The Impact of GIS Implementation on Increasing Business Efficiency

Marko Maric
Vladimir Stojanovic

July 15, 2014
San Diego Convention Center
2014 ESRI International User Conference

GIS implementation – How to start it?

Company management dilemmas:

- Why should we invest in it?
- What will we get from it?
- When can we expect return on investment?

„How much money?“

The path to success:

- Recognize and quantify the benefits – express them in financial terms
- Do the math i.e. cost-benefit analysis (CBA)
- Give persuasive presentations, emphasize advantages and lobby

In this presentation:

- GIS implemented for real property management purposes
- Estimation/quantification of benefits
- Impact on business efficiency

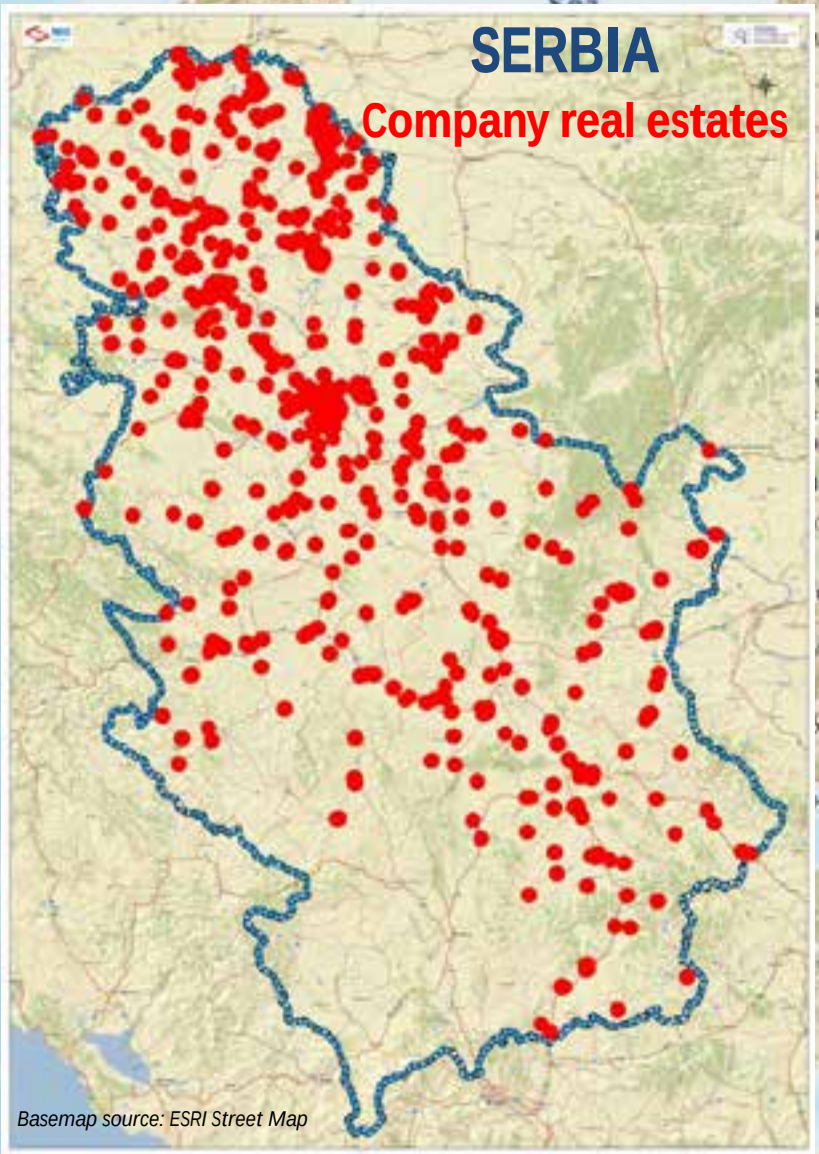
NIS (Petroleum Industry of Serbia)

One of the largest, vertically integrated energy companies in the South-East Europe

Its core business includes: oil and gas exploration, production, refining, sales and distribution of petroleum products, implementation of petrochemical and energy projects

