



Geospatial data' qualities in Bulgaria from the end-users point of view

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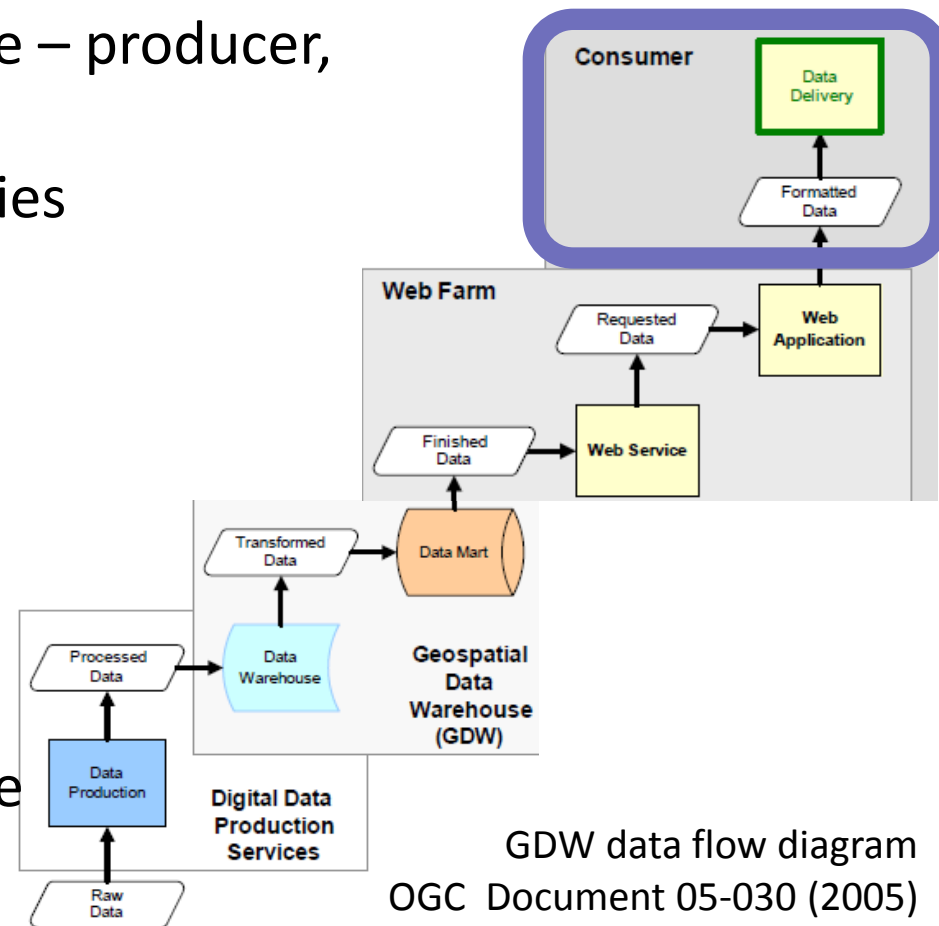
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Presentation Outline

- Introduction
- Geospatial data available in Bulgaria
- Qualities of geospatial data
- End-users needs – case study analyses
- Recommendations
- Conclusions

Introduction

- Geospatial data and information (SDI and INSPIRE Directive)
- Interested actors and their role – producer, provider, customer, end-user
 - Government, State Agencies
 - Municipalities
 - Academia, Universities
 - Research institutes
 - Business companies
 - NGOs, etc.
- Data qualities issues
- Data interoperability, exchange added-value



