

GENERALIZED DATA MODEL IN DISTRIBUTED REGISTERS

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Abstract

The study deals with an expanded view of data resources processed in information systems, and the scope and processing are closely connected with the need to redress formal legal requirements. The analysis covers all kinds of data that are related to information on natural and legal persons and unincorporated entities. The analysis also applies to attempts to create a generalized model of a homogeneous environment, which would give the possibility of using classical methods and ICT tools taking into account existing and currently created legal norms in this regard. The analysis also includes the potential effects that may arise as a consequence of changes in the manner and mode of data processing as a result of changes in legislation.

Key words: *Public Registers, Information Safety, Distributed Databases, Data Sources*

Introduction

The analysis of information resources collected by various institutions and organizations allows to perceive them as a huge database (often referred to as the data resources in the research literature). The resources are collected in different forms, both electronic and traditional - paper. In combination with the modern technology, which may be applied in this analysis, the data resources provide a possibility of gaining extensive knowledge of any entity (refers to both natural and legal persons)¹. Due to different technologies used for the purpose of processing such resources, it is impossible to apply universal information tools that would allow to easily obtain interesting analytical data. It is especially important in case of access to the data, which are processed in whole or in parts in a traditional manner. The above applies to the resources processed in an isolated information environment to a lesser extent.

The first part of the study includes basic records and registers with the most important information on natural and legal persons. All these resources are collected, processed, made available and archived in compliance with the binding regulations (usually, regulations equivalent and complementary to the acts of parliament - statutory regulations and internal regulations of appropriate government departments). Due to a large number of various registers, lists, records and breakdowns, only those which include the most important information on natural and legal persons as well as those with the most complete information (in the context of both data collected about particular entities and the number of such entities about which the data are processed) are subject to further analysis. The second part of the study covers the characteristics of the generalized model, which assumes existence of one system allowing the analysis of all data processed in the homogeneous environment. While an attempt to carry out various types of analyses in the existing heterogeneous environments may be compared to the "big data" processing, the construction of one model for all the processed resources shall result in a possibility of using "traditional" data analysis methods. In particular, the above refers to such resources which are processed in "their" environments, while using the already existing traditional information methods and tools. The analysis of legal bases related to the processing of collected data is another important aspect examined in this part. While considering the imposed - often very strict - restrictions, which are contained in the regulations on specific areas of application (sometimes strictly defined), an analysis of effects that may occur in case of amendments to such regulations was performed. On one hand, the above is aimed at further specification of such restrictions, but on the other - at their generalization. Therefore, it should be noted that some of the characterized resources may be processed (in whole or in parts) in a traditional manner, i.e. without using the ICT tools.

¹ In the subsequent part hereof, two terms are used with respect to the following entities: (1) natural person and (2) legal person (enterprises and all entities not being natural persons, e.g. associations, social and healthcare organizations, foundations, etc.).

Registers and records

Basic registers and records, where the scope of data refers to natural and legal persons, are mainly kept in compliance with various acts of law. Only some references are made to basic acts, which regulate the manner of collection, processing, storing and making available the data (Table 1). The presented legal footnotes shall not apply to other regulations, which are often supplementation and consequence of the above-mentioned acts. It should be noted that the aforementioned supplementation (usually in the form of regulations, whose creation is forced by a certain act) sometimes "distorts" the essence of the supplemented acts of law. This is usually due to failure to understand the problem by the authors of such regulations, but also due to inconsistency between the technological solutions and legal solutions that are lagging behind. Due to a large number and complexity of some legislative regulations, the descriptions include only those data that are closely related to the scope of the study, i.e. the data that refer to the most important information on natural and legal persons.

Table 1. Selected registers and records, with an indication of basic data concerning natural and legal persons.