Until 2009 - state owned company - since 2009 majority shareholder Russian oil company Gazprom neft

NIS (Petroleum Industry of Serbia)



Several thousands of diverse real estates across Serbia, Hungary, Romania, Bulgaria, Bosnia and Herzegovina

Basemap source: ESRI Street Map

Initial need for GIS application in NIS

- **Increased need for different types of data in one place for real property registration activities**
- **Asset management**
- **Recognized need of other company departments for enterprise GIS web application**

Initial status of real property data in the company *(2010)*

- Disorderly and unsystematic documentation throughout the Company departments
- Majority of documentation still in analog format
- No possibility of spatial search for data
- Duplicated documentation
- Nobody was responsible for data of common interest- time-consuming search for specific data

Primary activities that GIS was supposed to enable

- Registration of real property rights
- Property formation activities
- Spatial overview of company assets
- Real estate lease management
- Purchase and selling of real estates
- Project design support

2010	2011	2012	2013	2014
Recognized need for GIS	Application - v1.0 Data collection	Initial data input	Operational usage Application - v2.6	Upgrade & further development

The concept of GIS ODEON application

SYSTEM

ESRI ArcGIS Standard Enterprise
Custom intranet web app
Fully operated since January, 2013
Integrated with SAP, Lease database, internal database for retail (called Orfej)

GIS ODEON
Sve na svom mestu

PRINCIPLES

Based on the Serbian real estate cadastre
Hierarchy between classes
No data redundancy
Distributed responsibility for keeping data up-to-date across departments

DATA TYPES

Spatial data – *location on map*
Alphanumerical data – general, geodetic, legal, accounting, technical **(***Registered real property rights, assesed value of real estate, construction year)*
Scanned documentation – *(Building permissions)*

FEATURE CLASSES

- Business units
- Land parcels
- Buildings
- Appartments and offices
- Reservoirs
- Wells
- Pipelines
- Other objects

BASEMAPS
(vector & raster)

Esri basemap: Imagery, Street maps
Digital orthophoto (10-40cm)
Scanned topographic maps
Scanned cadastral plans
Survey plans (CAD)
Municipality borders
Cadastral municipality borders

Functionality of GIS ODEON application

Implementation of GIS

Application users

Application users	Real Property Management Department	Other departments within Company
Expected in 2011	30	20
June 1, 2014	**26**	**280**

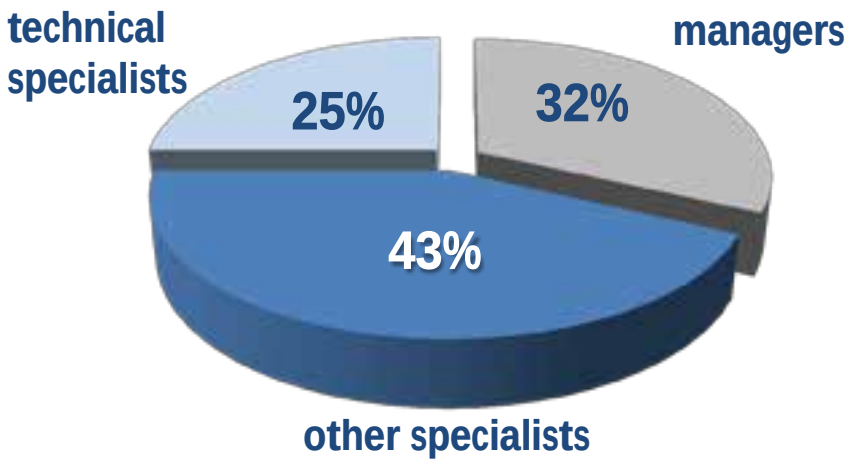
Average number of logins per day - **41**

Average number of active users per day – **31**

Number of logins in 2013 – **10,386**

Number of hours that users spent working with GIS application in 2013 – **7,688 h**

