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Sustainable Mobility in Malta  
**Transport Research in Practice**  
SmartCity Malta, Ricasoli - 30<sup>th</sup> November 2012

## **Session I: Transport and Technology**

# **Road Transport Information Sharing: Stakeholders' network analysis**

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1. Sustainable mobility
2. Road transport information sharing
3. Stakeholders' network analysis
4. Implications

# 1. Sustainable Mobility

# Road Transport Information Sharing – Stakeholders’ network analysis

## 1. Sustainable Mobility

## 2. Road transport information sharing

## 3. Stakeholders’ network analysis

## 4. Implications

Departing from the definition by the **World Business Council for Sustainable Development** as part of that organization’s *Mobility Project 2030*:

...mobility that meets the needs of society to **move freely, gain access, communicate**, trade and **establish relationships** without sacrificing other essential human or ecological requirements today or in the future;

**Rory Williams** expands the definition of **sustainable mobility** by establishing a set of principles that provide a framework for policy goals:

1. **Preserve the natural environment**
2. **Maintain human health and safety**
3. **Meet the travel needs of the population**
4. **Support a good economy**
5. **Minimize transport costs for access and mobility**
6. **Minimize infrastructure costs**
7. **Maintain energy security**
8. **Ensure long-term viability of the transport system**

# Road Transport Information Sharing – Stakeholders' network analysis

## 1. Sustainable Mobility

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The **availability, accessibility, proper use** and **dissemination** of road transport information:

- addresses congestion
- **improves the quality of travel and transport safety**
- reduces road transport effects on the environment
- **facilitates traveller information**



# Road Transport Information Sharing – Stakeholders’ network analysis

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## 1. Sustainable Mobility

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**Resource efficiency:** using the earth’s limited resources in an efficient manner

**Information sharing** in the field of road transport is all about **RESOURCE EFFICIENCY**

*Valid, comprehensive, and timely information is an important **resource** for planning, implementing, managing, and maintaining an increasingly multi-modal transportation system, its operation, and its interrelationships with the economy, our society, and the environment (Schofer et al., 2006)*

# Road Transport Information Sharing – Stakeholders’ network analysis

## 1. Sustainable Mobility

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The lack of quality road transport information or the dispersal of incomplete and outdated information hinders:

- the planner
- the network manager
- the public in general
- the researcher

**Transport decisions** need to be taken with a sound basis of quality information.



## 2. Road transport information sharing



# Road Transport Information Sharing – Stakeholders' network analysis

1. Sustainable Mobility

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Solutions to current transport problems can only be found through close **cooperation** between:

- neighbouring localities
- administrations
- authorities
- political bodies
- interest groups
- private sector
- citizens

leading to the development of solutions through the constant involvement of all stakeholders

Sharing of information needs to occur on various levels:

- Local
- Regional
- National
- International



# Road Transport Information Sharing – Stakeholders’ network analysis

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**Quality** information, made **accessible** to all potential users serves the basis for proper:

- Traffic management, control and forecasts
- Incident management
- Asset management
- Transport planning and modelling
- Land use planning
- Traffic impact statements, feasibility studies and environmental impact assessments

**Multidisciplinary** approach involving:

- Civil engineers
- Transport planners
- Geographers
- Information Technology experts
- Administrators



## 3. Stakeholders' network analysis



# Road Transport Information Sharing – Stakeholders’ network analysis

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## Research methodology

- PhD research project – between UoM and University of Siegen
- First Case Study: **Administration of the City of Siegen**
- Second Case Study: **Straßen.NRW** - road construction state enterprise in the region of North Rhine-Westphalia



# Road Transport Information Sharing – Stakeholders’ network analysis

**Social network analysis** provides the vocabulary and quantitative analysis of network patterns.

This research puts emphasis on **INTERACTONS** based on **FLOWS OF INFORMATION** between **INDIVIDUALS** working within organisations.

The stakeholders were identified and the **links** established by carrying out a combination of **interviews** and distribution of **questionnaires** to the identified stakeholders. The main stakeholders were the starting points for the **“discovery”** of the actual networks.

The data collected was analysed and visualised using **Pajek** – A program for large network analysis.