Central Population Register – CEL²	
Natural person	
Personal Identification Number (PESEL)	Previous, if changed
Date and place of birth	
Last name	Previous, if changed
Names	Previous, if changed
Last name at birth	
Details of the mother	PESEL, names, last names
Details of the father	PESEL, names, last names
Address of domicile/ residence / temporary stay	Current and previous (in the former version of the system - only four previous addresses)
Number of identity documents (ID card and passport)	Current and previous (including photographs)
Citizenship	Previous, if changed
Marital status	Previous, if changed
Date of death	
National Official Register of Business Entities (REGON)³	
Natural person	Legal person
REGON Number	REGON Number
Personal Identification Number (PESEL)	n/a
Last name, names	Name
Address of headquarters	
Date of foundation/establishment	
Date of commencement/termination of business activity	
Date of suspension / resumption	
Tax Identification Number (NIP) (if applicable)	
Telephone/e-mail details	
List of types of activities	
Surface of an agricultural farm	n/a
National Court Register (KRS)⁴	
Legal person	
KRS Number	All previous, if applicable
Name/Business name	
Address of headquarters	Addresses of branches, if applicable
Status of business	
Business Activity Register Number	(Business Activity Register) All previous, if applicable
NIP Number	(Tax Identification Number)
REGON Number	If applicable
Representatives, attorneys, proxies, partners, general partners	Depending on the status of business of an entity/enterprise
Manner of establishment	Appropriate Articles of Association
Type of business	Appropriate Articles of Association
Amount of share capital	

² Act on the Population Register and Identity Cards

³ Act on Official Statistics

⁴ Act on the National Court Register

Land and Property Register (EGiB)⁵	
Real Estate	
Land	location, boundaries, surface, types of usable land and their categories
Buildings	location, purpose, performance functions and general technical data
Premises	location, performance functions, usable area
Lands, buildings, premises	Owner - natural person Last name, names, names of parents, PESEL (if applicable), Address of domicile; alien or not?
	Owner - legal person Business name (full and short), address of headquarters; is the legal person an alien?
	Identification of the land and mortgage register (KW)
	Value of real estate
	Land register survey (map, site plan)
	Aboveground, ground and underground utility network
Land and mortgage register (KW)⁶	
Number of the land and mortgage register	Unique identifier
Designation of real estate	i.a. size, address
Designation of property / right of use	For natural person: Names, last name, PESEL no. (if applicable), names of parents (if no PESEL no.), address
	For legal person: Name/business name/designation/headquarters/REGON no.
Mortgages	In section 4
Details of the Notary Public drafting the notarial deed (register no. A, date, names, last name, headquarters)	
Register of Business Activity (EDG)⁷	
Designation of entrepreneur (EDG no.)	Unique identifier
Names, last name	
PESEL no.	If applicable
REGON no.	If applicable
NIP no.	If applicable
Place of residence	
Place of business activity	
Definition of the object of business	In accordance with the Polish Statistical Classification
Date of commencement of business activity	
Details of attorney	Names, last name, PESEL no.
Date of suspension / resumption of business activity	
Business Activity Central Register and Information Record (CEIDG)	
The scope of data covers data from EDG, and the information about:	Citizenship
	E-mail address
	Statutory joint property of spouses
	Bankruptcy, recovery proceedings
	Ban on business activity as stipulated in CEIDG
Register of Pledges (RZ)⁸	
Item no. in the register	
Date of filing	
Natural person	Names and last name
	PESEL no.
Legal person	Name/Business name
	REGON no.
Address of pledgor	If a civil law partnership acts on behalf of the pledgee, pledgor or debtor, all partners shall be mentioned in the motion for entry into the register.
Address of pledgee	
Address of debtor	
Designation of the object of pledge	Chattels
	Property rights, if transferable
	Receivables

⁵ Act on Surveying and Cartography Law

⁶ Act on land and mortgage register and Act on transferring the contents of the land and mortgage register to the structure of the land and mortgage register maintained in the IT system