Types of GIS ODEON web application users within NIS



Recognizing benefits

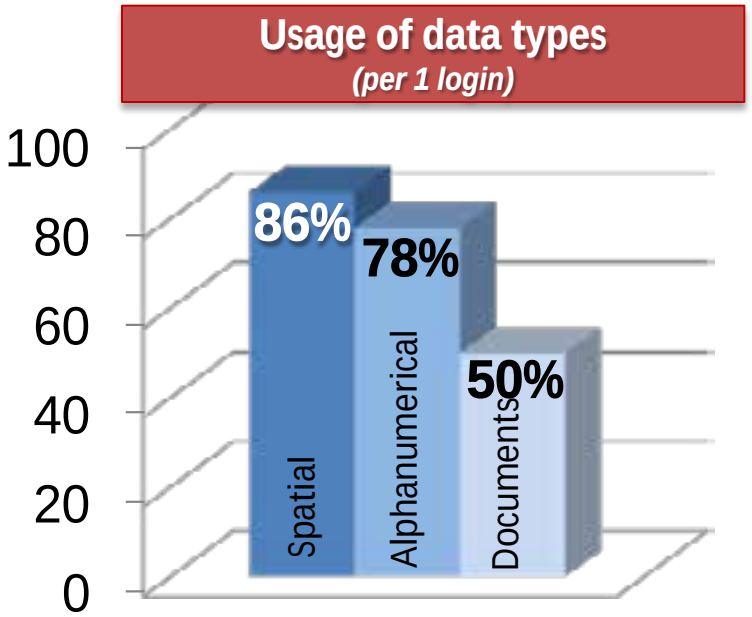
Potential types of GIS benefits

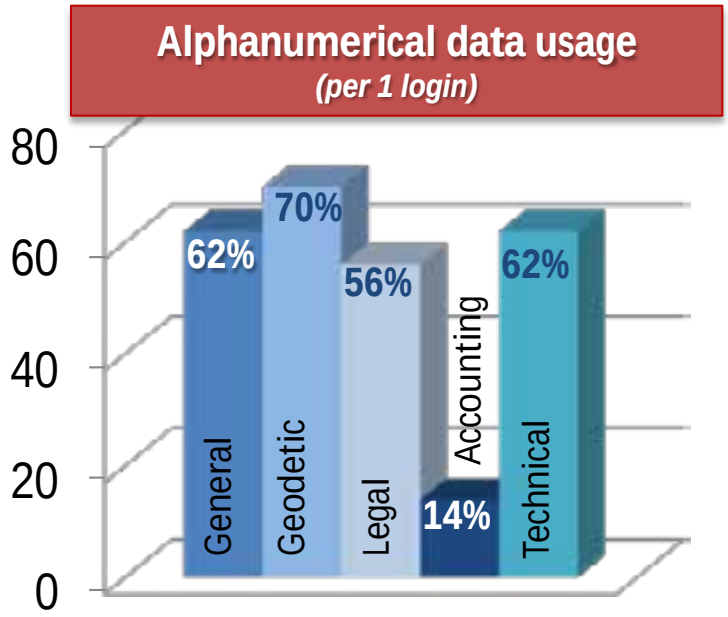
1. Reduction of working time needed for operations
2. Reduction of financial resources needed for business operations
3. Avoiding costly errors that might occur without GIS technology
4. Improved decision making process
5. Leveraging GIS technology to achieve completely new outputs
6. Enhanced quality and efficiency – increased profit

Estimating benefits - premises

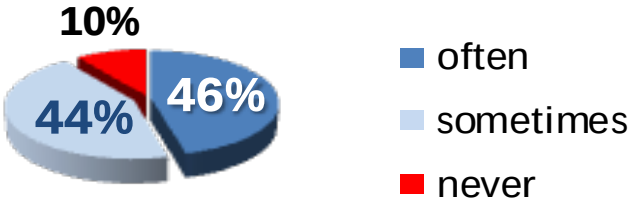
1. Estimating time & money needed for an alternative
2. Average costs for standard data
3. Data obtained from the questionnaire *(November 2013)*
4. One login – information for 1 entity
5. Intangible benefits – excluded from estimation
6. Value of one working hour - 5$/h *(for estimation purposes only)*

