



INTERNATIONAL  
HELLENIC  
UNIVERSITY

# Master Data management in the EU

## Comparative analysis of Access to Base Registries

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# Abstract

This dissertation was written as a part of the MSc in E-Business and Digital Marketing at the International Hellenic University. Scope of the dissertation is to review how currently EU public services approach the efficient and effective access to national and cross-border base registries. Identify Patterns in the way of working, identify points of attention and raise questions for further research.

The reader will have the chance to familiarize with the concept of Master Data Management and the newly introduced term Base Registry in order to follow up with the key observations.

# ACKNOWLEDGEMENTS

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# 1 Introduction

## 1.1 Where there is data smoke, there is business fire

Thomas Redman has wisely quoted ‘*Where there is data smoke, there is business fire* (Redman, 2008).’<sup>1</sup> Data is undoubtedly the base of a business’ knowledge, experience and ultimately the judgment for correct decision making. Only with data that is up to date, complete, valid, logical, and actionable, it will benefit an organization to bloom. If not, it can prove to be a profitless and even damaging asset. The last decades data is the center of attention leading innovative technologies breaking through with innovations of high importance and fundamental impact on society<sup>2</sup>. That being said, new data challenges and needs are generated daily with new data processes being introduced on frequent basis.

Someone could state that Data is the new black as Data terms are found to be always trending. Terms such as Big Data, Open Data, linked Open Data, Data hub, Machine data, Real time data, Operational data etc.<sup>3</sup> have gain popularity and their meaning is noticed to be changed, challenged and evolved over the years<sup>4</sup>. Despite the fact that significant amount of academic research being done on the mentioned previously terms, for one newly introduced key player Master Data and Master Data management there is yet limited academic research which is currently gradually expanding.

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<sup>1</sup> Redman, T. C. (2008). *Data Driven: Profiting from Your Most Important Business Asset*. Harvard Business Review Press.

<sup>2</sup> Innovation, C. f. (2014). *100 Data Innovations*. Retrieved September 20, 2019, from <http://www2.datainnovation.org/2014-100-data-innovations.pdf>

<sup>3</sup> Bridgwater, A. (2019). *Forbes*. Retrieved September 21, 2019, from <https://www.forbes.com/sites/adrianbridgwater/2018/07/05/the-13-types-of-data/#3cf656503362>

<sup>4</sup> Greco, A. D. (2015). What is big data? A consensual definition and a review of key research topics. *Publisher Logo Conference*. AIP Conference Proceedings.

## 1.2 Master Data and Master Data Management

Master Data and Master Data Management are novel terms that are established naturally to the era of the overflow of data. Undoubtedly marketers are battling with what is called “InfoObesity.” There is a wildly spread belief that more is better; however, that actually is far away from true in the case of data. The fast rise in our ability to gather data hasn’t been matched by our ability to support, filter and manage the information.<sup>5</sup>

Here Master Data and Master Data Management are coming to the rescue. Master data is a *single point of truth* in an organization to which all departments and applications refer to. For example there is a single entry of a phone number of a client to which all departments in an organization refer to, to be more specific: accounting, sales department, customer service department or any other department of the organization will not create a new phone number entry for the same customer if it is already been submitted once by other department; the entry can only be updated. As a result, there is no duplicated information and there is less data noise.

Master Data Management (MDM) is the technology, tools, and processes required to create and maintain consistent and accurate lists of master data<sup>6</sup>. It is not a static process as Master Data Management requires an ongoing practice of cleansing, rationalizing and integrating data enabling an organization to link all of its critical data to a common point of reference. It should be noted that Master Data Management is not the same with application specific data (see figure below).



Figure 1:1 Application Specific data VS Master Data

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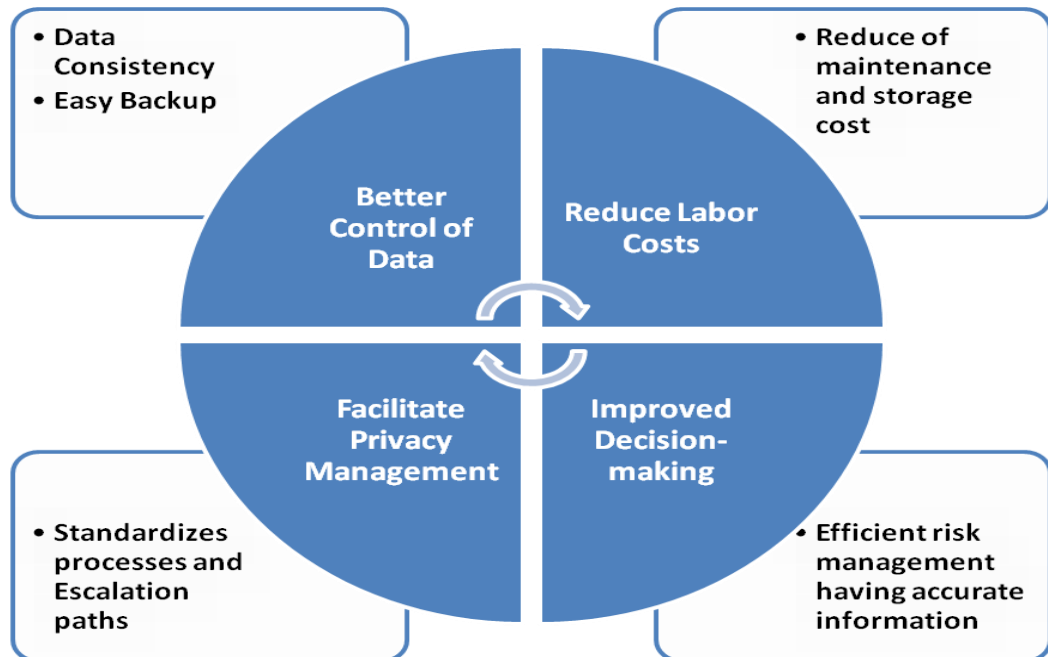
<sup>5</sup> Whitler, K. A. (2018, 03 17). *Forbes*. Retrieved 09 30, 2019, from [www.Forbes.com:https://www.forbes.com/sites/kimberlywhitler/2018/03/17/why-too-much-data-is-a-problem-and-how-to-prevent-it/#162b7207755f](http://www.Forbes.com:https://www.forbes.com/sites/kimberlywhitler/2018/03/17/why-too-much-data-is-a-problem-and-how-to-prevent-it/#162b7207755f)

<sup>6</sup> *Microsoft*. (2006, November). Retrieved September 30, 2019, from <https://web.archive.org/web/20170714193734/http://ms.dn.microsoft.com/en-us/library/bb190163.aspx>



## 1.3 Why Master Data Management is essential for an organization?

It is no secret that in order an organization to survive it needs to operate with the minimum cost. Cost is most likely to be increased due to time consuming procedures, bureaucracy and poor decision making. Master Data Management can put up with the mentioned above harmful factors.



