is the norm. This may seem far-fetched at present: ENIC-NARICs evaluate credentials from most of the world's approx. 200 countries, and it is difficult to know how many countries we can expect to see exporting structured credential data in the foreseeable future. Yet, digitalisation *can* occur quickly, sometimes skipping the “intermediate” stages. A country such as Estonia demonstrates that political will can drive dramatic and fast digitalisation efforts. Taxes can now be completed online, 99 percent of Estonia’s public services are available on the web 24 hours a day and nearly one-third of citizens vote via the internet<sup>18</sup>. Another example is the penetration of mobile phones in Africa, which has transformed communications in sub-Saharan Africa and allowed Africans to skip the “landline stage” of development and jump right to the digital age<sup>19</sup>. With this rate of

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<sup>17</sup> Fath-Allah et al: E-Government Maturity Models: A Comparative study. International Journal of Software Engineering & Applications (IJSEA), Vol.5, No.3, May 2014: 82 <http://airccse.org/journal/ijsea/papers/5314ijsea06.pdf>

<sup>18</sup> <https://www.cnbc.com/2019/02/08/how-estonia-became-a-digital-society.html>

<sup>19</sup> <https://www.pewresearch.org/global/2015/04/15/cell-phones-in-africa-communication-lifeline/>

mobile penetration, many young Africans may be ready to interact with e.g. credential evaluators on digital or mobile platforms, even if credential evaluators are not yet ready to do the same with its users.

In any case, it is important for organizations to identify the digitalisation maturity level at which most of their activities are currently at, and make informed choices about which level they are aiming for. There may be good reasons why an ENIC-NARIC shouldn't aim for a higher level of digitalisation and information architecture, depending on volume of applications, user needs, and various other cost/benefit analyses.

It is also important to realize that digitalisation choices, opportunities and risks correlate to the digital maturity level. Advanced features, such as extensive automatization, are only possible when a system is based on structured data. Some risks could be said to be present at every level, but may be especially pronounced at certain levels (examples include data security/GDPR issues in connection with using unencrypted e-mail, or how legislative issues can prevent the sharing of data between different agencies, or even within an organization).

## Digitalisation maturity levels comparison chart for ENIC-NARICS

MATURITY LEVEL	INPUT 1 (Application form)	INPUT 2 (Documentation)	THROUGHPUT (Case processing)	OUTPUT (Decision)	Opportunities	Challenges/risks
<b>0. Analogue with basic computer support</b>	Paper forms	Paper copies or originals	Manually (assessing paper)  Basic computer support (word processing etc)	Paper letter, sent as regular mail	None – analogue is no longer an option for most institutions	Time consuming  Environmental costs
<b>1. Analogue/digital hybrid</b>	Downloadable form on website (fill in on screen or by hand, submitted by regular mail)  Downloadable form on website (fill in on screen or by hand, submitted as e-mail attachment)	Paper copies or originals submitted by regular mail  PDFs, JPGs submitted as e-mail attachments  Encrypted PDFs sent by email directly from the institution through a digital platform.  Encrypted PDFs sent directly to a receive account.	Manually (assessing paper)  Manually (assessing documents on screen)  Computer support (electronic archives, databases)	Paper letter  (Encrypted) evaluation statement sent as e-mail attachment  Integration with secure digital e-mail possible	Fewer errors  Environmental gains (less paper)  Postal delivery times no longer part of case processing time  Use of mature technology (e.g. PDF files)	Distrust of electronic documents – the “Gutenberg effect”  Data protection/GDPR issues  Open PDF files can easily be manipulated.
<b>2. Digital with mostly manual processes</b>	Online form (data submitted by “click of button”)	PDFs, JPGs uploaded via online form  Structured data from external sources becoming possible – e.g. from national ID registers	Manually on screen still the norm  Digital case handling systems  Some structured data allow for limited automatization	(Encrypted) evaluation statement sent as e-mail attachment or downloadable online  Evaluation statements based on blockchain technology. Both structured and unstructured data depending on the recipient.  Possibilities for export of structured data to external registries and recipients	Easier and more accessible application procedure  Shorter case processing times  In line with expectations and national policies/ICT-developments  Increased portability of decisions  Applicants are offered additional digital services, e.g. e-wallets and e-portfolios to store electronic evaluation statements, digital credentials, micro credentials etc.	Legislative issues  PDFs and JPGs require more digital storage space than structured data  Vulnerable to obsolescence and changes in technology

<b>3. Digital with limited use of structured data, standardization and automatization</b>	Online form User interaction (“self service”) increasingly an option	Structured data from external sources increasingly becoming the norm	Increasingly automatized Some «self service» options for users possible	Export of structured data to external registries or recipients increasingly becoming the norm	Structured data Automation of processes Increased security and quality Structured data require less digital storage space Lower costs over time	Data quality issues - lack of standards, common formats Initial costs tend to be high
<b>4. Digital with extensive use of structured data, standardization and automatization</b>	User interaction	Structured data from external sources is the norm	Automatization/AI becoming the norm “Self service” options for users becoming the norm	Export of structured data to external registries or recipients is the norm	User in control Artificial intelligence (AI) Predictive analytics Various “unknown unknowns”	Fear of redundancy due to automatization Increased environmental costs due to energy required for data processing Various “unknown unknowns”

## Status of digital developments in the Nordic setting

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A mapping of the digitalisation developments in the five NORRIC offices shows that the Nordic countries have reached different stages of digitalisation. The various NORRIC offices also indicate that they have varying ambitions and plans for further digitalisation efforts.