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# Road Transport Information Sharing – Stakeholders’ network analysis

## First Case Study: Administration of the City of Siegen



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# Road Transport Information Sharing – Stakeholders’ network analysis

The city of Siegen is a university town and has a population of 103,370 (Destatis ,2011)

## Department 7/1 Roads and Traffic

The Head of Department 7/1 was the main point of contact for carrying out the SNA exercise. **35 employees** work within three main sections in this Department:

- Roads (including maintenance),
- Traffic (including a co-ordination team)
- Road traffic authorities

The administration of the city of Siegen uses the software **VIA VIS Siegen**, a **CAOS** (Computersoftware für Anwendungs-Orientierte Systeme GmbH, Karlsruhe) developed software for the **monitoring** and **maintenance** of the **public road network in Siegen**.

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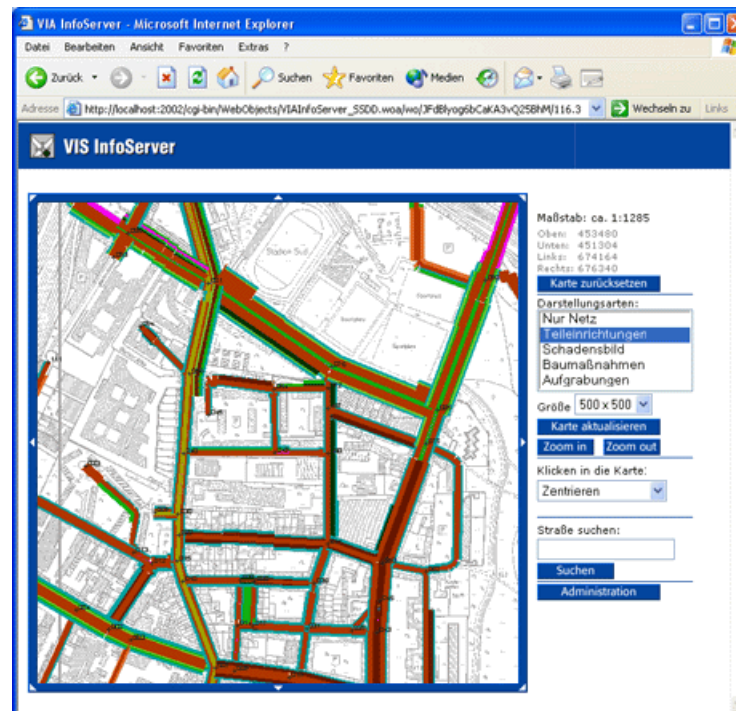
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# Road Transport Information Sharing – Stakeholders' network analysis

## VIA VIS Siegen

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# Road Transport Information Sharing – Stakeholders’ network analysis

## The Questionnaire

Each participant was asked to indicate **up to 10 people, within or outside of their organisation**, with whom he/she shares road transport related information, which is **important for his/her work**.

Participants were also asked about the **frequency** and **formality** of information exchange.

Study initiated with **9 identified participants** which led to **12 overall respondents**