1:2 Master Data Management Assets

- Having in an organization dataset with single point of truth reduces the duplication of information and information is much more manageable
- Less duplication of information is translated to less maintenance cost
- Information is info security protected, with data floating to the correct business users based on the access constrains
- Less data means less confusion and easier reporting which is constructive for decision making

## 1.4 Risks in implementing Master Data Management

Master Data Management is not for every organization. It is suggested to be implemented only for mature enough organizations which can face the risks that come along with it. Having one single point of truth feeding all operation systems can be harmful and acting as a virus spreading across departments.

The most common risks that organizations have to consider prior moving to Master Data Management implementation are:

Strategic risks, process risks, people risks, technology risks. Some indicative are listed below.

### Strategic

- Inconsistent legal regulatory<sup>7</sup>: Law must be always taken into account when it comes to information sharing. Organizations that are not stable and are not complying with the latest standards there is a high risks of suffering from legal consequences
- Changing priority of top management<sup>8</sup>: Implementation of MDM processes requires the restructure of work flow which means that management must be ready taking risks such as downgrading or upgrading departments. The process is of adjusting to the new business processes can be timeconsuming and needs to be implemented with the correct priority otherwise there is a high risks of unstructural transformation which can cause resourcesd loses

### Process risks

- Not all departments are linked and have the tools and processes to collaborate. If departments and they workflows in an organization are not linked correctly and they are not communicated there is a high risks the right information not reaching the correct resources creating gap of knowledge transfer

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<sup>7</sup> Ewa Ziemia, I. K. (2015). Risk Factors Framework for Information Systems Projects in Public Organizations - Insight from Poland.

<sup>8</sup> Hajeer, S. I. (2012). Critical Risk Factors for Information System (IS) Projects.

- There is a risk of conflicts between departments if roles and responsibilities of MDM parties are not defined. The hierarchies and authorities must be analyzed and test prior any implementation

### **People Risk**

- No matter how advanced is the technology used in MDM people are the most important factor in implementing advanced Data Management solutions. The is high risk of project to fail due to lack of project management experience and technical skills

### **Technology Risks**

- Implementation of MDM systems requires advanced technologies that are capable to process information fast, keep backups and being secure, otherwise there are a lot of chances the system performing with low quality standards which will reflect the technological immaturity of the organization
- MDM systems' quality depends on the incoming data feeding the systems. If the incoming information is not structured properly then the system itself is not safe and dependable for any operation. Error in master data can cause errors in all the applications that use it



## 2 Base Registries

Base Registries is a newly introduced term to the Data Management field. The Academic research on the term in 2019 is not enough to conduct an integrated literature review. Base Registries is a form of Master Data Management. Base Registries are interconnected Data Libraries monitored by public authorities providing information to the citizens and legal persons. With Base Registries Public administrations follow the Once Only Principal by reusing the information they already have and not asking information that they have already been provided before.

Below is described the definition of Base Registries provided in scope of the European Interoperability Framework.



Figure 2:1Base Registry Definition

In order Base Registries to be formatted and being fully functional a lot of legal, organizational, semantic and technical standards need to be defined. Currently in 2019 ISA<sup>2</sup><sup>9</sup> program managed by the Interoperability Unit of DG Informatics of the European Commission, DIGIT.D2 is working on defining Create a base registry framework.

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<sup>9</sup> European Commission. (2016). *About ISA<sup>2</sup>*. Retrieved October 02, 2019, from [https://ec.europa.eu/isa2/isa2\\_en](https://ec.europa.eu/isa2/isa2_en)

## 2.1 ABR Member States Factsheets

European Commission funded by the European Union via the Interoperability solutions for public administrations, businesses and citizens (ISA<sup>2</sup>) Program created a platform called Joinup<sup>10</sup> for collaborative purposes. The scope of the Joinup platform is to act as a communication channel enabling and initiating conversations regarding the re-usability of IT solutions. One of the Acts of Joinup is Access to Base Registries (ABR) which gathers the best practices and guidelines for creation of the Framework for Base Registry Access which is planned to be implemented across EU.

One of the main actions performed by the ABR is creating Fact Sheets after performing research and interviews with 28 EU Member States and the four European Free Trade Association (EFTA) countries. Currently Oct19 18 Fact Sheets have been approved and 14 are still is expected to be approved by MS authorities.



Figure 2:2 List of Approved Fact Sheets

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<sup>10</sup> European Commission, Commission *joinup.ec.europa.eu*. Retrieved October 02, 2019, from About Joinup: <https://joinup.ec.europa.eu/collection/joinup/about>

# 3 Research Methodology - Comparative Analysis

In scope of the dissertation the 18 approved Fact Sheets were analyzed and a comparative analysis was performed. Comparative analysis is performed by comparing and contrasting information which has been grouped under the same umbrella. Frame of reference is introduced prior proceeding to analyze the information and grounds of comparison are set.

## 3.1 How was formatted the base of the Analysis

To be more specific the following actions were performed in order to ensure a structured cooperative analysis.

1. All Fact Sheets were analyzed and it was identified that all had the same structure.

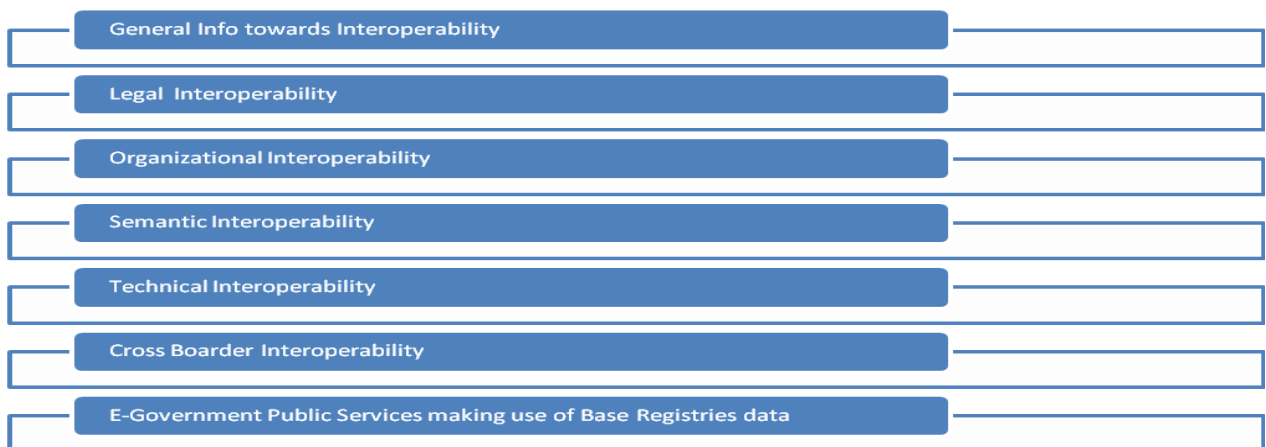


Figure 3:1 Fact Sheets Structure

2. After each chapter of all 18 Fact Sheets was evaluated and questions were generated to which all 18 Fact Sheets could provide at least on high level respond. Information had to be extracted from all Fact Sheets and provided for the same questions in order to have a subjective result and get to accurate conclusions.