⁷ Act on Business Activity Law and Act on Freedom of Business Activity

⁸ Act on Registered Pledges and Register of Pledges

	Securities rights
	Objects or rights, which the pledgor shall acquire in the future
Amount of receivables secured with a pledge	
Social Insurance Agency (ZUS)⁹	
Insured Natural person	PESEL no.
	NIP no.
	Identity document (type, number)
	Last name, names
	Date of birth
	Last name at birth
	Citizenship
	Sex
	Address of domicile
	Address of residence
	Mailing address
	Title and type of insurance
	Date of taking out / de-registering insurance policy
	Working time
Insurance contribution payer	(natural person or legal person)
	NIP no.
	REGON no.
	PESEL no. (if applicable)
	Short name
	Identity document (type, number)
	Last name, names
	Date and place of birth
	Citizenship
	Name/Business name
	Authorization to conduct non-agricultural activity
	Date of establishment of contribution payment obligation
	Date and reason for de-registration
	Numbers of payer's bank account
Address of headquarters, residence, mailing	
Payer's Accountancy office (NIP, REGON, name)	
Register of Members of the Open Pension Funds (OFE)	Last name, names
	PESEL no.
	NIP no.
	Date of birth
	Identity document (type, number)
	Date and method of contract execution with OFE
	Date of de-registration
OFE identifier	
Register of pensioners receiving pensions from the Lifetime Capital Retirement Funds	Last name, names
	PESEL no.
	NIP no.
	Date of birth
	Identity document (type, number)
	Type of benefit
Register of members of the insured's family entitled to health insurance	Symbol of benefit
	Last name, names
	PESEL no.
	NIP no.
	Date of birth
	Identity document (type, number)
	Degree of kinship
	Date of obtaining the rights
	Date of losing the rights
Address of residence of a family member	
Family member's identifier of the voivodeship's National Health Fund (NFZ)	

⁹ Act on Social Insurance System

Registers of particular Insurance Institutions ¹⁰	
Natural person	Legal person
Names and last name	Name/Business name
PESEL no.	KRS no.
Date and place of birth	REGON no.
Identity document (series and number)	NIP no.
Address of residence	Address of headquarters
Object of insurance	
Value	
Period (from-to)	
Emolument (natural persons)	
Insurance terms and conditions	
<i>NOTES: The information from particular insurance contracts (e.g. insurance of life, marriage, pension, casco, sea vessels, aircrafts, for damages caused by natural disasters, third party liability insurance of any type) is collected in the (common) Insurance Institutions.</i>	
Registers of the National Health Fund (NFZ) ¹¹	
Natural person	Names and last name
	Last name at birth
	Date and place of birth
	Sex
	Citizenship
	PESEL no.
	NIP no., if applicable
	Identity document (series and number)
	Address of residence
	Insurance number
	Degree of kinship with the insurance contribution payer
	Benefits granted
	Name of the granting institution
	Details of the physician executing a health service
	Details of the health service provider employing the physician
	Details of the drugstore filling a prescription
	Date of insurance application
	Date of de-registration from insurance
	Period of contribution payment
	Details of the insurance contribution payer
Date of death	
Reimbursed drugs	Drugstore identifier (REGON plus drugstore ID)
	Date of prescription receipt
	Date of drug delivery
	Code of prescription type
	Number of prescription
	Patient identification number
	Identifier of an entity issuing a prescription
	Number of medical license
Register of Taxes and Fees / Tax Records ¹²	
The data are stored - in case of natural persons - in tax records, in case of legal persons - in tax and fee records.	
Agricultural tax	
Agricultural tax payers are natural persons, legal persons.	
Land owners	
Autonomous land possessors	
Perpetual lessees of lands	
Owners of lands which constitute the property of State Treasury or local government units	
Forestry tax	
Forestry tax payers are natural persons, legal persons.	
Real estate tax	
Owner	
Perpetual lessee	
Autonomous possessor	