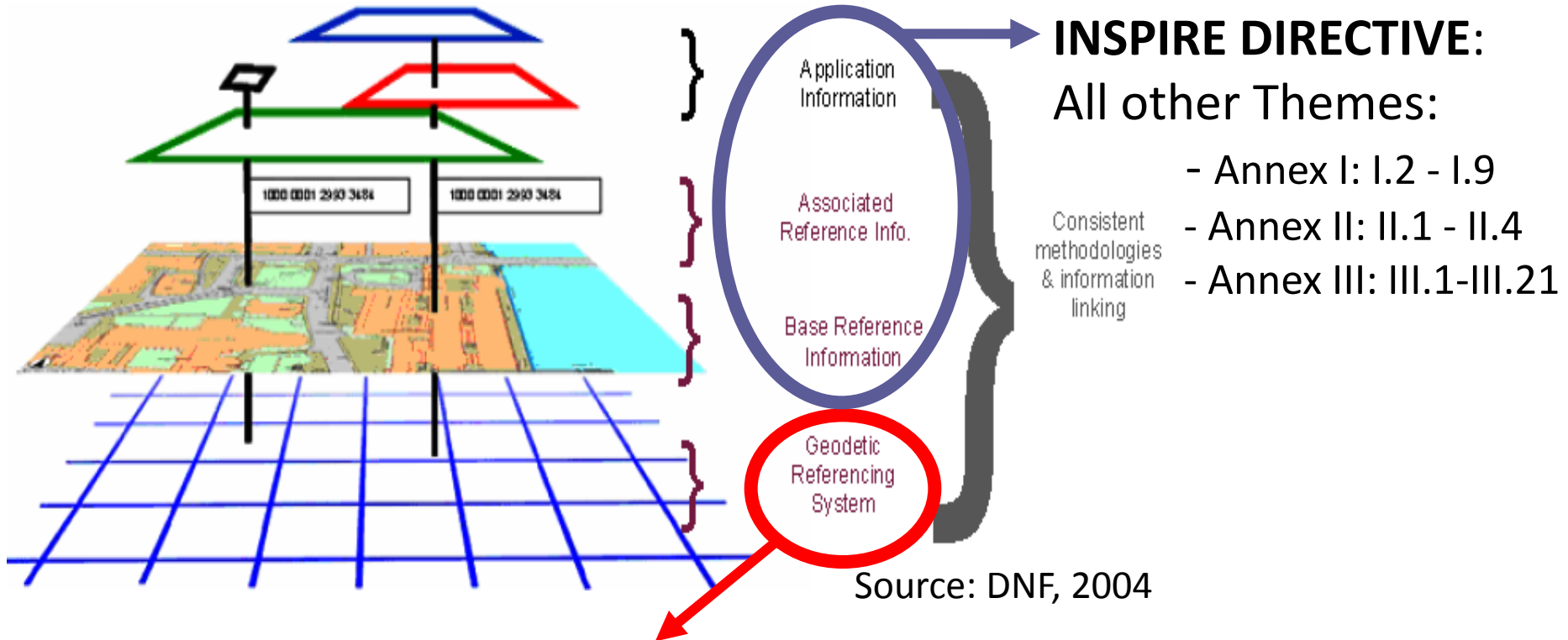
- Geospatial data available in Bulgaria

Spatial data and geoinformation

- Creation of digital SD in Bulgaria - since 90-st years with the adoption of a regulation for the cadastral plans of settlements
- Numerous GIS projects implemented by ministries, municipalities, research institutes and universities, NGOs, private companies and other institutions using the EU and national funds and following the strategy “bottom-up”
- The Law on Access to Spatial Data (SG, 2010; Amendment, 2015)
- Several changes of NCP – MTITC, State E-Gov Agency
- National and other geoportals - <https://kais.cadastre.bg/>, <http://gis.mrrb.government.bg/>, <http://eea.government.bg/zpo/en/index.jsp>, <http://bsdi.asde-bg.org/danni.php>, and others.

A framework to integrate the geoinformation

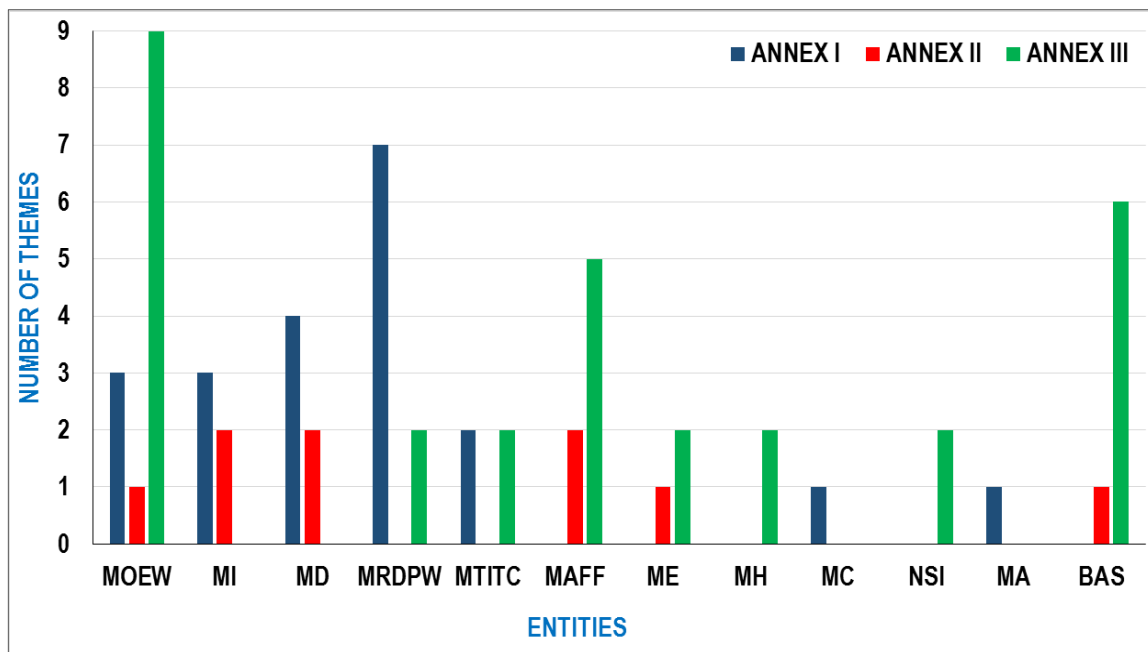
<https://www.eionet.europa.eu/gemet/en/inspire-themes/>