## 3.2 Comparative Analysis Questions

In this section is described how questions for the Comparative Analysis were structured. First action taken was to define the scope of the questionnaire. The scope was to identify common patterns and points of attentions in the effort of EU countries towards interoperability based on specific Fact Sheets.

Characteristics of the Questions:

- Questions are designed to help identifying clear differences / similarities between countries
- Information could be extracted from the Fact Sheets without input from other sources
- Effort was put to create the questions in only one dimension in order to avoid possibility of ambiguous response
- Questions are not impaling any answers and are structured to be objective.
- The majority of the questions are closed-ended, yes or no
- Yes or no questions are restricted questions that are easily quantified
- Each question addresses only one topic
- Questions are structured based on logical grouping, reflecting the structure of each Fact Sheet (e.g Legal Interoperability questions grouped together)

In the Figures below are presented the exact questions that were answered for all 18 Fact Sheets grouped

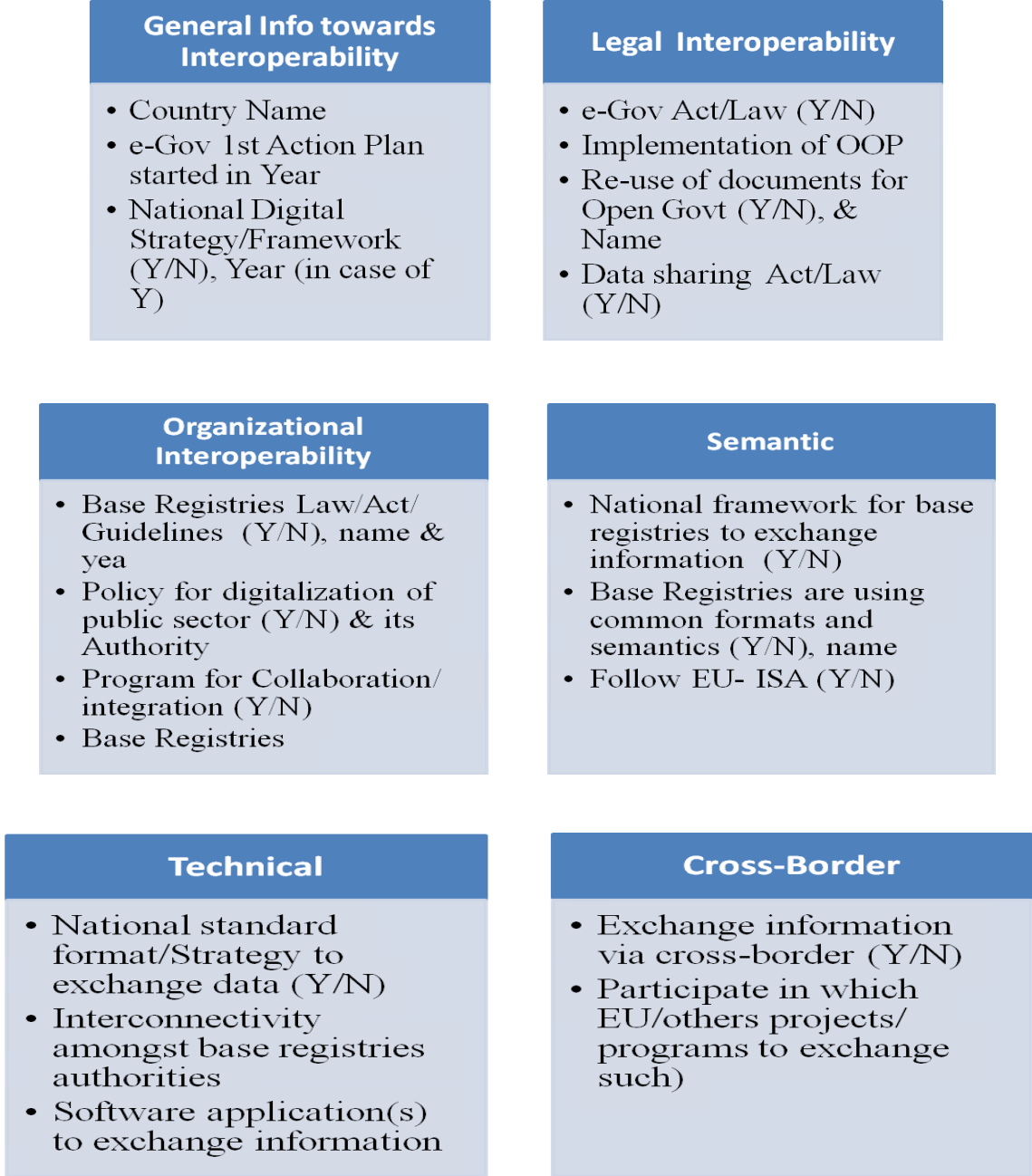


Figure 3:2 Comparative Analysis Questions



# 4 Results of Comparative Analysis

## 4.1 Analysis Disclaimer

Every effort has been put to perform an accurate Comparative Analysis. The material based on which the Comparative Analysis is conducted is based on current public information published by the European Commission that is considered to be reliable, but I do not represent it as accurate or complete, and it should not be relied on as such. Also, the analysis was performed by human being and not a technological tool, so there is a chance of misinterpretation and misreading of information.

## 4.2 Key Findings

In scope of the dissertation will be presented the key findings of the Comparative Analysis. The entire filled in questionnaire is the Appendix to the present document.

### 4.2.1 Observation #1 Dissimilar structure of Base Registries per country

The way currently countries have structured their registries varies. Some countries manage their Data with just one active Registry others have even 11 Registries. The average amount of Registries per country is Currently 5,7. Such a difference in number of Registries per country raises some questions that need to be taken into account prior setting Interoperability Framework in action.

- 1) What are the social and political characteristics that define how many Registries a Country should have?
- 2) Can on international level Registries of different structure authority scope and contentment exchange information?
- 3) What is the best Practice? Having less registries containing more information, or the more registries are divided the better they can be managed from organizational and legal perspective? What are the risks in both cases?