A matrix with a complete overview can be found in Appendix 2 on page 19, while an overview of other Nordic digitalisation developments can be found in Appendix 3 on page 20.

At the time of writing this report, Norway and Sweden have online application forms, while Finland and Denmark are either in the process of implementing an online application form, or estimating development costs of digital solutions. For those countries without online application forms, applications can be submitted as paper via regular post, or as e-mail attachments, sometimes through secure digital e-mail solutions existing for citizens in each country.

Norway's application portal and case processing system accepts and generates structured data, as will Finland's planned system. When automatized processes are used, they are so far only for administrative processes (e.g. when an application has been submitted, a case is generated and a case number assigned). None of the Nordic countries have as of yet developed automatized evaluation processes, but Norway is in the process of mapping and developing possibilities for this.

If we compare these findings to the Digitalisation maturity levels comparison chart for ENIC-NARICS, it becomes clear that all NORRICs have moved well beyond the baseline. Norway is at the forefront, at level 3, with some elements from level 4.

Three case studies are included in this report: Norway's application portal and case handling system, and two online databases from Denmark and Sweden. Online databases are not just useful for their intended target groups, but also examples of how information can be structured into data fields.

### Norwegian case study: eSam: NOKUT's application portal and case handling system

NOKUT's application portal and case handling system was launched in 2016, with 13 subsequent versions/updates since then. It now comprises an application portal in which applicants can apply for three of NOKUT's recognition schemes:

- Recognition of foreign higher education
- Recognition of foreign tertiary vocational education
- Recognition of foreign vocational education and training
- From 1 January 2020: Recognition of teacher qualifications - school and kindergarten

The applicant portal allows applicants to log in securely with their Norwegian electronic ID, which is the same as is used for other services in the country (e.g. public bodies and banks). Those who do not have a Norwegian electronic ID may create user profile with a username (e-mail) and password. Once registered in the application portal, applicants fill in personal information and upload scanned copies of the required documents for recognition.

The application portal also has EMREX integration. It now includes eight countries, and enables applicants to submit transcripts directly from national diploma registries into NOKUT's application portal.

Once an application is submitted, it is available in NOKUT's in-house case handling system. The credential evaluator responsible for the application is able to view all documents, and create a recognition statement in the case handling system. The system also allows for colleague guidance and support. The recognition statement is then stored in NOKUT's electronic archive, from which it is also transmitted to the applicant via secure e-mail or as a download from the applicant portal. All data produced in the system are stored as structured data, and are used in reports and statistics. In the future these data will be used in automation of the processes.

Currently, NOKUT can feed examples of recognition statements into a national database called GAUS<sup>20</sup>, which is used by employees at Norwegian higher education institutions working with approval of foreign studies, credit transfer and evaluation. In this way, employees at higher education institutions working with approval of foreign studies can access information about NOKUT's and other institutions' assessment and conclusions of credits and qualifications obtained outside Norway.

In 2020, recognition statements will also be shared to the Norwegian Diploma Registry (*Vitnemålsdatabasen*)<sup>21</sup>. This means that future holders of NOKUT recognition statements will be able to share them securely with employers or HEIs in the same way that candidates from Norwegian HEIs can now share their educational results.

### Danish case study: the list of recognised higher education institutions

The Danish Agency for Science and Higher Education has created and maintains an online database<sup>22</sup> on recognised higher education institutions. The database includes existing institutions and institutions that have existed as recognised higher education institutions in the period 2000 to the present. The database aims to make it easier for foreign recognition authorities, educational institutions etc. to obtain information about the status of both existing and former Danish higher education institutions. In so doing, the database is intended to support the recognition of Danish higher education qualifications abroad in accordance with the Lisbon Recognition Convention:

Each Party shall make adequate provisions for the development, maintenance and provision of [...] a list of recognized institutions (public and private) belonging to its higher education system, indicating their powers to award different types of qualifications and the requirements for gaining access to each type of institution and programme [...]" (Article VIII.2)

### Swedish case study: The Evaluation Service

In May 2019 the Swedish ENIC-NARIC introduced a new online product called *Bedömningstjänsten* ("The Evaluation Service")<sup>23</sup>. The service contains *general* information about what foreign qualification corresponds to in Sweden. A comparability statement can be downloaded as a PDF, which the jobseeker can then submit to the employer together with their education documents. The service currently contains nearly 500 qualifications from 37 countries. This new service offers applicants an additional service to the customary (individual) evaluation statements.