¹⁰ Act on insurance activity

¹¹ Act on Publicly Funded Healthcare

¹² Act on Taxes and Local Fees, Act on Agricultural Tax and Act on Forestry Tax

Transport tax	
Object of taxation	Trucks > 3,5 tons
	Tractor units and ballast tractors > 3,5 tons
	Trailers and semi-trailers > 7 tons (including tractor)
	Buses
Payers	Natural persons and legal persons
	Units
	Owners of the means of transport registered within the territory of Republic of Poland as entrusted by a foreign natural or legal person to a Polish entity

Treasury Registers¹³	
Register of National Taxpayer Register (KEP)	
Natural person	Last name, names
	Names of parents
	Date and place of birth
	Sex
	Last name at birth
	Citizenship
	Identity document (type, number)
	PESEL no.
	Address of residence
	Address of business activity
	Mailing address
	Data on business activity: full and short names, date of commencement/end of business activity, REGON no., personal bank account, bank accounts related to business activity
	Legal person
Organizational and legal frame of business activity	
Address of headquarters	
REGON no.	
Registrating or recording body	
Number assigned by the body (KRS or EDG)	
List of bank accounts	
Address of documentation storage	
Object of business	
NIP no.	

Income statement	
Property actions - requests	Sales, loan, donation, co-ownership dissolution, mortgage agreements, company deeds (Articles of Associations), usufruct title agreements.

Value Added Tax	
Register of Third-Party Liability Insurance Contracts of Motor Vehicle Owners¹⁴	
Name and address of the insurance agency, which executed the TPL contract	
Identifier of intermediary	If the contract was executed by an intermediary, if not - name, last name, PESEL no. of the natural person who entered into such agreement
Insured - natural person	Names, last name
	Address of residence
	PESEL no.
Insured - legal person	Identity document (series and number)
	Name/Business name
	REGON no.
Insured - non-resident	Address of headquarters
	Name, last name
	Address of residence
	Identity document (name and number)
	Address of the insured's headquarters
Identifier of the document confirming execution of the insurance contract	
Date of taking out insurance	

¹³ Act on the Principles of Records and Identification of Taxpayers and Payers, Act on Civil and Law Transactions, Act on Flat-Rate Individual Income Tax, Act on Corporate Income Tax, Act on Inheritance and Donation Tax and Act on VAT

¹⁴ Act on Mandatory Insurance, Insurance Guarantee Fund and Polish Motor Insurers' Bureau

Period of insurance	
Date of contract termination	If before the end of the period
Details of the motor vehicle	Registration number
	VIN number (vehicle body/chassis number)
	Make, type and model
	Type of vehicle
Owner of the motor vehicle	Names, last name
	PESEL no. or REGON no.
	Address of residence/headquarters
	If non-resident - ditto

Central Register of Issued and Lost Passports¹⁵

Series and number of passport	
Type of passport	Temporary, diplomatic, "normal"
Date of passport issue	
Validity of passport	
Photograph	Biometric images
Natural person	Names, last name
	PESEL no.
	Date of birth
	Sex
Issuing authority	
Date of passport issue	

Polish Register of Issued and Lost ID Cards¹⁶

Series and number of ID card	
Type of ID card	Temporary, "normal"
Date of ID card issue	
Validity of ID card	
Natural person	Names, last name
	PESEL no.
	Address of domicile/residence
	Date and place of birth
	Sex
	Former names and last names
	Last name at birth
	Names and last names of parents
	Height
	Eye color
	Signature
Photograph	
Former ID cards	Series and numbers, dates of issue, dates of validity
Issuing authority	
Date of ID card issue	

Credit Information Bureau ("Register of Borrowers", BIK)¹⁷

Natural person	Legal person
Names and last name	Name/Business name
PESEL no.	KRS no.
Date and place of birth	REGON no.
Identity document (series and number)	NIP no.
Address of residence	Address of headquarters
Date of credit, period	
Amount and currency of credit	
Timeliness of payments	
Information on indebtedness	
Information on debt collection/enforcement	
Information on account closure	