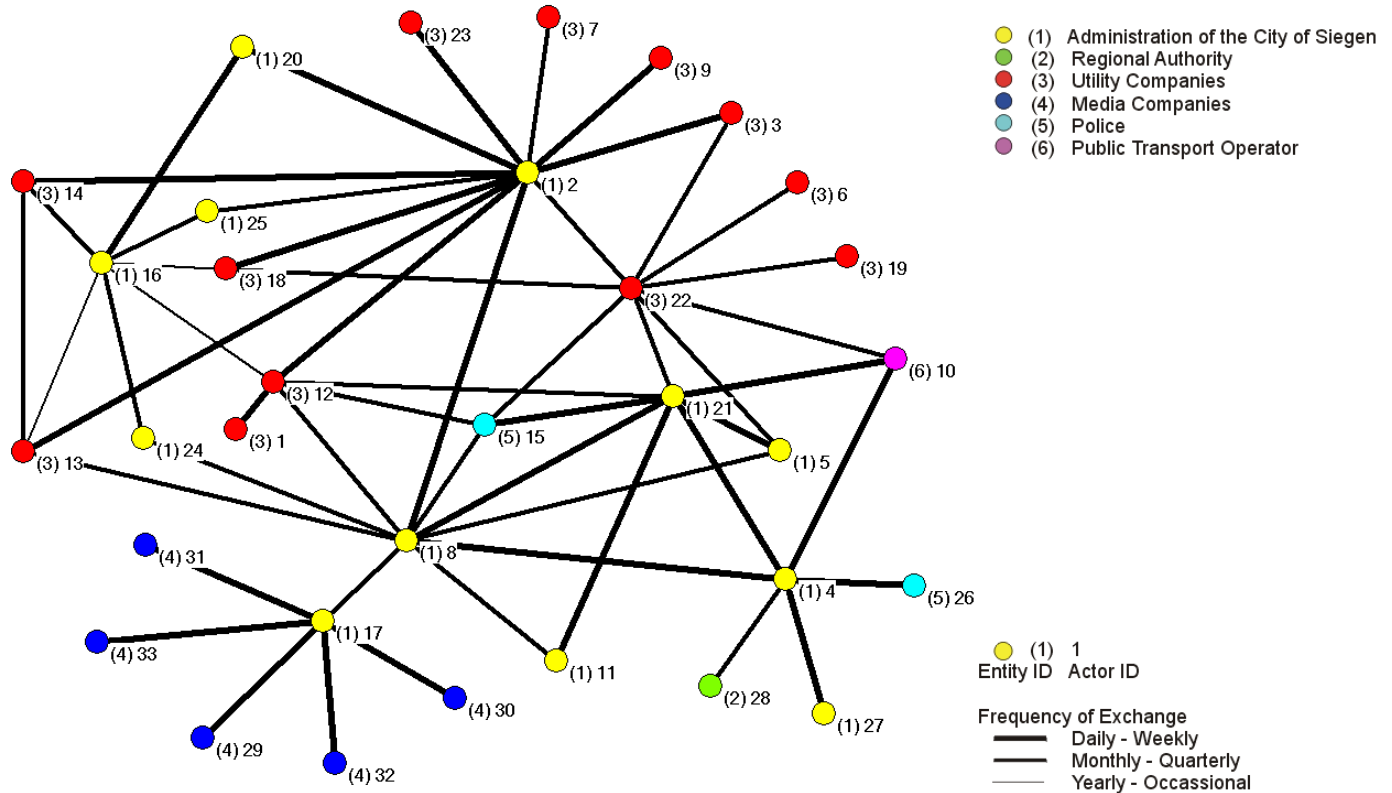
A network of **33 stakeholders (nodes)** was discovered with **61 instances of information exchange (links)**

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# Road Transport Information Sharing – Stakeholders’ network analysis

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## The Stakeholders’ Network



# Road Transport Information Sharing – Stakeholders’ network analysis

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Entities from which the identified actors originate

Entity ID No.	Entity Description	Number of Actors	%
1	Administration of the City of Siegen	12	36.4%
2	Regional Authority	1	3.0%
3	Utility Companies	12	36.4%
4	Media Companies	5	15.2%
5	Police	2	6.1%
6	Public Transport Operator	1	3.0%

# Road Transport Information Sharing – Stakeholders’ network analysis

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Frequency of information exchange within the stakeholders network of the Administration of the City of Siegen

Frequency of exchange	Instances of Exchange	Occurrence Percentage
Daily	7	11.5%
Weekly	21	34.4%
Monthly	28	45.9%
Quarterly	1	1.6%
Yearly	1	1.6%
Occasionally	3	4.9%
Total	61	