## International developments in the digital field

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This chapter focuses on developments and initiatives that are of immediate interest to credential evaluators. Many different models, technologies and formats for exchanging information about education and education holders digitally are currently being launched, and this will most likely continue for the foreseeable future. What is important for ENIC-NARICs is that any system developed should be able to accept data from several different providers, as well as accepting different standards and technologies.

These developments can be grouped in different ways. For ENIC-NARICs, it may be interesting to consider how these developments support the input, throughput and output stages of the recognition process. Included here are also a mention of initiatives that set the wider stage for recognition.

A list with more information about each of the developments in the digital field mentioned below can be found in Appendix 4 on page 22. The list is not conclusive. Technical standards and solutions that can be used in any business area are not included in this report.

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<sup>20</sup> <https://www.fellesstudentsystem.no/english/applications/gaus/index.html>

<sup>21</sup> <https://www.vitnemalsportalen.no/english/>

<sup>22</sup> <http://ufm.dk/en/hej>

<sup>23</sup> More about the Evaluation Service (in Swedish): <https://www.uhr.se/bedomning-av-utlandsk-utbildning/bedomningstjanst/>

## Developments supporting input and output of data

How data arrives at the ENIC-NARIC sets premises for the recognition process. If the data is from a trusted source, a diploma may not need to be verified by the credential evaluator. If the data is also structured, it may open up the possibilities for automatization of the verification of the diplomas.

Many of these same solutions may also be used to facilitate the output stage – in other words, recognition decisions can be exported as structured data to external registries or recipients, in addition to generating the traditional recognition document. Blockchain, Digitary<sup>24</sup>, EMREX<sup>25</sup>, The new Europass<sup>26</sup> and various digital solutions in the US (e.g. eScrip-Safe<sup>27</sup>, National Student Clearing House<sup>28</sup> and Parchment<sup>29</sup>) are all examples of initiatives that may support both the input and in some cases the output stages of the recognition process. Blockchain can be used to securely exchange student data, and several ENIC-NARICs and HEIs are currently developing different ways of using this technology. Digitary and EMREX are two examples of solutions that enable learners to both receive and share the results of their education digitally and as structured data. The goal of the new Europass is also to allow individuals communicate their academic qualifications, in addition to skills and experience.

It is important to note that many of these solutions give the owners of the data (i.e. students) more options for how to store and share their data digitally.

## Developments relevant for the throughput stage

The examples mentioned above also affect the throughput stage of the recognition process, and have the potential to change how credential evaluation is done. However, some developments are particularly relevant to the ENIC-NARICs themselves, to be used in case processing and administration.

Credential evaluators have for a long time been able to access national and international databases in order to find information about or verify qualifications, but in terms of digitalisation, it is also interesting to consider ways in which this data could be imported into case handling systems and used in connection with automatization. Examples include databases such as DEQAR<sup>30</sup>, and the International Association of Universities' World Higher Education Database (WHED)<sup>31</sup>.

While Erasmus Without Paper<sup>32</sup> is not specifically developed for ENIC-NARICs, it is an example of a system that aims to facilitate a digital administrative workflow. Key initiatives include the EU student card and the digitalisation of the Diploma Supplement.

## Developments that set the wider stage for digitalisation

Within Europe, the requirements formulated in EU's single digital gateway<sup>33</sup> will also dictate how ENIC-NARICs must facilitate online access to the information, administrative procedures and assistance services that citizens and businesses need to get active in another EU country. This includes the procedure of requesting academic recognition of diplomas, certificates or other proof of studies or courses.

Other initiatives, such as the Groningen declaration<sup>34</sup>, provides opportunities for idea sharing, research and development.

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<sup>24</sup> <https://www.digitalary.net/>

<sup>25</sup> <https://emrex.eu/>

<sup>26</sup> <https://ec.europa.eu/futurium/en/europass/new-europass>

<sup>27</sup> <https://escrip-safe.com/login>

<sup>28</sup> <https://studentclearinghouse.org/>

<sup>29</sup> <https://www.parchment.com/log-in/>

<sup>30</sup> <https://www.eqar.eu/qa-results/deqar-project/>

<sup>31</sup> <https://www.whed.net/home.php>

<sup>32</sup> <https://www.erasmuswithoutpaper.eu/>

<sup>33</sup> [https://ec.europa.eu/growth/single-market/single-digital-gateway\\_en](https://ec.europa.eu/growth/single-market/single-digital-gateway_en)

<sup>34</sup> The GDN website: <https://www.groningendeclaration.org/>

## Conclusions and recommendations

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The key question from the mandate of the group is how the use of digitalisation can increase both the efficiency and quality in the work taking place in the NORRIC offices. But as this report has shown, this may mean different things in different contexts. It is difficult to pinpoint one strategy or solution that applies to all. There may be many compelling reasons why it makes sense to move towards digitalisation of an organization, just as the best alternative – for the foreseeable future – is to stay at the current digitalisation level.