Below is the analysis of Registries and the Master data they contain per country.

Country	Name	Authority	Master data
<b>Sweden</b>	Civil Registry	The Swedish Tax Agency	Personal Data (Natural And Legal Persons)
	Vehicle Registry	The Swedish Transport Agency	Vehicles
	Business Registry	Company Registration Office	Business
	Land Registry	The National Land Survey	Land And Parcels
<b>Austria</b>	Central Registry of Vehicle (KZR)	Ministry of Interior	Vehicles
<b>Belgium</b>	National Register of Natural Persons	Ministry of Interior	Personal Data
	The Crossroad Bank for Vehicles	Central Government (Federal), Federal Department Mobility and Transport, Vehicles Registration Directorate	Vehicles
	The Crossroad Bank for Enterprises	Federal Department of Economy.	Business
	The Crossroad Bank for Social Security	Federal Department of Social Security	Social
	Vehicle Register	Federal Department of Mobility and Transport	Vehicles
	Land Registry	Federal Ministry of Finance's national property documentation centre	Land, Parcels
<b>Croatia</b>	Civil registry	Ministry of Interior Affairs	Personal Data

Country	Name	Authority	Master data
	OIB/PIN	Ministry of Interior Affairs	Personal Identification Numbers
	Vehicle Registry	Ministry of Interior Affairs	Vehicles
	Tax Administration	Ministry of Finance	Tax
	Commercial Registry	Ministry of Justice	Business
	Business Registry	Ministry of Justice	Business
	Cadastral/Land Registry	Ministry of Construction and Urban Planning	Land Parcels Buildings
<b>Czech Republic</b>	Registry of Natural Persons / Civil Registry	Ministry of Interior	Personal Data (Natural Persons)
	Registry of Economic Entities / Business Registry	Czech Statistical Office (CSU)	Legal Entities, Incl. Businesses
	Registry of Territorial identification, Addresses and Real Estates	Czech Office for Surveying, Mapping and Cadastre (CUZK)	Addresses, Buildings, Administrative Units, Real Estate, Related Geographic Names
	Registry of Rights and Duties	Ministry of Interior	Legal Documents, Public Administration Bodies

Country	Name	Authority	Master data
<b>Malta</b>	Civil registry	Central Government, Ministry for Home Affairs and National Security, Public Registry	Nd Legal Persons)
	Vehicle Registry	Central Government, Ministry for Transport and Infrastructure, Transport Malta	Vehicles
<b>Estonia</b>	Population Registry	Central Government, IT and Development Centre of the Ministry of the Interior	Personal Data (Natural Persons)
	Vehicle Registry	Central Government, Estonian Road Administration	Vehicles
	Tax Registry	Central Government, Tax and Customs Board	Tax
	Commercial Registry	Centre of Registries and Information Systems, Tartu County Court	Business (Legal Persons)
	Land Registry	Centre of Registries and Information Systems, Ministry of Justice	Property Number, Name, Type, Cadastre Code
<b>Finland</b>	Population Information Registry	Population Register Centre	Personal Data (Natural And Legal Persons)
	Land Information System	The National Land Survey of Finland is responsible for the establishment, administration, maintenance, information service and development of the Land Information System	Land
	Business Information System	National Board of Patents and Registration of Finland and the Finnish Tax Administration	Business

Country	Name	Authority	Master data
	Taxation Information System	Tax Administration	Tax
	Vehicle Registry	Finnish Transport Safety Agency	Vehicles
	Trade Registry <sup>3</sup>	Finnish Patent and Registration Office	Traders, Ie Companies And Businesses
<b>Hungary</b>	Personal Data and Address Registry	Deputy State Secretary for Registries	N/A Not Analyzed In The Fact Sheet
	Electronic Civil Registry		
	Travel Document Registry		
	Offence Registry		
	Road Traffic Registry		
	Hungarian ID cards, Hungarian independent ID cards holders Registry		
	N.SIS (National sub-system of SIS)		
	Third-party Liability Insurance Registry		
	Private Entrepreneurs Registry		

Country	Name	Authority	Master data
	Criminal Registry		
<b>Denmark</b>	Civil Registry	Ministry of Social Affairs and the Interior	Personal Data (Natural Persons)
	Business Registry	Ministry of Business and Growth1	Business
	Denmark's Address Registry	The Danish Agency for Data Supply and Efficiency	Addresses
	Cadastral Registry	Danish Geo-data Agency	Land Parcels Buildings
	Vehicle Registry	Tax Ministry of Denmark	Vehicles
	Danish Tax and Customs Administration	Tax Ministry of Denmark	Taxes
	Patent and Trademark Registry	Ministry of Trade and Industry	Patents
<b>Ireland</b>	Civil registry (General Register Office)	Department of Social Protection	Personal Data (Birth, Death, Marriage)
	Vehicle Registry (Road Safety Authority)	Department of Transport	Vehicles
	Business Registry (Companies Registration Office)	Department of Jobs, Enterprise and Innovation	Business

Country	Name	Authority	Master data
	Land Registry	Property Registration Authority	Land, Deeds
<b>Netherlands</b>	Registry of Persons (BRP)	Ministry of the Interior and Kingdom Relations	Personal Data (Natural Persons)
	Vehicle Registry (BRV)	Ministry of Infrastructure and the Environment	Vehicles
	Business Registry (HR)	Ministry of Economic Affairs	Business And Legal Entities
	Land Registry - Cadastre (BRK)	Ministry of the Interior and Kingdom Relations	Land And Parcels
	Registry of Addresses and Buildings (BAG)	Ministry of Infrastructure and the Environment	Addresses And Buildings
	Topography Registry (BRT)	Ministry of Infrastructure & Environment	Maps
	Base Registry of Wages, Benefits and Employment Relations (BLAU)	Ministry of Social Affairs and Employment	Wages, Benefits And Employment
	Base Registry Income (BRI)	Ministry of Finance	Taxes
	Registry of Valuation of Im-movable Property (WOZ)	Ministry of Finance	Taxes

Country	Name	Authority	Master data
	Registry Large Scale Topography (BGT)	Ministry of Infrastructure & Environment	Maps
	Base Registry Substrate (BRO)	Ministry of Infrastructure & Environment	Geological And Soil
Norway	National/Population Registry	Tax Administration of Ministry of Finance	Personal Data (Natural)
	Vehicle Registry	Norwegian Public Roads Administration (NPRA)	Vehicles
	Central Coordinating Register fo Legal Entities*, Registry of Business Enterprises	Brønnøysund Registry Centre, Ministry of Trade and Industry	Business, Legal Persons
	Land Registry and Cadastre	Norwegian Mapping Authority	Land, Parcels
	Norwegian Digital Contact Information Register	Agency for public management and ICT (Difi)	Digital contact information for citizens and possibility to reserve against digital contact



<b>Country</b>	<b>Name</b>	<b>Authority</b>	<b>Master data</b>
<b>Poland</b>	Population Registry	Ministry of Digital Affairs	Personal Data (Natural And Legal Persons)
	Vehicle Registry / Central Record of Vehicles	Ministry of Digital Affairs	Vehicles
	National Court Registry	Ministry of Justice	Business
	Land Registry	Ministry of Justice	Land, Real Estate And Parcels
<b>Portugal</b>	Civil Registry	Ministry of Justice	Civil status (marriage, separation, divorce, etc.); birth, death.