# Road Transport Information Sharing – Stakeholders’ network analysis

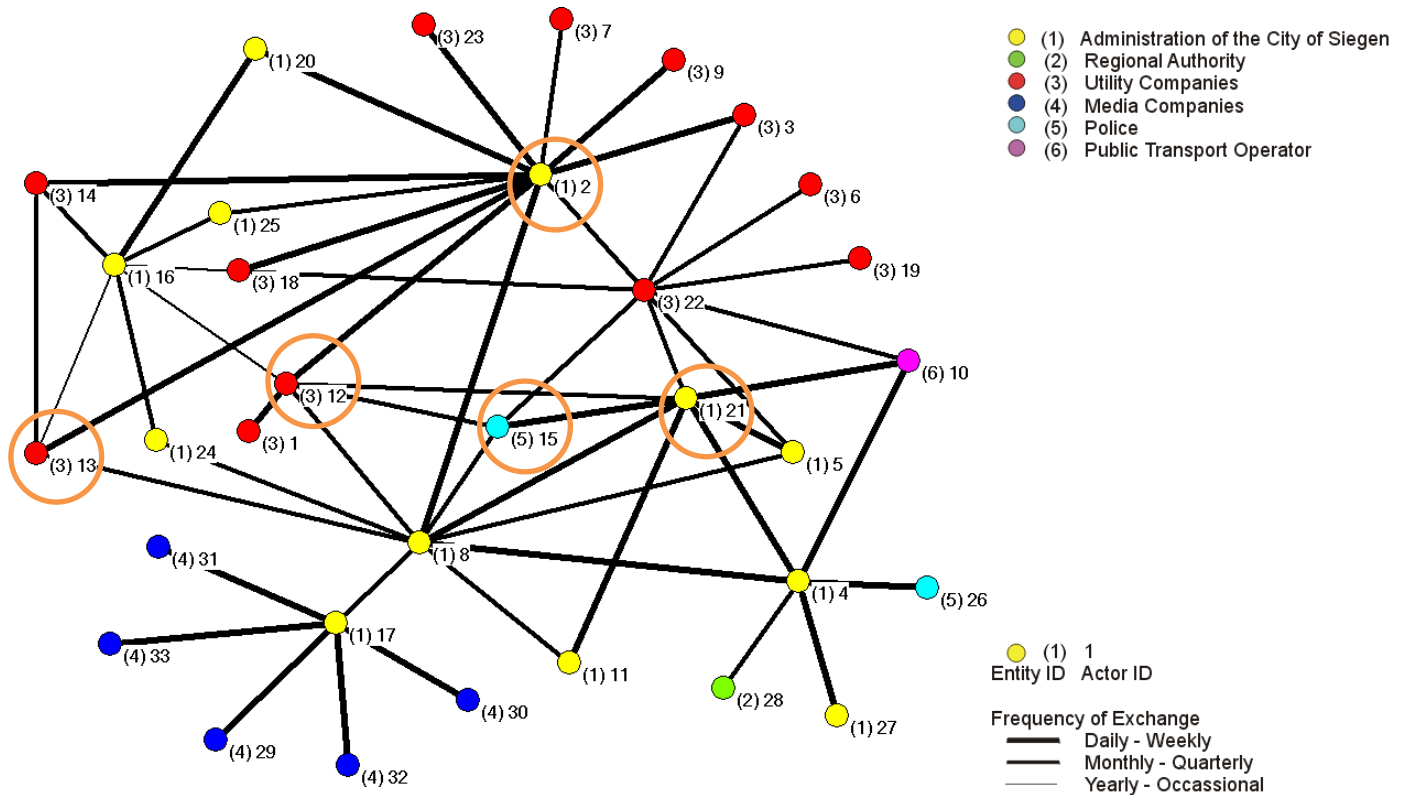
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Table 4.4 Measures of Centrality for the actors within the stakeholders network of the Administration of the City of Siegen

Actor ID No.	Entity ID No.	Betweenness (Control)	Closeness (Ease of access)	In degree (Popularity)
2	1	0.066	0.189	0.156
21	1	0.038	0.196	0.125
12	3	0.033	0.154	0.094
4	1	0.031	0.152	0.094
22	3	0.027	0.100	0.031
18	3	0.023	0.154	0.094
8	1	0.022	0.061	0.031
16	1	0.017	0.106	0.063
17	1	0.010	0.061	0.031
10	6	0.008	0.152	0.094
14	3	0.007	0.141	0.063
15	5	0.000	0.200	0.125
13	3	0.000	0.182	0.125
5	1	0.000	0.167	0.094

# Road Transport Information Sharing – Stakeholders' network analysis

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# Road Transport Information Sharing – Stakeholders’ network analysis

Nordrhein-Westfalen (NRW) is the most populated state in Germany, with a population of **17.84 Million** (De Statist, 2011).

