GISification of Business Processes for Greater Effectiveness

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The Importance of "WHERE"

GISification

Improving business processes by using GIS data and GIS functionalities

Bringing GIS to many different business stakeholders

GISification case – NIS (The Petroleum Industry of Serbia)

From a small web app used for data visualization on the map to

A system that integrates different processes in one place making them easier and more efficient

23 active users of GIS ODEON application in 2011

370 active users of GIS ODEON application in 2019
One of the largest, vertically integrated energy companies in Southeastern Europe and one of the most successful companies in Serbia

Immovable property of the Company includes over 25,000 assets - land parcels, buildings, production facilities, wells, pipelines, utilities, tanks, office space, apartments etc.

The Company operates and has real estate/assets in Serbia, Romania, Bulgaria, Hungary and Bosnia & Herzegovina.
GIS ODEON – Enterprise Web App for Real Property Management

2009

Shift in ownership (change of the majority shareholder) revealed that 99% of the company real estate didn’t have registered ownership rights in the official real estate registry (Real Estate Cadastre)

Department for real property management
Managing real property rights registration
Customized intranet web GIS application for registered users

Insight into the exact location of each real estate on the map
Insight into the actual cadastral status of each real estate
Insight into legal documentation (permits, official title deeds)

GIS ODEON
Unified Digital Registry of Immovable Assets

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Expected number of app users (2010)

50
25 – Department for real property management
25-30 others – Upstream, Downstream, Corporate Center

370
Current number of active app users

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Development of GIS ODEON App Functionalities

- **2010**: Idea and initiative for GIS
- **2011**: GIS ODEON web app created
- **2012 - 2019**: Development of new functionalities

Development of functionalities led to a wider usage of the app.

Wider usage of app opened up the possibility for its usage in other business processes.

App usage in other business processes lead to a need for new functionalities.
GIS ODEON – Structure

Web App – GIS ODEON
Full insight into the company’s real property + Editing alphanumerical DB / photos / scanned docs

GIS Servers

ArcMap & ArcGIS Pro
Creating and editing entities in the geodatabase

Geodatabase
Geometry – a set of attributes related to location
Exploitational status of assets
Photos and scanned documentation

Alphanumerical DB
Geodetic data
Cadastral data
Accounting data
Legal data
Technical data
...

ArcGIS Server
GIS Portal
ArcGIS Server
GIS ODEON
DB Server
Geodatabase
GIS ODEON – Key Improvements – Advanced Query Builder

2018 – Advanced Query Builder Module

The Game Changer

A large amount of data needed for everyday business processes was stored in the alphanumerical DB

Enabled easy creating of a whole list of assets that fulfill the requested criteria

Useful tool that dramatically increases efficiency

For combining different types of data from both databases – SQL literacy was needed + knowing the structure of the databases

No SQL literacy needed

No knowledge of DB structure needed

New possibilities for using GIS data (new business processes involved)

4 steps module:

1. Choose the feature class/es

2. Define the query criteria

3. Choose the output attributes

4. Execute – get the output

Output:

Excel table

Map

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GIS ODEON – Key Improvements – Thematic Views

Current legal status of real estates – type of registered rights (ownership, right of use, lease, without registered rights)

Current exploitational status of real estates/facilities – (in use, conservated, leased to 3rd party, out of use)

Assets with different types of corrective measures – defined in audit (legal, exploitational, accounting)

Current status of implementation of corrective measures on assets (not started yet, in progress, finished)

- Planning of geological activities
- Pipeline maintenance
- Map making for reporting to the Ministry of Mining
- Managing fieldwork by mobile devices
- New construction planning
- Tax filing
- Managing Leases
- Advertising property for lease and sale
- Issuing work orders for appraisal
- Real property expert analyses
- Internal real estate audit
- Land surveying management and monitoring
- Managing real property & utility rights registration
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GISification of Business Processes – Real Property Management

Efficient Analysis for decision making – using GIS tools for combining different data types for different purposes

Spatial relations/intersections
List of geographically connected assets + visualization on map
Example: company assets affected by new urban development plans

Advanced query builder
Results can be shown as a list with attributes and/or marked places on map
Example: Land parcels in a particular municipality that are out of use, with area larger than 5000m², with registered ownership rights in the name of the company

Thematic views
Easy identification of “hot spots”
Example: Unused assets with registered ownership rights these assets can be sold or leased

Ability to efficiently do things that could not be done without GIS tools
GISification of Business Processes – Land Surveying Management

Managing land surveying for:

- Property formations - parcel subdivisions/reallotments *(before new constructions)*
- Surveying for mapping newly constructed buildings, pipelines, facilities
- Surveying for the removal of demolished buildings from cadastral records