Databases of the General Inspector of Banking Information¹⁸

Identification of natural persons	Name and last name
	Identity document (series and number)

¹⁵ Act on Passport Documents

¹⁶ Act on the Population Register and Identity Cards

¹⁷ Act - Banking Law

¹⁸ Act on Preventing and Fighting Money Laundering and Financing of Terrorism

	PESEL no. (in case of ID card holders)
	Country code (for aliens and passports)
	Address
Identification of legal persons	Name/Business name
	Headquarters (address)
	Document confirming authorization of the person involved in the transaction
	Details of the representing natural person: last name, address, identity document (series and number), PESEL no. or country code

Established Bank Accounts¹⁹

Natural person	Legal person
Names and last name	Name/Business name
PESEL no.	KRS no.
Date and place of birth	REGON no.
Identity document (series and number)	NIP no.
Address of residence	Address of headquarters

Resource: Own study based on [KIEDROWICZ, M. 2014. *Uogólniony model danych w ...*].

According to various sources, the number of registers and records, whose maintenance is required by legal regulations, oscillates between 600 and 3000. Generally, the registers described in table no. 1 constitute only a fraction of this number. Nonetheless, on the basis of the described contents, it may be stated that the scope of the collected, stored, processed and available data is significantly broad. The issues of the data availability are (in most cases) regulated in detail in the above-cited acts of law (together with their accompanying secondary legislation). Some of them refer to general provisions as resulting from the statutory regulations on the protection of personal data or trade/state secret. Table no. 2 includes a list of registers and records, which supplement the above list and contain information about natural and legal persons. Nonetheless, both tables do not exhaust the entire catalog of the effective registers and records.

Table 2. List of the selected registers and records.

Selected Registers and Records (statutory grounds)
Act - Restructuring Law (draft)
Act - Bankruptcy and Recovery Law (ultimately - Bankruptcy Law)
Act on Acquiring Real Estates by Aliens
Act on Weapons and Ammunition
Act - Civil-Status Records Law
Act on Social Insurance of Farmers
Act on the National Register System for Producers, Farms and Motions for Subsidies
Act on the Livestock Identification and Registration
Act on the Police
Act on the Participation of the Republic of Poland in the Schengen Information System and Visa Information System (VIS)
Act - Road Traffic Law
Act on the Collection, Processing and Provision of Criminal Data
Act on Customs Services
Act - Customs Law
Act on Excise Tax
Act on the National Criminal Record
Selected Registers of the Regulated Business Activity (statutory grounds)
Act - Provisions introducing the Act on Freedom of Business Activity
Act on Freedom of Business Activity
Act on the National Archives
Act on Veterinary Clinics
Act on the Nurse and Midwife Profession
Act on the Medical and Dentist Profession
Act - Road Traffic Law
Act on Tourist Services
Act on Warehouses
Act on Horse Races
Act on Ethyl Alcohol and Tobacco Production
Act on Investigative Services
Act - Foreign Exchange Law

¹⁹ Act - Banking Law

Act on Spirit Drinks Production and Registration and Protection of Geographic Designations on Spirit Drinks
Act on Road Transport of Hazardous Goods
Act on Road Transport
Act on Rail Transport of Hazardous Goods
Act - Postal Law
Act on Seed Production
Act on Plant Protection
Act on Manufacturing and Bottling of Wine Products, Marketing of Wine Products and Organization of Wine Market
Act on Employment Promotion and Labor Market
Act on Veterinary Clinics
Act on Biocomponents used in Liquid Fuels and Biofuels