Country	Name	Authority	Master data
	Business Registry	Ministry of Justice	<p>Legal situation of sole traders, commercial companies, civil law companies having a commercial form, individual establishments with limited liability, cooperatives, public enterprises, additional company groups and European Economic Interest Groups, as well as individuals and associations required by law to register.</p>
	Land Registry	Ministry of Justice	<p>Technical and legal information on the buildings and parcels.</p>

Country	Name	Authority	Master data
	Real Estate	Ministry of Justice	Ownerships and legal status of the buildings and parcels.
	Vehicle Registry	Ministry of Justice	Registration of actions on cars, purchase and sale, mortgage, leasing, registration certificates, retention title, transfer of property, other.
	Tax Administration Registry	Tax and Customs Authority	Tax payers data, tax declarations, files, statistics, simulations, etc.
<b>Slovenia</b>	General Civil Registry (CRP - Centralni register prebivalstva)	Ministry of internal affairs	Personal data (natural and legal persons)

Country	Name	Authority	Master data
	Spatial Registry (RPE - Register prostorskih enot)	Ministry of environment and spatial planning, Surveying and mapping authority of the Republic of Slovenia (GURS)	Administrative units and addresses
	Business Registry (PRS - Poslovni register Slovenije)	The Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES)	Business data
	Real Estate Registry (Register nepremičnin)	Ministry of environment and spatial planning, Surveying and mapping authority of the Republic of Slovenia (GURS),	Land cadastre, Building cadastre
	Surveying and Mapping Registry (GURS - Geodetska uprava RS)	Ministry of environment and spatial planning, Surveying and mapping authority of the Republic of Slovenia,	Ownership data
	Vehicle registry (MRVL - Podatki o vozilih)	Slovenian Traffic Safety Agency (Javna agencija RS za varnost prometa (AVP))	Vehicle data
	Land Registry ZK - Zemljiška knjiga	Supreme court of Republic of Slovenia	Land Registry

Country	Name	Authority	Master data
<b>Spain</b>	Civil registry	Ministry of Justice	Natural personal data, birth, legal capacity, absence or death, nationality, marriage
	Person Identification	Ministry of Interior (Home Affairs)	Natural person ID data
	Cadastre	Ministry of Finance and Public Function	Land and real estate property description for taxing purposes
	Real State	Ministry of Justice	Land and real estate property, for legal purposes
	Vehicle Registry	Ministry of Interior (Home Affairs)	Vehicles owners, vehicle description (like plate number), driver licences, etc

Country	Name	Authority	Master data
	Business Registry	Ministry of Justice	Business identification, activity description, foundational data and documents, financial and economic information
	Residence data	Ministry of Economy, Industry and Competitiveness	Large range of data about natural and legal persons, agriculture, economy, climate, science and technology, employment, etc.
	Tax Agency database	Ministry of Finance and Public Function	Data on natural person's and legal entities' taxes, fiscal obligations and fiscal status.
	Social Security Agency database	Ministry of Employment and Social Security	Data on natural and legal persons related to their labour history, social security rights, obligations, aids, etc.

Country	Name	Authority	Master data
<b>United Kingdom</b>	Civil Registry (General Registry Office)	Ministry of Interior (Home Department)	Personal Data (Natural Persons)
	Business Registry (Companies House)	Department for Business, Innovation and Skills	Business
	Vehicle Registry (Driver and Vehicle Licensing Agency)	Department for Transport	Vehicles
	Tax Registry (Her Majesty's Revenue and Customs)	Revenue Department	Tax
	Land Registry	Department for Business, Innovation and Skills	Land, Parcels, Buildings

Table 4:1 How Base Registries are divided per country

## 4.2.2 Observation #2 Digitalization Authority coming not from the field of Technology

For digitalization of public sector in most cases is responsible the Ministry of Economy & Interior. Question raised: Both Ministries are in charge of many crucial objectives in a country. Having entered the digitalization era shouldn't more specialized Authorities exist dedicated to digitalization?

Points of attention for authorities implementing digitalization strategies:

- Digitalization requires budget capacities. Authorities coming not from the field of technology solutions have to split their budget with other non digitalization strategies in their agendas. How feasible is to allocate important amount of budget for digitalization when in parallel other strategies require budget allocation?
- Digitalization requires changing roles, changing departments or an overhaul of your organizational structure. How easily Ministries of Economy & Interior will be able to adjust internal structure in order to fit new coming digitalization tasks?
- Isn't the risk of slow adoption of digitalization strategies in such Ministries due to lack of expertise, personnel and digitalization experience?

The quality of the Interoperability Framework should be supported by experts with experience in digital implementations otherwise the allocation of unskilled resources can be proved to be harmful despite the fact of its maturity.

All in all, more than half of the analyzed countries(10/18) have authorities responsible for digitalization that are not directly related to field of technology or having technological background

Even if a Framework will be implemented the adoption could be a struggle for unqualified departments and driving and leading it can be proved a challenge.

Country	Policy for digitalization of public sector (Y/N) & its Authority
Sweden	Y, Ministry of Finance
Austria	Y, Ministry of Interior
Belgium	no single entity responsible for e-Government in Belgium Y, Ministry for Enterprise and Simplification Federal



	Information and Communication Technology (Fedict) Agency Agency for Administrative Simplification (ASA)
<b>Croatia</b>	Y e-Croatia: in the Ministry of Public Administration e SII :The Council for the SII ,The central State administration body competent for e-Croatia, Public sector bodies
<b>Czech Republic</b>	Y, The Ministry of Interior is in charge of eGovernment in the Czech Republic
<b>Malta</b>	Y, Ministry for Competitiveness and Digital, Maritime and Services Economy
<b>Estonia</b>	Y, Ministry of Economic Affairs and Communications
<b>Finland</b>	Y, Ministry of Finance
<b>Hungary</b>	Y, Deputy State Secretary for Informatics (Ministry of Interior)
<b>Denmark</b>	Y, Ministry of Finance
<b>Ireland</b>	Y, Department of Public Expenditure and Reform
<b>Netherlands</b>	Y, Ministry of the Interior and Kingdom Relations
<b>Norway</b>	Ministry of Local Government and Modernisation (KMD)
<b>Poland</b>	Y, Ministry of Digital Affairs
<b>Portugal</b>	Y, Agency for the Administrative Modernization (AMA)
<b>Slovenia</b>	Y,Council for Informatics in Public Administration
<b>Spain</b>	Y, Ministry of Economy and Business
<b>United Kingdom</b>	Y, Cabinet Office

#### 4:2 Digitalization Authority

### 4.2.3 Observation #3 Usage of different software applications

Questions raised: Shouldn't EU countries use same software applications to exchange information to achieve interoperability and to reduce costs?