Questionnaire results *(November 2013)*

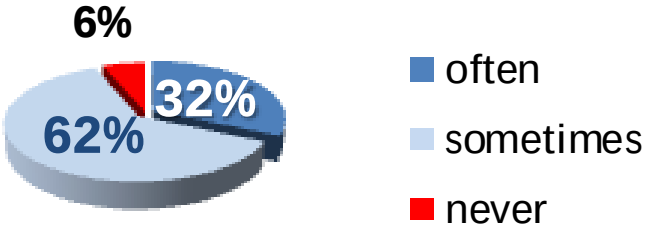




How often do you use functions for measuring length, area and coordinates?



How often do you use functions for graphical report creation?



Estimating benefits – savings in terms of time

Web application

Estimation = (***Aternative*** – ***GIS***) x ***Nº of logins per year*** x ***data usage coefficient**** x ***weight within data type*** x ***hour value***

* - *from the questionnaire results*

	activity	GIS time	Alternative time	Logins per year (2013)	Data usage coeff.	Weight within data type	Hours saved	Value of one hour	Money value of the saved time
spatial	Position of object within parcel	10s	1h	10386	0.86	0.2	1,786.39	5$	8,931.96$
	Distances and areas	20s	2h			0.4	7,145.57		35,727.84$
	Finding location by coordinates	20s	3h			0.05	1,339.79		6,698.97$
	Overview of pipeline route	20s	3h			0.05	1,339.79		6,698.97$
	Graphical report	30s	1h			0.3	2,679.59		13,397.94$
docs	Access to documentation	20s	1h	10386	0.5	1	5,193.00	5$	25,965.00$
								Total money value of the saved time:	***97,420.68$***

Estimating benefits – savings in terms of money

Web application

	Alternative – Price/value per one item	Number of logins in 2013	Reduction by usage	Savings	Reality reduction*	Real savings in money
Spatial information	The Official Copy of Cadastral plan - 10$	10386	0.86	89,319.60$	0.75	66,989.70
Alphanumerical information	Query for legal data in official state web application- 2$		0.78	16,202.16$		12,151.62
Documentation	Issue of document copy – 15$		0.50	77,895.00$		58,421.25
					Total savings in money (web app):	*137,562.57$*

** Reduction – it does not necessarily imply that the amount of information/documentation would have been purchased without GIS*

Desktop application

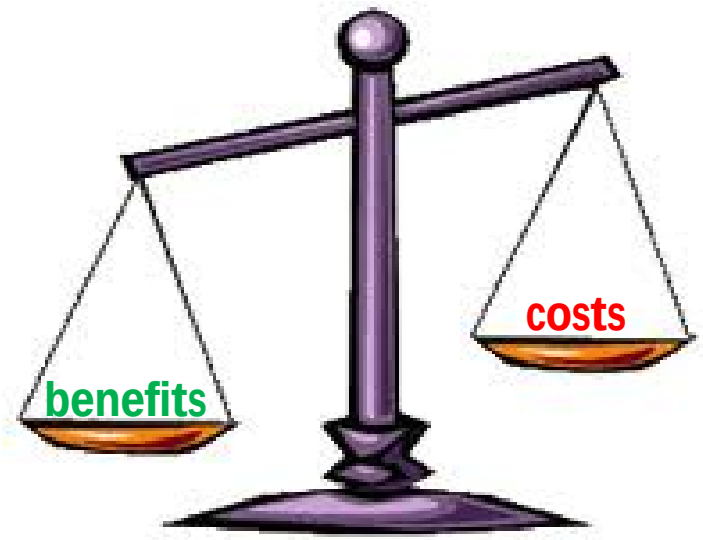
	Number of maps created in 2013	Estimated average price per one item	Savings in 2013
Maps	199	350$	*69,650.00$*

Total savings in money
207,212.57 $

Costs & Benefits

Costs	total costs for 3 years (2011-2013)
Software&hardware	<300,000.00$
Staff	
Data collection	

Benefits	savings for 1st year (2013)
Savings in time	304,633.25$
Savings in money	