Selected Local Registers

Name of register	Authorized holder (subject liable)
Register of entities storing personal and payroll documents	Marshal of the Voivodeship
Register of Hunting	Voivode
Register of Nurse and Midwife Practice	Regional Board of Nurses and Midwives
Register of Medical Practice	Regional Medical Chamber
Register of Entrepreneurs with Technical Inspection Centers	Staroste
Register of Entrepreneurs with Driving Schools	Staroste
Register of Entrepreneurs with Driving Improvement Schools	Voivode
Register of Business Activities related to the Manufacturing and Bottling of Spirit Drinks	Minister of Agriculture
Register of Entrepreneurs with Psychological Centers	Marshal of the Voivodeship
Register of Travel Organizers and Agents	Marshal of the Voivodeship
Register of Storage Companies	Minister of Economy, Minister of Agriculture
Register of Horse Race Organizers	President of the Polish Jockey Club
Register of Investigation Activities	Minister Competent for Internal Affairs
Register of Currency Exchange Activities	President of the National Bank of Poland
Register of Business Entities Manufacturing and Processing Ethyl Alcohol	Minister of Agriculture
Register of Entrepreneurs with Skill Improvement Centers	Marshal of the Voivodeship
Register of Entrepreneurs with Education Centers	Voivode
Register of Entrepreneurs with Course Organization Activities	Railway Transport Office
Register of Postal Surveys	President of the Office of Electronic Communications
Register of Entrepreneurs Marketing of Seed Material	Voivodeship Inspector for Plant Protection
Register of Employment Agencies	Marshal of the Voivodeship
Register of Entrepreneurs with Packaging and Marketing of Plant Protection Products Business	Voivodeship Inspector for Plant Protection
Register of Entrepreneurs with Production and Bottling Wine Product Business	Minister of Agriculture
Register of Veterinary Clinic	Regional Medical and Veterinary Board
Register of Entrepreneurs Creating and Storing Biocomponents	President of Agricultural Market Agency

Register of Authorized Entities / Holders of Licenses / Permits

Registers in the field of Building Law
Register of Persons with Geodetic and Cartographic Licenses
Register of Experts in Commercial Quality of Agri-Food Articles
Register of Experts in Product and Service Quality
Register of Insurance Intermediaries
Register of Actuaries
Register of Brokers and Investment Advisors
Register of Customs Agents
National Register of Attorneys-at-Law and Attorney Trainees
Register of Legal Counsels
Register of Auditors
Register of Notaries Public
Register of Debt Collectors
Register of Sworn Translators
Register of Official Receivers

Register of Expert Witnesses
Register of Court-Appointed Physicians
Registers in the field of Real Estate Management
Register of Tax Advisors
Register of OHS Experts
Register of the Polish Information Processing Society Experts
Register of the Motor Experts
Register of the Central Office of Measure
Commune Registers
Register of Pharmacists
Central Register of Physicians and Dentists
Register of Veterinary Physicians
Central Board of Nurses and Midwives

Other Registers / Records (selection)

Register of Seagoing Vessels
Register of Inland Waterway Vessels
Register of Fishing Vessels
Register of Civil Aircrafts
National Register of Forest Basic Material
Register of Monuments
Register of Benefits
Register of Foreign Entrepreneur Representatives
Records of Securities Admitted to Official Listing
Economic Information Bureau (BIG)
Register of Drugstores
Register of Healthcare Centers
Register of Universities
Register of Airports and Civil Landing Strips
Repatriation Registers
Registers for Aliens
Registers of Patents
Register of Producers and Salespersons of Liquid Fuels
Register of Entrepreneurs with Global and General Permits

Source: own elaboration

The above-described scope of data includes only basic information. Since the data are processed in a traditional (paper) manner or using modern information technologies, the access thereto is in many cases difficult or even impossible. Even if certain IT systems are used to keep the registers, in many cases these are the systems created in different periods of time (where 5-7 years means a huge "technological gap") and by using tools and products of different producers. Therefore, the possibilities related to communication and automatic use of the same data (not to mention their integration) are often time-consuming or even unfeasible.