Digitalisation may open up new opportunities for NORRICs to use data for even better services –in ways we can't even think of right now, and it may promote freedom of movement in the Nordic region, and reduce "gränshinder" – border barriers – in the region.

Digitalisation may even lead the way to *digital transformation*. There are several definitions of digital transformation, but one pertinent definition might be this: "Digital transformation closes the gap between what digital customers already expect and what analogue businesses actually deliver"<sup>35</sup>.

Based on the meetings and discussions in the ad hoc group on digitalisation in recognition, the following recommendations have been formulated:

- ENIC-NARICS that want to digitalize their activities should look beyond specific technologies (e.g. Blockchain) or formats (e.g. PDFs). In order to succeed with digitalisation, an organization should develop a strategy that takes into consideration data maturity (current and foreseeable), terminology work and standardization, and the three layers of architecture (business, information and technology). It will be useful to assess both the current level of digitalisation maturity, as well as developing a cost-benefit analysis of moving to a higher digitalisation maturity level. Strategies should also consider user needs and wants.
- Systems that are developed to integrate structured data from external sources should be able to accept several different standards, such as EMREX, Europass, PESC, etc.
- The NORRIC network and/or the ENIC-NARIC network should arrange peer learning activities, such as study visits to support the development/transition of digital systems. It is especially important that data and policy experts connect to create practical and sustainable solutions<sup>36</sup>. The NORRIC network and/or the ENIC-NARIC network may also consider different ways that best practices can be shared and discussed, as well as new standardization processes that may aid digitalisation.
- Ministries and transnational organizations could make funding available for the digitalisation of old and new records at higher education institutions, especially in areas where such funding may otherwise be lacking. This could be a way to enable both past and future learners to share the results of their studies, to employers, other HEIs or to ENIC-NARICs.
- More efforts should be made to gather and share structured data about accreditation status and quality assurance for HEIs throughout the years. This could be done at the national level, in which the ENIC-NARIC cooperates with national quality assurance agencies. It could also be done at a transnational level, through a cooperation between the ENIC-NARIC network and organizations such as ENQA. Denmark's database of recognized higher education institutions and DEQAR are good examples to be followed.
- In most Nordic countries there are large digitalisation projects and/or digital services being built for labour market needs. NORRICs should investigate how these projects should match up or link with the digitalisation projects in the educational sector.

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<sup>35</sup> <https://www.gregverdino.com/digital-transformation-definition/>

<sup>36</sup> <https://emrex.eu/2019/09/04/emrex-newsletter-september-2019/>

# Appendices

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## Appendix 1: Mandate

### Background

The current and future developments of digitalisation in the fields of recognition of foreign qualifications will have effect on the potential in efficiency and quality in the work taking place in the Nordic Recognition Information Centers/Nordic ENIC-NARICs (NORRIC) offices. This includes solutions for sharing data with NORRIC-offices, higher education institutions and others, such as EMREX (in which Denmark, Finland, Norway and Sweden, plus three other European countries, are part of the network).

By importing structured metadata from secure sources, there lies a potential to improve the quality and increase the effectiveness in recognition processes. In addition, the holders of the document should be able share their recognition decisions, digitally, with higher education institutions, employers and other NORRIC offices.

The key question is how the use of digitalisation can increase both the efficiency and quality in the work taking place in the NORRIC offices, by means of for example Artificial Intelligence and automatization of recognition process. Rambøll Management Consulting also discusses the potential for more cooperation in their report of October 2017, on behalf of The Nordic Council of Ministers and the Norwegian presidency.

The working group is also a follow up on the revised Reykjavik Declaration, which aims to secure that:

- *the Nordic countries continue to strengthen administrative and methodological co-operation on the evaluation of qualifications obtained in Nordic and other countries, e.g. by establishing working groups and the ongoing exchange of information and good practices in higher education, in particular via the NORRIC Network*

Through strategic Nordic cooperation in utilizing the developments in the digital field in recognition, the Nordic region has the potential to provide a better user experience, increase the quality of recognition decisions and make the processes more effective. If this potential is reached, the Nordic countries will become pioneers and a showcase in utilizing current and future digital developments in developing recognition practices.

### Objectives

To further these aims, the Nordic Council of Ministers invites an expert group to propose ways of exploring the possibilities in digital developments, both in the Nordic region and globally.