- **INSPIRE DIRECTIVE: Annex I.1. Coordinate reference systems**
- CRS for EU (incl. Bulgaria):
 - ETRS 1989 - for coordinates (x, y, z) and/or (φ, λ) , (B, L)
 - EVRS 2007 - for height h or H

Holders of reference spatial data - INSPIRE

- State e-Government Agency /2016/
- National Geoportal: www.inspirebg.eu
- Main players – interested parties



INSPIRE		ANNEX I	ANNEX II	ANNEX III
Themes	Entity	9	4	21
	Entity			
MINISTRIES	MOEW	3	1	9
	MI	3	2	
	MD	4	2	
	MRDPW	7		2
	MTITC	2		2
	MAFF		2	5
	ME		1	2
	MH			2
	MC	1		
OTHER	NSI			2
	MA	1		
	BAS		1	6
SUM		21	9	30

Holders of spatial data in Bulgaria

App. 1, Art. 6, LASD (2015)

N	ANNEX I Themes	HOLDERS OF REFERENCE SPATIAL DATA	HOLDERS OF SPATIAL DATA
1	<p>I.1. Coordinate reference systems Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.</p>	<p>Geodesy, Cartography and Cadaster Agency Art. 12 of the LGC</p> <p>Ministry of Defense – Military Geographic Service Art. 12 of the LGC</p>	<p>GCCA MD - MGS MI BPI Co. EA EMDR</p>
4	<p>I.4. Cadastral parcels Areas defined by cadastral registers or equivalent.</p>	<p>Geodesy, Cartography and Cadaster Agency Art. 2 and 23 of the LCPR</p>	<p>GCCA MAFF MRDPW Municipal administrations BPI Co.</p>

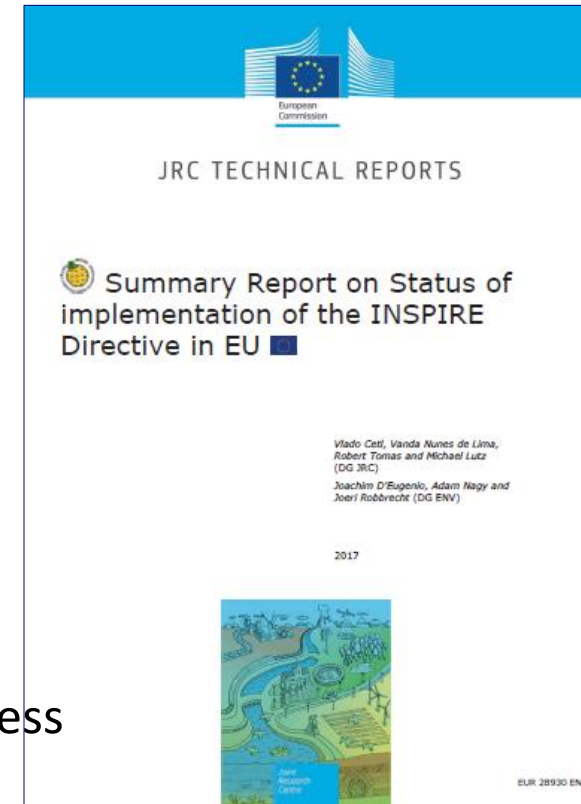
INSPIRE SDI indicators

INSPIRE components	Indicator	Description	Measure
Metadata	MDi1	Existence of metadata for spatial data sets and services	%
	MDi2	Conformity of metadata for spatial data sets and services with the implementing rules on metadata	%
Data Sets	DSi1	Geographical coverage of spatial data sets	%
	DSi2	Conformity of spatial data sets with the data specifications and of their metadata with the implementing rules on metadata	%
Services	NSi1	Accessibility of metadata for spatial data sets and services through discovery services	%
	NSi2	Accessibility of spatial data sets through view and download services	%
	NSi3	Use of network services - annual number of service requests for discovery, view, download, transformation and invoke services	number
	NSi4	Conformity of network services to the implementing rules on network services	%