- 1) How feasible is to achieve interoperability if every country uses different software to exchange information?
- 2) Will every country have different cost to adopt interoperability Framework? And is yes will all countries be able to handle the cost?

Below is the list of compared Software where someone can identify that all countries use totally different technology.

Country	software application(s) to exchange information
<b>Sweden</b>	<p><b>NAVET</b>: Is the Swedish Tax Agency system for distribution of information about the registered population through a peer-to-peer exchange of data</p> <p><b>SPAR</b>: Is the Swedish population and address registry that contains all persons that have been entered in the population registry</p>
<b>Austria</b>	<p><b>EDIAKT</b>: Is a standard format for communication between different public institutions specific to the manufacturer of the software and not built according to a uniform standard.</p> <p><b>ELAK</b>: Is the document and workflow management tool that enables the communication between public authorities</p>
<b>Belgium</b>	<p><b>FedMAN3</b>: Infrastructure that connects the Administrations of 15 federal ministries and Government services in Brussels</p> <p><b>Federal Service Bus (FSB)</b>: Platform where web services are used to efficiently streamline data flows between authoritative sources</p> <p><b>BCED</b>: It is a tool developed to facilitate the data sharing. It ensures reliable transmission and distribution of authentic data and information, in compliance with the law for the protection of privacy and information security rules.</p> <p><b>MAGDA2</b>: Is a platform that ensures that data from authentic sources can be picked up from databases in a secure manner.</p>

Country	software application(s) to exchange information
Croatia	<p><b>Metaregistry:</b> the public register which is a part of the SII and is used to control the system of all public registers</p> <p><b>OIB/PIN:</b> t specifies the exchange protocol, documents, messages, data security and the data storage system</p> <p><b>HITRONet:</b>Is the communication system that represents the backbone of the public administration network</p>
Czech Republic	<p><b>Egsb:</b> is connected to the Information System of Base Registries (ISZR) and to the different Agenda Information Systems (AIS). Its main purpose is to provide data of one AIS to another through a guaranteed interface</p> <p><b>EGON:</b> Respects long-term existing administrative processes in public administration</p>
Malta	<p><b>MAGNET:</b> Offers a telecommunications interconnection platform as a response to the growing need for secure information exchange among public sector organisations</p> <p><b>eForms Platform:</b> allows Government to deliver citizen-centric e-Services by presenting a single standard point of reference</p> <p><b>Common Database system:</b> A corporate system served as a central repository for records</p> <p><b>Corporate Data Repository:</b> the CDR is one of the main publishers of the list of available data sets, as defined by Maltese Open Data Strategy</p> <p><b>CDR Adapter Web Service:</b> This service gives access to the data irrespectively to the technology utilised, and enables MITA to encapsulate the source of the data</p>
Estonia	<p><b>State Information Management System (RIHA):</b> is a secure web-based database and software application. It ensures that no registry collects the same data.</p> <p><b>Xroad:</b> Unifies the access to all e-services and allows secure access to data in the distributed databases</p>
Finland	<p><b>Xroad:</b> It is a platform independent data exchange layer between different databases and information systems.</p> <p>National Service Bus</p>

Country	software application(s) to exchange information
	<b>ESB:</b> Is a software architecture for middleware that provides fundamental services for more complex architectures
<b>Hungary</b>	<b>KKSzB:</b> technical level interoperability platform that will allow the public administration's systems to use the services of other sector specific systems via one access point <b>TAKARNET:</b> Is an intranet-like network of the land offices. It connects all official entities involved in the land administration sector and provides online access to the continuously updated land registration data.
<b>Denmark</b>	<b>Data Distributor:</b> Is the digital infrastructure for the distribution of basic data in Denmark
<b>Ireland</b>	Not mentioned
<b>Netherlands</b>	<b>OSSG:</b> It is ready for install/use once the access to a SPARQL endpoint containing the data is set up
<b>Norway</b>	<b>Altinn:</b> A common technical platform was created for the public sector, called Altinn to exchange data from base registries with the purposes of prefilling digital forms, reporting to the public sector and for look-up-services in the base registries, e.g
<b>Poland</b>	<b>Electronic Platform of Public Administration Services</b> (Epuap): IT platform created for the public administration (current version: 2). Its main functionalities are to be a common platform that public administration uses to provide services, to be a tool meant to facilitate interoperability by allowing the institutions to interact, communicate and share information, and to be an Electronic Inbox, which in turn permit public actors to carry out the legal requirements of accepting documents in electronic form.
<b>Portugal</b>	<b>iAP:</b> Technical interoperability for the exchange of information between systems is granted by the iAP platform at the national level.
<b>Slovenia</b>	<b>TRAY:</b> Central system for electronic data enquires <b>IO-MODULE:</b> Common platform for

Country	software application(s) to exchange information
	standardized data distribution <b>ASYNCHRONOUS MODULE:</b> Enables electronic enquiries to data sources that are not accessible via synchronous access <b>SECURITY PLATFORM:</b> Enables electronic enquiries to data sources that are not accessible via synchronous access
Spain	<b>Red SARA network:</b> Is Spain's Government intranet. It interconnects ministries, all Autonomous Communities (17) and Autonomous Cities (2), as well as around 4000 local entities, representing more than 90% of the population
United Kingdom	<b>RESTful APIs:</b> No description provided

Table 4:3 Software application(s) to exchange information

#### 4.2.4 Observation #4 Different Semantics

Having different Semantics in an organization it is like having departments speaking different languages. Achieving interoperability means achieving all departments of an organization speaking the same language or at least having mechanisms translating information to a final form which is easily understood by all involved parties.

Half of the countries do not use for their Base Registries common formats and semantics. Questions raised:

- 1) What are the risks of having different formats and semantics?
- 2) What is the most efficient and less costfull way of transition to the same formats and semantic?
- 3) What actions should be considered to have smooth transition by the countries
- 4) Can Interoperability Framework be implemented if Base Registries in the same country do not have same Semantics?

Countries that are not using common formats and semantics are Sweden, Austria, Belgium, Croatia, Malta, Hungary, Slovenia, Spain.