1. The expert group will map the status of digital developments in the NORRIC offices.
2. The expert working group will map relevant international developments in the digital field.
3. The expert working group will look into models for effectively and securely to import metadata in order to improve recognition processes.
4. The group will inform itself on the ongoing work in the ENIC-NARIC project DigiRec and, if relevant, incorporate findings and experiences from this project founded by the European Commission.
5. In addition, the group should also see its work in relation to the ongoing Nordic Council of Minister's Ad hoc Group for the Follow-up of the Revised Reykjavik Declaration, which focuses on automatic recognition, as there can be relevant synergies.
6. The working group also will look into models for how recognition decisions can be shared digitally with higher education institutions, employers and other NORRIC offices.

### Outcome

1. The outcome of the work will be a report (policy paper) with concrete recommendations for the Nordic Council of Ministers, the Nordic Ministries responsible for higher education, NORRIC offices, and higher education institutions.
2. As a follow-up to the report, a Nordic seminar, with participation of international representatives, will be organized. The purpose of the seminar is to inform key stakeholders of the results and to further the implementation of relevant digital solutions in the work of NORRIC offices.

## Appendix 2: Nordic digitalisation matrix

Mapping points	DK	FI	IS	NO	SE
<b>Current situation: Paper based or electronic application system</b>	Paper based or digital post for Danish residents (PDF)	Paper based	Paper based. Applicants print out form online, submit via e-mail or regular mail.	Online application system	Online application system
<b>Future digitalisation plans</b>	A digital application system is on the cards, but no final decision has been made. We are clarifying development costs.	Online application system to be launched in 2019	Automatic recognition for Scandinavia and some other high-volume countries, such as Poland and Lithuania. Waiting for a new filing system (under the auspices of the University of Iceland).	Integration with Emrex, develop solution in our case handling system for recognition of vocational education and training and recognition of foreign tertiary vocational education. Launched in 2019	UHR pilot study on predictive analytics. Will be completed during Q4 2020.
<b>Does/will your online application system generate structured data?</b>	No (the planned system will generate case processing data, but qualification and assessment data will continue to be entered into a database by credential evaluators).	Yes	No	Yes	No
<b>Do/will you share structured data with other institutions/databases nationally or internationally?</b>	No	No	No	Yes	No
<b>Do/will you import structured data from other institutions/databases nationally or internationally?</b>	No	No	?	Yes	No
<b>Does/will your application system include automatic processes?</b>	Yes, we plan to have automatic registration of person, case and application document.	Yes, admin/internal processes	?	Yes, admin/internal processes	No
<b>Do/will you use digital IDs, e.g. linked to national ID-numbers?</b>	Yes, that will be part of a digital application system.	Yes	?	Yes	No

## Appendix 3: Other digitalisation developments in the Nordic region

### Nordic Council of Ministers

The Nordic countries work together on digitalisation. The goal is to turn the Nordic/Baltic region into a coherent and integrated digital region. Working together provides benefits for the people, businesses and public sectors of the Nordic and Baltic countries. An ad-hoc council of ministers for digitalisation has therefore been established for the period 2017 to 2020 with the following objectives: a digital single market in the Nordic and Baltic countries, deepened digital collaboration, and the development of a cohesive digital infrastructure for the region's citizens, businesses, and administrations.

Within the area of education, two projects are currently running in relation to digitalisation. One project was initiated in November 2019 where the focus is an analysis of digitalisation and higher education; more specifically to see how the institutions use digitalisation in their education and training.

Nordic CRAFT (Creating Really Advanced Future Thinkers) is the other project and was initiated in 2018. The focus of Nordic CRAFT is to promote computational thinking and strengthen competencies in innovation, problem solving, critical thinking, communication, IT in use and collaboration among teachers and learners in Nordic primary schools.

### Denmark

Central, regional and local governments work together on joint public sector digital strategies. One of the main goals of the Digital Strategy 2016-2020 is digitisation and better reuse of data in order to help create more cohesive and efficient public services with digital, high-quality welfare solutions<sup>37</sup>.

As a part of the Digital Strategy 2016-2020, it was agreed to make an analysis of options for a digital education portfolio as a framework architecture for educational data including higher education qualifications. However, this initiative has not been carried out.

As regards general upper secondary education, the Danish Ministry of Education maintains an exam database with data on qualifications awarded since 2004. Qualification holders can access but not share their data<sup>38</sup>.

### Finland

The higher education institutions are currently working on digitalizing their diplomas, transcripts and Diploma Supplements. This presents possibilities and opportunities for better exchange of information (for recognition purposes) and each HEI is responsible for their own documents and their digitalisation process. The Certificate Supplement documents for VET education are available on a database<sup>39</sup> and in the future their format (machine-readability, interoperability) will be looked upon.

There is a national register/service called KOSKI<sup>40</sup> that contains information about qualifications and studies completed in institutions that are part of the national system of education. Including information about recognition decisions, issued by the Finnish National Agency for Education, to this register has been discussed but a decision has not yet been made. Similarly, the Diploma Supplements may be included into KOSKI in the future. The idea is that a person could give an employer the right to view his/her information directly from this register.