**29,582kms** (Statistik-Portal, 2012) of the 230,800kms of the German **inter-urban roads** are found in NRW.

## Straßen. NRW

Straßen.NRW is responsible for:

- 2,207 kilometres of highways (Autobahnen)
- 4,767 kilometres of federal roads (Bundesstraßen)
- 12,837 Kilometres of state roads (Landesstraßen)
- Around 13,000 structures (bridges, tunnels and traffic sign gantries)
- 1,000 kilometres of district roads (Kreisstraßen) (Straßen.NRW, 2012)

Districts, cities and municipalities are responsible for the remaining roads in NRW.

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# Road Transport Information Sharing – Stakeholders' network analysis

Straßen.NRW is made up of:

-Headquarters in Gelsenkirchen

-Four specialist centres in seven locations

- Ten establishments in 17 locations:

of which eight regional establishments focusing on roads  
and two establishments focusing on highways

- Eighty five road and highway maintenance authorities:  
of which 56 road authorities  
and 29 highway authorities

Around **6000 people** are employed by Straßen.NRW



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# Road Transport Information Sharing – Stakeholders’ network analysis

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The SNA was carried out in one of the specialist centres:

**Fachcenter Vermessung/Straßeninformationssysteme (FCVS)**

The team leader of the **NWSIB** team was the main point of contact for carrying out the SNA. The information system - Straßeninformationsbank Nordrhein-Westfalen (NWSIB) is in use in the region of NRW. NWSIB was developed by **GIS Consult GmbH** and covers all highways, parts from national, regional and district roads, but does not cover local roads in NRW.

There are currently 7 employees in FCVS working on NWSIB network. Actual data collection is decentralised with around 35 people involved. Around **4,000 people** from different departments have access to NWSIB over intranet. Different access modes are given according to needs. On the internet only general data is provided. Sensitive data like land ownership is restricted to certain users.

# Road Transport Information Sharing – Stakeholders’ network analysis

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## NWSIB



## The Questionnaire

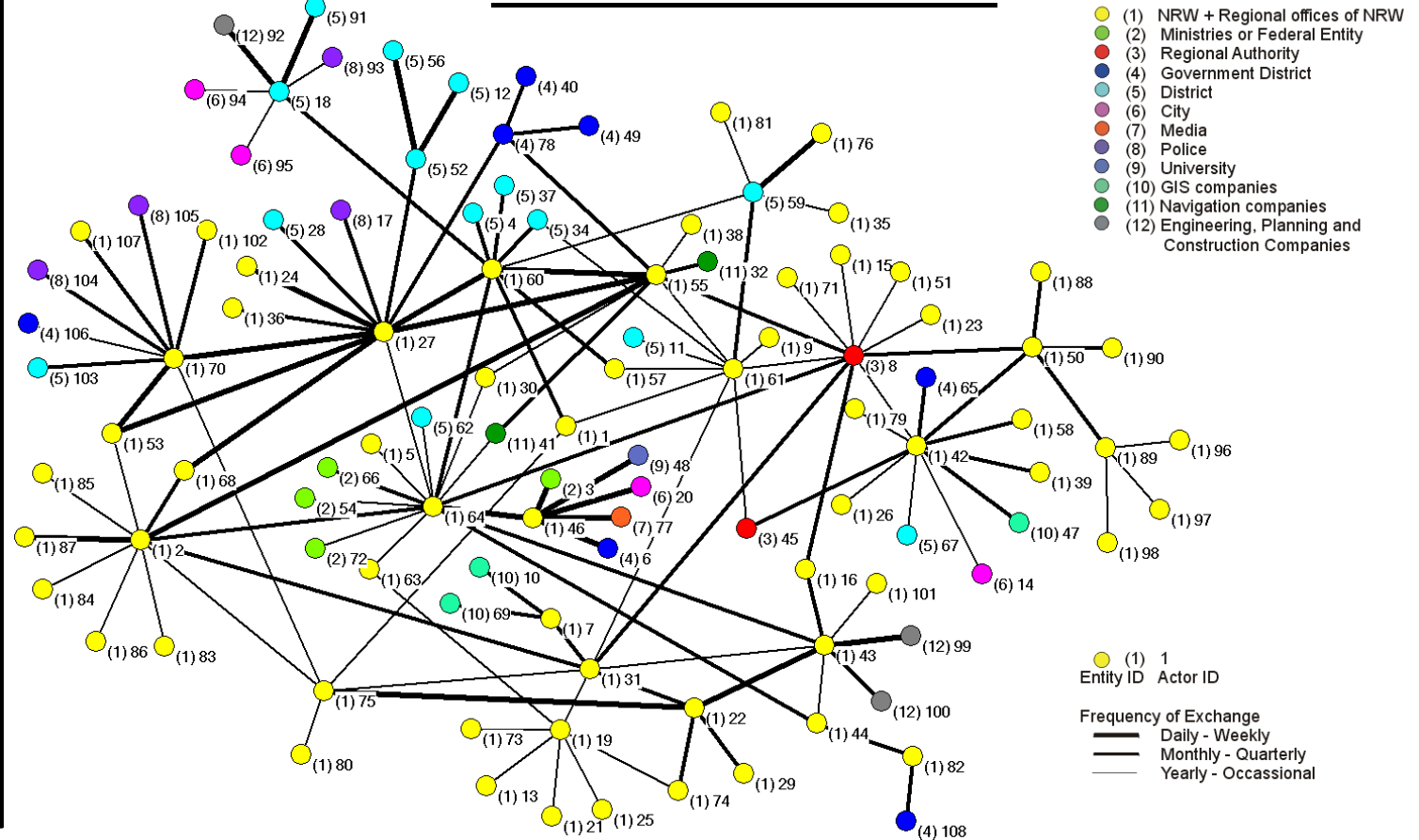
Study initiated with **12 identified participants** which led to **24 overall respondents**