Status of INSPIRE implementation in EU (2017)

Criteria:

- Ensure effective coordination
- Data sharing without obstacles
- Identification of spatial data
- Documentation of datasets and services (metadata)
- Provision of services for identified spatial datasets (discovery, view, download)
- Provision of interoperable spatial datasets
- Main conclusions for Bulgaria:
 - Implementation has started and made some progress but is still far from being complete
 - The trend of the implementation is neutral or positive
 - Clear and targeted actions have been identified or no real progress has been made in the recent past



- Qualities of geospatial data

Reasons for concerns about SD quality

- After 80 the SDQ increase (GIS and Space technologies)
- There is an increasing availability, exchange and use of SD
- More and more end-users – business interests
- GIS extend SD usage in many applications
- GIS tools are used for decision making
- Difficult to evaluate SDQ by end-users
- Trust on secondary sources of SD
- Nowadays, no book about GIS or GI Science goes without a chapter on spatial data quality.

Spatial Data quality

- Components of data quality - spatial, temporal, and thematic
 - Accuracy
 - Precision or resolution
 - Consistency
 - Completeness
- Data quality standards
 - SDQ standards USA-SDTS (1992), ICA (1995), CEN/TC287 (1998), ISO/TC211I (2002)
 - Meta-data standards - accepted in the USA in 1998 and by ISO in 2003
 - Lineage, Positional accuracy, Attribute accuracy , Logical consistency, Completeness, Semantic accuracy, Usage, purpose, constraints, Temporal quality, Variation in quality, Meta-quality, Resolution (fitness-for-use assessment)

- End-users needs – case study analyses

Analysis of Spatial data quality

I case: P. van Oort (2006) Spatial data quality: from description to application, Thesis, Wageningen University

- Statistical survey - 55 respondents (from 250) of a questionnaire
- Results:
 - There is a growing group of users less aware of SDQ
 - GIS enable the use of SD in all sorts of applications, regardless of the appropriateness with regard to SDQ
 - Current GIS offer hardly any tools for handling spatial quality
 - Stakeholders will detect and inform the decision makers about errors in the SD and so reduce risks to an acceptable level
 - Increasing the distance between those who use the SD (**the end users**) and those who are best informed about the SDQ (**the producers**)

Analysis of SDI impact

II case: P. Almirall et al. (2008) The Socio-Economic Impact of the Spatial Data Infrastructure of Catalonia, EC, JRC, IES, 62 pp.

- 22 Local Authorities and 12 Private companies were interviewed
- Some results of Survey Participants:
 - IDEC is still in the initial phases and people are just starting to become aware of it
 - The motivation of local public administrations of IDEC resources is increasing during the time
 - The real impact of IDEC resources for external users such as citizens, regional initiatives, residents' associations, and companies requires dedicated surveys
 - To define more precise indicators to make a quantitative assessment and the study must be highly focused (i.e. services)

Analysis of Spatial data quality

III case. Sociological Survey on the quality of CM&CR in Bulgaria

- The survey is performed by Dr. Ilinka Ivanova in 2015 (2016)
- Survey is concerted with the AGC, USLM, CGE, CEID
- Three groups were interviewed:
 - I group: Private geodetic companies (18 questions)
 - 32 questionnaires
 - II group: Specialized municipal administrations (17 questions)
 - 110 (from 175 municipalities with approved CM&CR)
 - III group: Citizens (13 questions)
 - from several cities