### Iceland

Higher education institutions in Iceland are working on implementing the digitalisation of exchange studies, such as digital learning agreements and contracts. Soon, transcripts will also be digital for exchange students. The Diploma Supplement will also be digitalized in the coming months.

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<sup>37</sup> <https://en.digst.dk/policy-and-strategy/digital-strategy/>

<sup>38</sup> <https://www.stil.dk/digitale-test-og-proever/eksamensdatabasen>

<sup>39</sup> <https://eperusteet.opintopolku.fi>

<sup>40</sup> <https://www.oph.fi/utvecklingsprojekt/koski>

## Norway

In 2019, Norway appointed its first minister of Digitalisation<sup>41</sup>, and in June, a digitalisation strategy for the public sector from 2019-2025 was launched<sup>42</sup>. The aims of the digitalisation strategy is to give citizens, businesses and non-profits easier access to public services, make the public sector more efficient, and increase productivity in society.

The Norwegian Diploma Registry<sup>43</sup> was first launched in 2017, and now collects results from almost all universities and university colleges in Norway. Users can share results from higher education in Norway with potential employers, educational institutions and other relevant recipients. The Diploma registry was developed in cooperation with the Erasmus+ project EMREX.

## Sweden

The digitalisation of UHR's workflow started in 2007 by introducing an electronic processing system. In 2014 an electronic application system was launched. This was followed by the introduction of digital evaluations statements as of April 2019. Thus, the whole evaluation process from the application to the final product is now digital:

1. The applicant applies for an evaluation through our portal and downloads all necessary documents;
2. The application is digitally processed;
3. The applicant receives a digital evaluation statement.

The Swedish higher education institutions are digitalizing as well. In December 2017 the Linnaeus University started to award digital degree certificates. This was followed by the University of Gothenburg in November 2018. Other institutions that have followed suit are the KTH Royal Institute of Technology, Linköping University, Södertörn University College and Stockholm University.

## Åland Islands

According to the IT strategy for the Government of Åland, adopted 6 June 2018, there is a need for more e-services in order to improve government services through the automatization of processes. The goal is to develop e-services in order to approach the concepts of e-schools and e-democracy. The work on developing e-services for the higher education sector is still at a stage in which a mapping of needs is carried out.

Within higher education in Åland, some parts of the application processes have been digitalized. Students can apply digitally through the schools' websites, but diplomas and diploma supplements are not yet digitalized. Results of studies are saved digitally, but only within the institution, and is not sharable with other people or authorities.

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<sup>41</sup> <https://www.regjeringen.no/en/dep/kmd/organisation/minister-of-digitalisation-nikolai-astrup/id2626348/>

<sup>42</sup> <https://www.regjeringen.no/no/dokumenter/en-digital-offentlig-sektor/id2653874/>

<sup>43</sup> <https://www.vitnemalsportalen.no/english/>

## Appendix 4: List of international developments in the digital field

### Blockchain-based initiatives

What is "Blockchain technology"? As the word implies, it is a chain of blocks consisting of encrypted data.

Blockchain is the technology behind the virtual currency Bitcoin, which has existed since 2008. The main areas of use have so far been the creation of cryptocurrencies, but the technology has also been adopted in other areas, including the banking sector.

Interestingly enough, the same technology can also be used to for the secure exchange of student data.

Blockchain is based on decentralized servers that rest on millions of nodes. Each data block is encrypted and timestamped, thus creating a chronology. Blockchain-based technology is generally considered difficult to hack, since changes in one block cannot be made without knowledge of the structure of the previous blocks. The technology behind Blockchain is new and disruptive, i.e. it has the potential to change the entire education sector.

### CIMEA and Blockchain technology

In April 2019 the Italian ENIC-NARIC Office CIMEA launched a new service called "Diplome." CIMEA's Diplome Service is the first credential evaluation service in the world that issues electronic evaluation statements based on Blockchain technology.<sup>44</sup> Thus far CIMEA has issued over 800 evaluation statements using block chain technology.

### Massachusetts Institute of Technology and Blockchain technology

Massachusetts Institute of Technology (MIT) was among the first HEIs to use Blockchain technology. MIT has developed an open standard for verifiable digital records together with a company called Learning Machine<sup>45</sup>. Others are also experimenting with systems that allow for student-owned digital diplomas based on the Blockchain technology<sup>46</sup>.

### European Blockchain Partnership

On 10th of April 2018, 21 EU member States and Norway agreed to sign a declaration creating the European Blockchain Partnership (EBP)<sup>47</sup> and cooperate in the establishment of a European Blockchain Services Infrastructure (EBSI) that will support the delivery of cross-border digital public services, with the highest standards of security and privacy. Since then, five more countries have joined the Partnership, bringing the total number of signatories to 27.