Countries that are using common formats and semantics are Czech Republic, Estonia, Finland, Denmark, Ireland, Netherlands, Norway, Poland, Portugal, United Kingdom.



4:1 Countries using common formats and semantics

# 5 Conclusions

Master Data technologies will be the center of attention for the next decades. The need to reduce operational costs via reduction of duplicative information is in the agenda of all Public Administrations which suffer from overflow of information. The need of Base Registries a single source of truth of information is crucial for the EU development as policies which allow openly vehicles and residents crossing borders, require interoperability in order to operate smoothly.

The scope of the Comparative Analysis was to compare ABR Fact Sheets in order to extract points of attention and generate a material that would be useful input for further research (entire analysis is in the Appendix)

The comparative analysis showed that currently the analyzed EU countries are reaching to interoperability gradually and that a lot of progress has been made as:

- Since early 2000 all countries started working on e-Gov acts
- All countries are working on Digital Strategy (since 2010 and after)
- Only 22% do not implement OOP yet
- 33% Do not have National framework for base registries to exchange information
- 22% Do not have National standard format/Strategy to exchange data
- All countries re-use documents for Open Government
- All countries implement Data sharing Laws
- 17/18 Have Base Registries Laws, acts
- All countries are using programs for Collaboration / Integration
- 39% Do not follow EU- ISA
- 17% Do not have Interconnectivity amongst base registries authorities
- All compared countries exchange information via cross-border
- All compared countries participate in EU programs

The key observations showed that to achieve interoperability cross border is challenging and the digitalization strategies have a lot of obstacles to overcome.

**Finding 1:** The way currently EU countries structure their Base Registries varies from 1 to 11 Registries per country. **Proposal for further Research:** Identification of optimum number of Registries per country and size for optimum Master Data Management.

**Finding 2:** Digitalization Authorities have questionable resources and experience and priorities in order to implement complex interoperability solutions. **Proposal for further Research:** Evaluate what skills and resources are required in order to support complex digitalization transitions. **Finding 3:** All countries use different software to transact Master Data which raises risks for interoperability solutions failure due to incompatibility. **Proposal for further Research:** Evaluate the risks and cost of all countries using different software to transact data and evaluate if it is possible to standardize a single software that would be in use by all countries. **Finding 4:** Almost half of the countries use different semantics which means interoperability can not be achieved internally. **Proposal for further Research:** Can a country join interoperability framework without standard definition of internal semantics? What are the risks that should be taken into account? Calculation of a single score value of each country in terms of organizational, semantics and technical interoperability compliance status

**You can have data without information, but you cannot have information without data.” Daniel Keys Moran**



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# Appendix

In the Appendix below can be found all answers to the questioner of Comparative Analysis that are not analyzed in the core document

General Info		
Country	e-Gov 1st Action Plan started in Year	National Digital Strategy/Framework (Y/N), Year (in case of Y)
Sweden	2000	Y, 2013 & 2017
Austria	2001	Y, 2015
Belgium	2001	"Y , 2009,2015 ,2016
Croatia	2001	Y, 2014
Czech Republic	2001	Y, 2008
Malta	2001	Y, 2014
Estonia	2001	Y,2013
Finland	2000	Y, 2011
Hungary	2001	Y, 2012
Denmark	2001	Y ,2012
Ireland	2001	Y, 2008
Netherlands	2006	Y,2017
Norway	2001	Y, 2015
Poland	2001	Y, 2014
Portugal	2001	Y, 2006,2017
Slovenia	2001	Y.2015

General Info		
Country	e-Gov 1st Action Plan started in Year	National Digital Strategy/Framework (Y/N), Year (in case of Y)
<b>Spain</b>	2001	Y, 2007
<b>United Kingdom</b>	2001	Y, 2013
<b>Conclusion</b>	Beginning 2000 all countries started working on e-Gov acts	All countries are working on Digital Strategy (starting after 2010)

Legal				
Country	e-Gov Act/Law (Y/N)	Implementation of OOP	Re-use of documents for Open Govt (Y/N), & Name	Data sharing Act/Law (Y/N)
Sweden	N	Y	Y, Act on the Re-use of Public Administration Documents	Y
Austria	Y	Y	Y, Re-use of Information Act	Y
Belgium	N	Y	Y, "Law on the re-use of public sector information"	Y
Croatia	Y	Y	Y Law on Freedom of Information Act (NN 25/13, 85/15)	Y
Czech Republic	Y	Y	Y, Act on Free Access to Information 2000 / Re-use of Public Sector Information (2003/98/EC)	Y
Malta	N	N	Y, Re-use of Public Sector Information Act, Ch. 546	Y
Estonia	Y	Y	Y, Reuse of Public Sector Information	Y
Finland	Y	N	Y, Act on the Openness	Y

Legal				
Country	e-Gov Act/Law (Y/N)	Implementation of OOP	Re-use of documents for Open Govt (Y/N), & Name	Data sharing Act/Law (Y/N)
			of Government Activities	
<b>Hungary</b>	Y	Y (partially applying the "Once-Only" principle)	Y, Act No. LXIII. of 2012. on the re-use of Public Data	Y
<b>Denmark</b>	Y	Y	Y, Act on Reuse of Public Sector Information	Y
<b>Ireland</b>	N	Y	Y, European Communities (Re-use of Public Sector Information) (Amendment) Regulations 2015	Y
<b>Netherlands</b>	N	Y	Y, Re-use of Public Sector Information law	Y
<b>Norway</b>	Y	Y	y, Freedom of Information Act	Y
<b>Poland</b>	Y	N	Y, Law amending the Law on Access to Public Information and related laws (2011)	Y
<b>Portugal</b>	Y	Y	Y, rules to access administrative and environmental information and to reutilise administrative documents	Y
<b>Slovenia</b>	Y	N	Y, Transfer and re-use of public sector informatio	Y



Legal				
Country	e-Gov Act/Law (Y/N)	Implementation of OOP	Re-use of documents for Open Govt (Y/N), & Name	Data sharing Act/Law (Y/N)
<b>Spain</b>	Y	Y	Y, Reuse of the Public Sector Information; Law 30/2007	Y
<b>United Kingdom</b>	Y	Y	Y, Reuse of Public Sector Information Regulations (2015)	Y
<b>Conclusion</b>	All countries have e-Gov Act/Laws	22% do not implement OOP yet	All countries re-use documents for Open Govt	All countries implement Data sharing Laws