It should be also noted that both the scope of data (the characteristics of individual natural and legal persons) and the scope of entities about which such data are being collected may differ significantly. In the further part hereof, an attempt was made to create a generalized data model, which would include the most important information on natural and legal persons. One of the criteria, among other things, shall be the scope of entities about which the data are collected - i.e. the registers covering the largest number of such entities (in case of some registers and records, they should include the lists of all natural and legal persons).

General data model

The above-mentioned list of data (necessarily limited to the most important information), which are and should be collected, gathered, processed, made available and archived shows the scale of the problems, which occur or may occur in case of an attempt of a global view of the issue.

It is assumed that all of the described resources provide for a possibility of comparison due to their formats if they use specific attributes (e.g. names, last name, PESEL no., address, etc.). The above refers to both internal formats used for recording particular values (including a possibility of using national alphabets) as well as lower and upper case letters. In case of keeping specific records in paper, it is also assumed that the data shall be made available in an electronic form. The scope of the collected data may be presented in one "large" table, including all available information for both natural and legal persons.

Additionally, it is also assumed that the identification of a natural person and legal person shall be unambiguous. It means that if the PESEL number, name and last name of a specific person is available in

a given register, the same name and last name shall be assigned to such PESEL number in another register. Therefore, it may be stated that the data in the aforesaid registers are integral. Apparently, such statement is not fully legitimate. An appropriate research should be made to answer the question - "To what extent the examined data are integral?" (such reach is not subject to this study).

The proposed scope of data of the designed model was presented in a tabular form. In the subsequent part hereof, the said scope may constitute grounds for creating a relational and/or object-relational model (using any tools to support the design processes of the databases).

Table 3. Collective set of data for natural and legal persons.

Attribute (characteristics)	Natural person	Legal person	Comments
Identifier	X		PESEL, NIP
Identifier		X	KRS, REGON, NIP
Last name	X		
Name	X		
Name		X	
Address	X	X	
Location	X	X	In some cases <i>Location</i> is "included" in the <i>Address</i> attribute.
Document	X		ID card, passport
Date of birth	X		
Marital status	X		
Citizenship	X	X	In case of a legal person - it means the country of incorporation
Date of death	X		
Period of business activity		X	Date of commencement, suspension, termination of business activity
Status of business		X	
Type of business		X	Polish Statistical Classification (PKD), in compliance with EDG
Representation	X	X	Representatives, Attorneys, Proxies, Partners, General Partners
Real Estate	X	X	Lands, Buildings, Premises
Collateral	X	X	Chattels, Property rights Receivables, Rights on securities
Insurance (policies, value, period)	X	X	Property, Motor Vehicle, Life
Insurance contribution	X	X	Social insurance, Health insurance, Open Pension Fund (OFE), Life annuities
Employment	X	X	Who, where, in which period?
Health insurance	X		Insurance family members
Remuneration	X	X	From employment (full-time), specific task, retirement/disability pension
Health benefits	X		Type, Institution, Physician, Drugstore, Health Care Center, Reimbursed Drugs
Tax liabilities	X	X	Agricultural Tax, Forestry Tax Real estate Tax, Transport Tax, Excise Duty
Property activities	X	X	Sales, loan, donation, co-ownership dissolution, mortgage agreements, company deeds, usufruct title
Financial liabilities	X	X	Banks (BIK), Treasury Department, ZUS, NFZ
Financial transactions	X	X	Bank transactions (General Inspector of Financial Information (GIIF)), Bank accounts
Chattels	X	X	Motor vehicles, Sea vessels, Aircrafts, Benefits, Weapon, Works of art
Transactions and suspicious activities	X	X	KRK, KCIK, KSIP, AFIS, Schengen
International transactions	X	X	Customs clearance, Customs duty
Authorization	X	X	Licenses, Permits, Regulated professions