### Digitary and Digitary-based solutions

Digitary<sup>48</sup> is a cloud based platform. Institutions use Digitary's standards-based technology to issue cryptographically signed, legally valid, digital academic records to learners. Learners who receive credentials through Digitary CORE<sup>49</sup> can share them securely with whoever they wish. Employers who receive Digitary-issued credentials can verify them online using Digitary's secure verification service. Digitary provides an enhanced API<sup>50</sup> to enable organisations to accept verified credential documents for attachment into online applications for employment and further study.<sup>51</sup>

### Australia and New Zealand: Digitary and My eQuals

Digitary is the technology provider for My eQuals<sup>52</sup>, an online digital credentialing platform serving all 47 publicly-funded Universities in Australia and New Zealand. The platform enables Australian and New Zealand students and graduates to access digital versions of transcripts and academic documents and share them with employers,

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<sup>44</sup> More about Diplome: <http://www.cimea.it/en/diplome-in-breve.aspx>

<sup>45</sup> <https://www.learningmachine.com/>

<sup>46</sup> <https://www.prnewswire.com/news-releases/using-Blockchain-new-mexico-community-college-becomes-first-community-college-to-issue-student-owned-digital-diplomas-300557931.html>; <https://firesidewiththedeans.wordpress.com/2019/04/01/why-we-are-offering-digital-credentials-for-learners-and-using-Blockchain-to-do-so/>

<sup>47</sup> <https://ec.europa.eu/digital-single-market/en/news/european-countries-join-Blockchain-partnership>

<sup>48</sup> <https://www.digitary.net/>

<sup>49</sup> <https://core-int.digitary.net/login>

<sup>50</sup> An application program interface (API) is a set of routines, protocols, and tools for building software applications.

<https://www.webopedia.com/TERM/A/API.html>

<sup>51</sup> <https://www.digitary.net/users/>

<sup>52</sup> <https://www.myequals.edu.au/>

universities or other parties. The My eEquals platform will also allow universities to confirm the digital qualifications of students from China, Europe and America seeking admission to their courses. Overseas institutions can view the digital documents of Australian and New Zealand students applying for entry shared with them by the student/graduate.

Ireland: Irish institutes of technology have implemented Digitary  
Irish Institutes of Technology (IoTs) have used Digitary to implement a cloud-based digital credentialing system, which includes transcripts, EDS, and grade mailers.

Norway and Digitary

Norway is testing the possibility of downloading academic records from Digitary, with the aim of developing a solution that enables NOKUT's applicants to download academic records directly into NOKUT's application portal. This is equivalent to the solution NOKUT has developed for EMREX.

USA: Digitary and CertiFile

In partnership with CollegeNET Inc.<sup>53</sup> and Educational Perspectives<sup>54</sup>, Digitary powers the *CertiFile*<sup>®55</sup> service, enabling US schools to receive verified academic credentials for inbound international applicants, regardless of where in the world they have studied. Over 20 US Universities are now using *CertiFile*<sup>®</sup> to receive verified documents from over 80 countries around the world. Verified records are pushed directly into the schools' systems, streamlining the admissions process.

China: Digitary integrated with CHESICC

In 2015, Digitary, in partnership with CHESICC <sup>56</sup> (part of the Chinese Ministry of Education), integrated their respective technology platforms. Chinese students and graduates can share their verified Chinese transcripts, qualification certificates, and GAOKAO scores with Digitary-enabled education providers. Education providers using Digitary CORE can receive these verified records as English-translated PDF documents in a consistent format, with accompanying XML data for machine readability.

DEQAR

DEQAR<sup>57</sup> is a database on higher education institutions and programmes that have been externally reviewed against the standards and guidelines for quality assurance in the European Higher Education Area. DEQAR intends to serve as a trusted source of information and support different types of decisions, including the recognition of qualifications.

Digital solutions in the US

In the US, where it has long been the norm to require transcripts sent directly from the awarding institutions, various initiatives for digitally sharing educational credentials have been developed. They include eScrip-Safe<sup>58</sup>, National Student Clearing House<sup>59</sup> and Parchment<sup>60</sup>.

EMREX

EMREX<sup>61</sup> is an electronic data exchange solution that enables students or former students fast, secure and digital transfer of their achievement records. Students can transfer across borders and provide their academic credentials to institutions, employers and more through the EMREX network. It enables the digitalisation of any process in need of assessment data - before, during and after studies, including student mobility programs,

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<sup>53</sup> <https://corp.collegenet.com/>

<sup>54</sup> <https://edperspective.org/>

<sup>55</sup> [https://corp.collegenet.com/pdfs/CertiFile\\_CN-F-583.pdf](https://corp.collegenet.com/pdfs/CertiFile_CN-F-583.pdf)

<sup>56</sup> <http://www.chsi.com.cn/en>

<sup>57</sup> <https://www.eqar.eu/qa-results/deqar-project/>

<sup>58</sup> <https://escrip-safe.com/login>

<sup>59</sup> <https://studentclearinghouse.org/>

<sup>60</sup> <https://www.parchment.com/log-in/>

<sup>61</sup> <https://emrex.eu/>

cooperative arrangements e.g. joint degrees/double degrees, admission services, recruitment solutions, credential evaluation and authorization.