A network of **108 stakeholders (nodes)** was discovered with **145 instances of information exchange (links)**

# Road Transport Information Sharing – Stakeholders’ network analysis

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## The Stakeholders’ Network



# Road Transport Information Sharing – Stakeholders’ network analysis

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Entities from which the identified actors originate

Entity ID No.	Entity Description	Number of actors	%
1	NRW + Regional offices of NRW	62	57.41%
2	Ministries or Federal Entity	4	3.70%
3	Regional Authority	2	1.85%
4	Governmental Districts	8	7.41%
5	Districts	14	12.96%
6	Cities	4	3.70%
7	Media	1	0.93%
8	Police	4	3.70%
9	University	1	0.93%
10	GIS companies	3	2.78%
11	Navigation companies	2	1.85%
12	Engineering, Planning and Construction Companies	3	2.78%

# Road Transport Information Sharing – Stakeholders’ network analysis

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Frequency of information exchange within the stakeholders network of Straßen.NRW

Frequency of exchange	Instances of Exchange	Occurrence Percentage
Daily	12	8.3%
Weekly	12	8.3%
Monthly	30	20.7%
Quarterly	29	20.0%
Yearly	16	11.0%
Occasionally	46	31.7%
Total	145	

# Road Transport Information Sharing – Stakeholders’ network analysis

Measures of Centrality for the actors within the stakeholders network of Straßen.NRW

Actors	Entities*	Betweenness	Closeness	In degree
ID No.	ID No.	(Control)	(Ease of access)	(Popularity)
64	1	0.049	0.095	0.056
27	1	0.042	0.081	0.037
60	1	0.033	0.078	0.037
8	3	0.026	0.035	0.019
50	1	0.019	0.039	0.028
55	1	0.019	0.090	0.047
70	1	0.013	0.062	0.019
44	1	0.012	0.065	0.009
42	1	0.010	0.039	0.028
18	5	0.009	0.060	0.009
43	1	0.009	0.052	0.019
78	4	0.006	0.064	0.009
2	1	0.005	0.019	0.009
52	5	0.004	0.058	0.009
75	1	0.003	0.019	0.009
61	1	0.003	0.019	0.009
82	1	0.002	0.053	0.009
89	1	0.002	0.026	0.009
59	5	0.001	0.019	0.009
31	1	0.000	0.075	0.075