Source: own elaboration

An analysis of the information scope presented in table no. 3 allows to conclude that in case of certain data, they shall appear very seldom. In particular, the above refers to such areas as: court records, police records (generally, records whose scope of data is determined by the occurrence of certain events, which concern only some entities). Other areas shall be filled in the "majority" of cases. The above refers, among other things, to such records as: personal data (each citizen has a unique PESEL number, each legal entity has REGON/EDG/KRS/NIP nos. assigned thereto), document data (each citizen has an ID card, most citizens have passports), data of Registry Office (each citizen has / should have a birth certificate), ownership data (most of the citizens have flats/houses, or at least one member of their family), information on drivers (most / high percentage of citizens have cars), financial data (most citizens have accounts/bank accounts, each legal person must have an account/bank account), fiscal data (each citizen pays Personal Income Tax (PIT), each legal entity pays Corporate Income Tax (CIT), most entities pay VAT), health insurance data (each citizen pays social and health insurance contributions, natural person/employed as insured as well as natural or legal person as insurance contribution payer).

Apart from a possibility of direct use of the aforementioned data, a possibility of obtaining additional information on the basis of the already held data should be also taken into account. For example, on the basis of social and health insurance data, it is possible to obtain the information on employment of natural persons (place of employment, period of employment, amount of remuneration) - while considering the list of contributions paid by the payer, it is possible to "calculate" the period of employment and at least estimate the amount of remuneration (the amount of contributions constitutes a strictly defined percentage of the remuneration) as well as provide the name of the employer (i.e. insurance contribution payer). It is also possible to obtain data on the basis of links between particular register/records. For example, on the basis of entries in the land and mortgage registers (with respect to values of the established mortgages), it is possible to calculate/determine the amount of a loan taken out by a given natural person (recommendations of the Polish Financial Supervision Authority show that the bank establishes a mortgage equivalent to 150% of the loan value) and the name of the bank which granted the loan. The data may be also used for cross-checks of the information included in BIK registers.

The presented examples show that the "gathering of all data" in one model offers a wide range of opportunities of their use. It should be noted here that the access thereto shall be also possible by using "standard" data exploration tools.

Conclusions

On the basis of the presented analysis, it is evident that both the scope of data on various entities as well as their volume (often resulting from the number of entities about which the data are being collected and processed) make it difficult to find homogeneous methods and/or tools, which could be used for the purpose of such analysis. On top of all this come legal and normative constraints, which significantly complicate the whole issue. On the other hand, we have the whole spectrum of formal restrictions due to acts of law on personal data or corporate data protection. Another area that has not been tackled herein is related to EU legislation and its effects. It refers to both the issue of gathering and processing data as well as making them available, while observing restrictions related to personal data or corporate data protection (from the point of view of competitiveness). Additionally, the issues of globalization and technology development, which may (and often do) result in a possibility of gathering and processing data in vague environments (for example, "cloud computing") should be characterized in terms of protection of data access and security.

The presented characteristics of the formal and legal conditions mainly refer to the Polish legislation, however, it may be also assumed that other countries have successfully implemented analogous or similar legal solutions. Therefore, it is necessary to find such solutions which would concern similar or the same issues related to the "use" of the data resources. The issues that also need to be tackled concern the following fields:

- correlations between various acts of law corresponding to the links between the data which they concern;
- legal solutions "delayed" as compared to the technological progress;
- language "inaccuracies" resulting from, among other things, an increasing number of new terms typical for modern technologies, which have no grounds in the present wording of the legal regulations;
- emergence of terms and expressions directly borrowed from other languages (mainly English) and their acceptance by technical circles;
- lack of definitions of the new terms, which makes them misunderstood by law recipients.

Regardless of the data area (and information resulting therefrom) that shall be examined (personal data, financial data, medical data, ownership data, etc.), the method of data integration and use should include all formal and legal aspects as well as the consequences resulting therefrom.

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