EMREX is based on the ELMO format<sup>62</sup>. The general format of ELMO is built on the standard model of Diploma, Diploma Supplement, Transcript of records (CEN:2011). EMREX is GDPR compliant.

The following are so far included in the EMREX network:

- Croatia: All HEIs in
- Denmark: 4 universities in, working on the rest
- Finland: All HEIs in
- Italy: 2 universities in, working on the rest
- Netherlands: All HEIs in
- Norway: All HEIs in
- Poland: 8 universities in, several new this year
- Sweden: All HEIs in
- China ready to start development (plan for production autumn 2019)
- Sigma (Spanish student information system) ready to start development
- The federal government of Germany is about to implement a pilot in EMREX.

Efforts are also made to implement the eIDAS<sup>63</sup> in EMREX, enabling individuals from all over Europe to sign in using national eIDs. There are also processes in place to make sure that Europass will be compliant with ELMO.

### EU's single digital gateway

According to the Regulation (EU) 2018/1724 of the European Parliament and of the Council<sup>64</sup>, each Member State must ensure that users can access and complete a number of procedures fully online, including the procedure of requesting academic recognition of diplomas, certificates or other proof of studies or courses. This initiative, known as the single digital gateway<sup>65</sup> will facilitate online access to the information, administrative procedures and assistance services that citizens and businesses need to get active in another EU country. By the end of 2020, citizens and companies moving across EU borders will easily be able to find out what rules and assistance services apply in their new residency. By the end of 2023 at the latest, they will be able to perform a number of procedures in all EU member states without any physical paperwork.

### The new Europass

Europass is a service provided by the EU to help individuals to communicate their skills, qualifications and experience. The new Europass<sup>66</sup> is a set of web-based tools and information to support individuals in managing the different stages of their career and learning. These tools and information will be made available on a new online platform that is being developed by the European Commission. The main work strands of the new Europass are:

- e-Portfolio
- Information Provision
- Interoperability
- Digitally-signed credentials

Digitally signed credentials are electronic documents issued by education and training institutions that confirm the award of a qualification to a person. The technical format will be based on open standards and integrated into the new Europass platform, where digitally-signed qualifications can be stored and shared. The aim is to offer 100% verification, easy transfer and a common format for the learning experienced. As a service offered to citizens of

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<sup>62</sup> <https://emrex.eu/technical/>

<sup>63</sup> <https://ec.europa.eu/futurium/en/content/eidas-regulation-regulation-eu-ndeg9102014>

<sup>64</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.295.01.0001.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.295.01.0001.01.ENG)

<sup>65</sup> [https://ec.europa.eu/growth/single-market/single-digital-gateway\\_en](https://ec.europa.eu/growth/single-market/single-digital-gateway_en)

<sup>66</sup> <https://ec.europa.eu/futurium/en/europass/new-europass>

the entire EU/EEA area, the new Europass may prove to be a useful resource to individuals and ENIC-NARICs alike. The digitally-signed credentials may also steer the direction of digitalisation in the area

### Erasmus without Paper

The Erasmus+ programme is a funding programme from the European Union to support education, training, youth and sport in Europe. Erasmus Without Paper<sup>67</sup> is a project co-funded by the European Commission aiming to digitalize Erasmus administration and streamline technical solutions for student mobility. The initiative includes replacing a paper-based workflow for administering Erasmus programs, thereby reducing the administrative workload for students and staff. It also aims to create free public infrastructure that facilitates a digital administrative workflow. Key initiatives include the EU student card and the digitalisation of the Diploma Supplement.

### Groningen Declaration

The Groningen declaration was first adopted in 2012 in the Dutch city of Groningen.<sup>68</sup> The focus of the Groning Declaration's is the mobility of student data: "Citizens worldwide should be able to consult and share their authentic educational data with whomever they want, whenever they want, wherever they are." The Groningen Declaration Network (GDN) can be described as a utopian movement with the ultimate goal of eliminating paper in the exchange of student data. Over 90 organizations have thus far signed the declaration, including EMREX, Felles studentsystem (Norway), NOKUT, Ladok Consortium (Sweden) and the Swedish Council for Higher Education.

WHED: The International Association of Universities' World Higher Education Database  
WHED<sup>69</sup> provides information on higher education systems, credentials and institutions around the world. The IAU WHED Portal provides information in 196 countries and territories on higher education systems, credentials and higher education institutions.

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<sup>67</sup> <https://www.erasmuswithoutpaper.eu/>

<sup>68</sup> The GDN website: <https://www.groningendeclaration.org/>

<sup>69</sup> <https://www.whed.net/home.php>