Таблица 3

№	Въпроси	Отговорн (относителен дъл, %)	
		Да	Не
1.	В разяснителната кампания при открито производство за изработване на кадастрална карта и кадастрални регистри трябва да участват: а) СГКК; б) СГКК и правоспособното лице; в) СГКК, общината и правоспособното лице.	90% са посочили – - буква „в“ и - 10% буква „б“	
2.	Като собственик на поземлен имот, наясно ли сте защо трябва да означите границите му?	5%	95%
3.	Като собственик на недвижим имот, наясно ли сте защо трябва да представите на фирмата, която изработва кадастрална карта, документа за собственост?	10%	90%
4.	Трябва ли всички дейности, свързани с поземлената регистрация (кадастър, карта на възстановената собственост, специализирани данни за земята и за имотите, ограничения и др.), да бъдат в една административна структура (поземлена администрация)?	70%	30%

Problems identified from I group

- Poor organization in preparing and conducting the awareness campaign in the process of CM and CR production
- Lack of engagement of the property owners due to unawareness of their rights and obligations
- Errors in CM
- Detecting errors in CR
- No current control when creating CM and CR
- The time for field measurements is not is not good enough for quality work of CM
- Administrative structures for CM and CR should be only one administrative structure

Problems identified from II group

- Municipalities (70%) did not mark the boundaries of the municipal ownership on the terrain
- Co-operation between municipalities, AGCC and contractors is rather “poor”, rarely “satisfactory” and exceptionally “good”
- Most of the municipalities state that have a capacity and can serve the citizens with actions related to CM & CR
- Municipalities (95%) state that the exchange between the CIS and the municipal administration have to be on-line
- A representative of the municipalities to participate in the control of CM and CR
- Correct completion of the CM is of utmost importance to the municipalities, but CM are completed of 50-60% in reality

Problems identified from III group

- Very often the citizens are not aware of the CM & CR activities
- Not unaware of their rights and obligations during this process
- Do not know why the cadastral map is being made and should mark the boundaries of their property
- Mistrust the accuracy of boundaries of land properties in the CM and the data entered in the CR
- Many of them are convinced that surveyors deliberately reflect the boundaries in CM with errors to have a work
- All land registration, cadaster and land registry activities should be in one institution
- The issuance of real estate sketch should be done also by the municipalities

Suggestions given by I group

- All owners have declared consent upon a notice by the CM &CR
- To pay attention to the bodies with state and municipal property
- To provide for optimal deadlines for the CM elaboration
- Contractor must acquaint himself with all information in advance
- To use new technologies for cadastral maps elaboration
- To eliminate inconsistencies in the regulatory framework
- Regulation 3 (2005) to be updated and specified the rules for different boundaries
- To solve the problems with the different coordinate systems used in practice – CS 1930/1950/ 1970, BGS2005 and introduced by technical assignment “Cadastral Coordinate System 2005”
- Aligning the requirements for approval the CM by the Cadaster services in the district towns

Suggestions given by II group

- Specialized municipal administration to have a current copy of CM and CR and current regulatory plan
- Free of charge access and in real time to the CM of AGCC and CR of the Registry Agency
- Future changes in CM and CR for the municipalities properties to be free of charge
- GCC to assist the municipal experts with advices on spatial planning

Inferences from the survey (Ivanova, 2016)

- There are many discrepancies between property boundaries in CM and CR (MRP) and their actual position on the terrain
 - this leads to the errors in detailed Urban development plans.
- Issuing documents with false content (cadastral sketch);
 - as a consequence of issuing other documents with false content- notary deeds, partition agreements, mortgages, etc.
- Incorrect reflection in cadastral maps of linear objects;
 - AGCC to become an initiator for the CIS upgrade with specialized data.
- Errors in the properties boundaries in CM will have a negative impact on the creation of specialized maps of underground and over ground pipelines and the whole infrastructure.

Some recommendations

- Creating SD with high quality: **ones obtained – many usage**
- Observe the international standards (ISO, OGC, ICA, etc.)
- Using a standard approach to assessing SDQ
- Perform regular SDQ control
- Maintaining communication between the different actors involved in creating, managing, updating, using and sharing of SD, incl. through SDI geo-portals
- Validating data, metadata or services by common INSPIRE validator Ver. 1.0.0
- Using SDI Diagnostic Tool (Kelm et al. , 2017)

Conclusions

- According to SDQ in Bulgaria:
 - Geospatial databases developed in digital form are:
 - in most cases not subject to common rules
 - are not covered by uniform national information systems.
- The need for serious joint multidisciplinary efforts to:
 - evaluate available databases and their quality
 - harmonization of SD in accordance with national and European legislation
- According to establishing NSDI:
 - Policies, people, advanced technology, criteria, and standards
 - Need of a National strategy that reflects the interests of all parties, users and suppliers of geospatial data
 - Indicators to account the INSPIRE implementation



Thank you for your attention!

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