Efficient land surveying management using GIS ODEON app

- Online assignment of tasks/work orders for land surveying *(where, what asset, what kind of activity)* – effective communication
- Land surveying information is affixed to each related asset in GIS ODEON app
- Easy access and overview of current status of all ongoing tasks
- Overview of financial costs of surveys – budget management

Effective communication within company – time saving
GISification of Business Processes – Reporting on the legal status of an asset

Supporting tool for legal analysis and report creation

- Analysis of current legal status for a particular asset – registered rights in official real estate registry, permits, contracts related to asset etc.
- Mandatory reports during construction planning
- Eliminating legal risks before starting the construction

Enabled analysis (for each asset) of:

- Spatial relations (complex → parcel → building → part of the building/office; apartment)
- Legal status of real estate (ownership rights)
- Current exploitational and accounting status
- Current and planned activities related to the change of legal, exploitational and accounting status

Real estate asset “passport” – generated in GIS ODEON app

- Automatically generated document for printing or sending via e-mail
- Contains legal, accounting, exploitational, lease and general data + automatically generated visualization of asset on the map
- Enables experts to get the full picture of a particular real estate for analysis and report writing purposes

Time savings – over 450 hours per year/2 working months for having all of the necessary information in one document
GISification of Business Processes – Lease Management

Unused company real estate – to be leased or sold

Complete management of leased assets through GIS ODEON

- Data related to contracts (lease amount, period of lease, type of lease, other details)
- Data related to appraisals – before leasing
- Scanned contracts and supporting documentation

Thematic view on map:
- What is for lease
- What is already leased

E-mail notification of expiring lease contract

E-mail warning to a responsible employee for the expiring lease contract

Alerts:
30 days, 15 days, 1 day before lease contract termination

Predefined queries for the list of active leases

Reports in .xlsx format directly from database for further analysis and reporting
(enabled by advanced query builder)

Automatic building of work order for appraisal through GIS ODEON

- Automation of a process and standardized output

Time savings – over 900 hours per year/5 working months
for automation of the process
GISification of Business Processes – Real Estate Audit

Process of real estate audit

- Analysis of each real estate asset and its current status from three perspectives (accounting, legal and exploitational)
- Each year – 6-8 months
- Goal: effective usage of company real estate

GIS ODEON Survey

*Customized mobile GIS app for data collection in the field*

**Data collection in the field:**
- Location check for the asset (does it still exist in the field?)
- Current exploitational status of the asset (is it in use, conserved, rented to 3rd parties, temporarily out of use, ...?)
- State of asset – in good condition, in bad condition, reparation needed, ...
- Photograph of asset

Connected to GIS ODEON database – enabled online data acquisition and editing in the field

When creating a new entry in the field, depending on the position of mobile device, the app recognizes the parcel where the operator stands and automatically records it in the attribute for parcel number.

Keeping track of audit progress through the web app

- Predefined queries in web app for reporting on audit progress (acquired data, date of acquisition, operator, ...)

Monitoring the implementation of corrective measures

- Easy editing of the current status of implementation of corrective measures to assets
- Current status of implementation of corrective measures to assets
- Assets with different types of corrective measures

Management of real estate audit process

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# GISification – Real Estate Audit (Efficiency improvement)

## Financial savings

By using the mobile app “GIS ODEON Survey” instead of “pen&paper”

<table>
<thead>
<tr>
<th>Activity</th>
<th>How are the savings achieved</th>
<th>Average annual savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undeveloped parcel - identification on the spot</td>
<td>A user can see the shape of each parcel on the map and his/her current position in the mobile app – alternatively, an external land surveyor would have to be hired.</td>
<td>$5,300</td>
</tr>
<tr>
<td>Savings for transportation</td>
<td>Efficient work means more surveyed entities per day – less time spent driving back and forth – fuel savings</td>
<td>$7,272</td>
</tr>
<tr>
<td>Saved working hours for survey</td>
<td>Efficient work means completing the job earlier – savings for engaging work force</td>
<td>$45,448</td>
</tr>
</tbody>
</table>

**Total:** $58,000

## Time savings

### Data check and preparation for real estate audit

<table>
<thead>
<tr>
<th>Activity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average time needed for checking and preparation of data for 1 asset in the list of assets for real estate audit</td>
<td>10min</td>
</tr>
<tr>
<td>Average number of assets in a real estate audit</td>
<td>5750</td>
</tr>
<tr>
<td>Time needed for checking and preparation of data for all assets in the list of assets for a real estate audit</td>
<td>958h</td>
</tr>
<tr>
<td>Total time needed with GIS ODEON App by using predefined queries per audit</td>
<td>40h</td>
</tr>
</tbody>
</table>