Organizational		
Country	Base Registries Law/Act/ Guidelines (Y/N), name	Program for Collaboration/ integration (Y/N)
Sweden	Y, e-Delegation in 2015	Y
Austria	N/A Information not provided	Y
Belgium	<p>“National Register, whose main piece of legislation is the “Act of 8 August 1983 organising the National Register of natural persons”</p> <p>Crossroads Bank for Social Security was given legal existence via the “Act of 15 January 1990</p> <p>Crossroads Bank for Enterprises Law</p> <p>Crossroads Bank for Vehicles was created under the “Act of 19 May 2010 “</p>	Y
Croatia	<p>Y ,</p> <p>a) Court Register Act (001/1995)</p> <p>b) the Law on State Survey and Real Estate Cadastre (16/07)</p> <p>c) Regulation on keeping records and the form of personal data (105/04)</p> <p>d) Metaregistry is defined in the legislation as a new public registry and it acts as the Croatian Registry of Registries.</p>	Y
Czech Republic	<ul style="list-style-type: none"> <li>• The Act No. 111/2009 Coll., on Base Registries I</li> </ul>	Y

Organizational		
Country	Base Registries Law/Act/ Guidelines (Y/N), name	Program for Collaboration/ integration (Y/N)
	The Act. No 227/2009 Coll., Amending certain acts in connection with adoption of the Act on Base Registries	
Malta	Y 2016 National Data Strategy, Public Registry Act Motor Vehicles Registration and Licensing Act Commercial Code 139 and the Companies Act	Y
Estonia	NO, in Estonia, all registries are base registries	Y
Finland	Y, JHS 179 on Enterprise Architecture Development (2017), JHS 170 XML Schemas (2009), JHS 158 of Geographic Metadata (2010),	Y
Hungary	Y, The specific legal provisions for base registries are, however, the ones that detail the purpose of the authentic sources, when and how they have to be accessed, the responsibilities of the Authority in charge of them, exceptions, restrictions, etc. Two examples of these in Hungary are: For the Civil Registry, Act No. LXVI of 1992 on Citizens' Personal Data and Ad-	Y

Organizational		
Country	Base Registries Law/Act/ Guidelines (Y/N), name	Program for Collaboration/ integration (Y/N)
	<p>dress of Registration</p> <p>In the case of the Business Registry, the primary piece of legislation in Hungary is the Act No. V of 2006 on Public Company Information, Company Registration and Winding-up Proceedings</p>	
Denmark	Y, Act on the Central Business Register	Y
Ireland	<p>Y, The Companies Act 2014</p> <p>Land and Conveyancing Law Reform Act 2009</p> <p>The Civil Registration Act of 2004, along with its Amendment from 2014</p> <p>Social Welfare Consolidation 2005</p>	Y
Netherlands	<p>In the Netherlands, each base registry is arranged by law. Examples are as follows:</p> <p>Base Registry Persons and the BRP law,</p> <p>Trade Registry Act</p> <p>Basic Registry of Addresses and Buildings Act</p>	Y
Norway	Y, Circular on Digitisation, SKATE , Brønnøysund Registry Centre (no mention of year)	Y
Poland	Y, Act on the Computerisation of the Operations of the Entities Performing Public Tasks	Y

Organizational		
Country	Base Registries Law/Act/ Guidelines (Y/N), name	Program for Collaboration/ integration (Y/N)
	(2005)	
Portugal	Y, Institute of Registries and Notaries 2012	Y
Slovenia	N	Y
Spain	The registry-specific legal norms deploy the general legal framework applicable to any type of administrative procedure and public administration Law 39/2015	Y
United Kingdom	Y,Registries Design Authority (	Y
<b>Conclusions</b>	17/18 Have Base Registries Laws, acts	All countries are using programs for Collaboration / Integration

Semantic		
Country	National frame work for base registries to exchange information (Y/N)	Follow EU- ISA (Y/N)
Sweden	N	Y
Austria	N	Y
Belgium	N	Y
Croatia	N	Y
Czech Republic	Y	Y
Malta	N	N
Estonia	Y	N
Finland	Y	N
Hungary	Y	N
Denmark	Y	N
Ireland	Y	N
Netherlands	Y	Y
Norway	Y	Y
Poland	Y	N
Portugal	Y	Y
Slovenia	N	Y
Spain	Y	Y
United Kingdom	Y	Y
<b>Conclusions</b>	33% Do not have National framework for base registries to exchange information	39% Do not follow EU- ISA

Technical		
Country	National standard format/Strategy to exchange data (Y, N)	Interconnectivity amongst base registries authorities
Sweden	Y	Y
Austria	Y	Y
Belgium	Y	Y
Croatia	N	N
Czech Republic	Y	Y
Malta	N	N
Estonia	Y	Y
Finland	Y	Y
Hungary	N	N
Denmark	Y	Y
Ireland	N	Y
Netherlands	Y	Y
Norway	Y	Y
Poland	Y	Y
Portugal	Y	Y
Slovenia	Y	Y
Spain	Y	Y
United Kingdom	Y	Y
<b>Conclusions</b>	22% do not have National standard format/Strategy to exchange data	17% Do not have Interconnectivity amongst base registries authorities

Cross-Border		
Country	Exchange information via cross-border (Y/N)	Participate in which EU/others projects/ programs to exchange such information
Sweden	Y	EUCARIS,EULIS, BRIS, EESS
Austria	Y	EUCARIS, EBR, EUCARIS, ECRIS, EULIS
Belgium	Y	EUCARIS
Croatia	Y	EUCARIS ECRIS EULIS
Czech Republic	Y	EUCARIS ECRIS EULIS ELF
Malta	Y	EUCARIS EULIS
Estonia	Y	EUCARIS ECRIS EULIS Memorandum of Understanding
Finland	Y	eResept CCN ETK ENSIB EUCARIS



Cross-Border		
Country	Exchange information via cross-border (Y/N)	Participate in which EU/others projects/ programs to exchange such information
		ECRIS EULIS
Hungary	Y	ECRIS EUCARIS Ereg SIS II
Denmark	Y	EUCARIS
Ireland	Y	EBR EULIS EUCARIS (ECRIS
Netherlands	Y	EUCARIS EBR ECRIS
Norway	Y	NSPIRE EULIS EUCARIS TOOPproject SmartGovernment Nordisk eTax
Poland	Y	EUCARIS ECRIS ELRA
Portugal	Y	EULIS ECRIS BRIS

Cross-Border		
Country	Exchange information via cross-border (Y/N)	Participate in which EU/others projects/ programs to exchange such information
		ERRU RESPER
Slovenia	Y	EUCARIS Horizon 2020 call for Once Only Principle (ELF)
Spain	Y	epSOS, Stork,e-Codex, EULIS,ECRIS,BRIS,ERRU, RESPER,IS A and ISA <sup>2</sup>
United Kingdom	Y	EUCARIS EULIS
<b>Conclusions</b>	All countries exchange information via cross-border	All countries participate in EU programs