	1st Q 2013	1st Q 2014	increase
Nº of logins	2510	2891	15%
Maps created	68	97	42%

Intangible benefits

Not included in benefits estimation

Spatial reference for every single real estate of the company combined with different basemaps	Avoided errors reffering to real estate location, relation between object and parcel (cadastral municipality) which used to cause delays and incur unnecessary costs
Fast access to different data types related to each real property	More effective (faster and easier) task solving in everyday real property management
Graphical reports with a possibility for users to draw and make markings on the map and share	More effective comunication between departments related to specific real estate
Spatial queries - including different data types	More effective decision making for optimization of resources – cutting operational costs
High accuracy of spatial data with tools which enable measurement of coords, length and area	Supporting tool for project design

Further development of GIS ODEON

GIS ODEON PRO application

GIS web application for :

- Fuel market price analysis
- Retail network development
- Both competitors' and NIS' gas stations

2013

Mobile Application for Android:

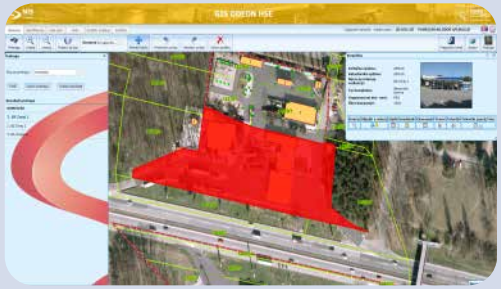
For efficient data collection from the field

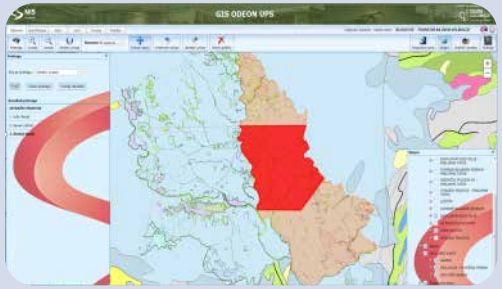
- Spatial – GPS location
- Alphanumerical atributes
- Photo from mobile device

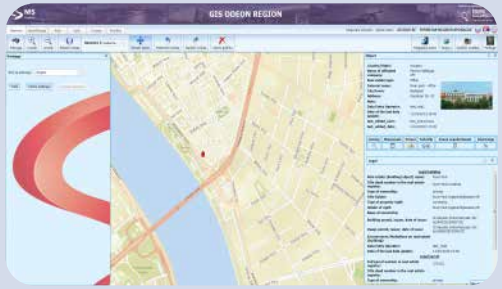
since March 2014

Further development of GIS ODEON

GIS ODEON for HSE, UPS, Assets in the region







GIS ODEON – HSE

Web application for HSE risk management

GIS ODEON – UPS

Web application for upstream

(Planned connection with SCADA system this year)

GIS ODEON – REGION

Web application for real property management outside Serbia

Conclusion

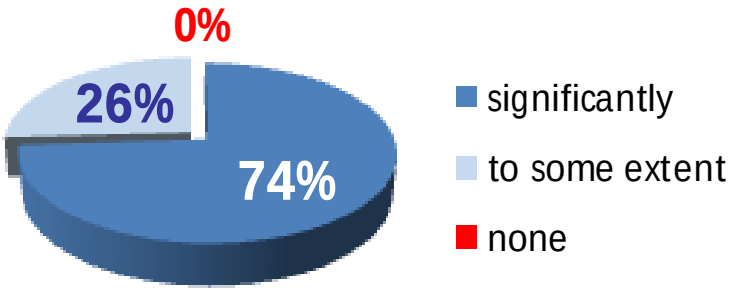
1. Time & money – scarce resources

2. Efficiency – lower amount of inputs produces a greater amount of outputs

3. Increased business efficiency with the implementation of GIS

4. Quantification of benefits enables measurement of efficiency – further investments in GIS

To what extent has GIS ODEON application increased your daily business efficiency?



THANK YOU FOR YOUR TIME!

marko.maric@nis.eu
vladimir.r.stojanovic@nis.eu