**Total saved time per year:** 918h, **over 5 working months**

### Mobile app GIS ODEON Survey – real estate audit

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<tr>
<td>Average number of surveyed entities per day without the mobile app – “pen &amp;paper”</td>
<td>42</td>
</tr>
<tr>
<td>Average number of surveyed entities per day using GIS ODEON Survey mobile app</td>
<td>85</td>
</tr>
<tr>
<td>Average annual number of assets/items per audit:</td>
<td>5750</td>
</tr>
<tr>
<td>Average time needed for collecting data per audit with / without the mobile app:</td>
<td>541h/1095h</td>
</tr>
</tbody>
</table>

**Total saved time per year:** 554h, **over 3 working months**
GISification of Business Processes – Managing New Construction Planning

Projected positions of new facilities

Temporary lease of land for well reparation / overhaul

Urban planning zones and affected company real estate

App enables a quick insight into:

• Legal status – ownership rights
• Position in relation to surrounding areas
• Distances and areas

Easy identification of temporarily leased piece of parcel in the field by Mobile app GIS ODEON UPS

By spatial intersecting, a user can get a quick insight into affected assets on map or in an Excel table
GISification of Business Processes – Map Making

Geological Maps for Project Designing

Creating maps of exploitational fields for reporting to the Ministry of Mining

Fuel Station Maps for further development of network

Geological data can be combined with the GIS ODEON data for efficient planning of field activities

ArcMap / ArcGIS Pro

Over 150 maps per year
GISification of Business Processes – New Directions (ongoing projects)

**Pipeline maintenance management**

- Technical data related to pipelines (diameter, material, date of construction, last reconstruction date, responsible maintenance operator etc.) and special feature classes for pipeline maintenance
- Locations of perforations with related attributes – for pipeline maintenance and risk assessment

**Tax Filing Support**

- GIS data of company real estates are used for tax filing
- Data related to taxes can be visualized on map and are available to GIS ODEON users.
- Increased efficiency of the company Tax Department, with time savings and readily updated information from GIS ODEON

**Web services of GIS ODEON for other business applications – usage of spatial data (asset locations) for increasing operational efficiency**

Ongoing projects for increasing operational efficiency where GIS ODEON data is used:

- Fleet Management
- Mobile Operator
- Maximo - Asset Management
- SCADA
GIS ODEON – Portal (Active since 2019)

Dashboard for current state of real estate audit

- Quick insight into progress of fieldwork related to real estate audit:
  - Currently active operators in the field
  - Number of surveyed assets per day
  - Total number of surveyed assets
  - Percentage of surveyed assets out of the total number of assets included in audit

Internal story map of real estates for lease or sale

- Web app made through Web app builder on the Portal:
  - Quick overview of Company real estate currently for sale or lease
  - For advertising purposes
  - The plan is to make it open for the public (outside of the Company) in the future
Development of functionalities resulted in a wider usage of the app

Increase in the number of active users of application

Time spent by users working with the app in 2018: 5178 h

Increase in the number of average monthly logins

Average number of logins per day in 2019: 97

User Management Application

- For efficient management of given roles, user rights and statistics related to the usage of the app
- Information needed for advocating GIS benefits and further development
Looking into the future

What’s next?

- Implementing current ongoing projects
- Improving data quality
- Improving GIS skills of users
- Keeping the course – focus on business needs
- Keeping pace with new developments in GIS technology

Engine – GIS software

Fuel – GIS data

Captain – GIS experts
The way to achieving success with GISification

<table>
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<th>Challenges</th>
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<td>✔️ Involvement of potential stakeholders (non-GIS people) in GIS development/adaptation to their needs</td>
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<tr>
<td>✔️ Understanding different business processes and finding the optimal solution for them</td>
</tr>
<tr>
<td>✔️ Reacting to changes during the process of development and implementation</td>
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<tr>
<td>✔️ Support “from above“ – a strong sponsor aware of all benefits that GIS can bring</td>
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<tr>
<td>✔️ Quantifying and advocating benefits of GISification to the senior management (non-GIS people)</td>
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Conclusion – Keeping GISification on its course

GISification path

Development of app functionalities according to users needs
Identifying what could be “spatial” in different workflows
Determining what could be simplified in workflows
Adapting GIS to work processes

Don’t forget to

- Keep building your GIS team
- Stay focused on user goals/give them a vision - “How could GIS improve your business process?”
- “Bring GIS to users, not users to GIS” (adapt GIS to the existing workflows, rather than adapting workflows to GIS)
THANK YOU FOR YOUR ATTENTION!