1. Sustainable Mobility

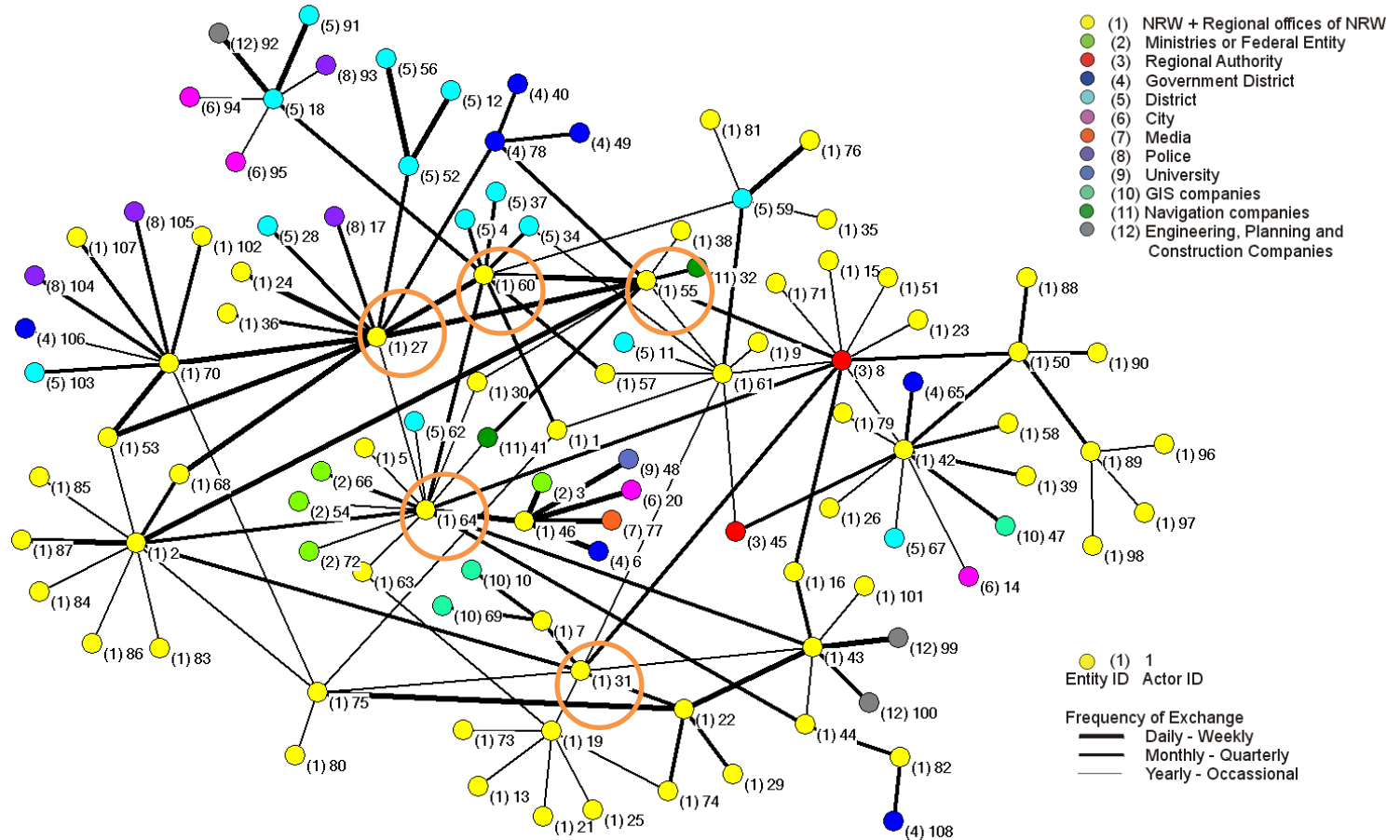
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# Road Transport Information Sharing – Stakeholders' network analysis

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## **4. Implications**

# Road Transport Information Sharing – Stakeholders’ network analysis

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The two case studies highlight differences on what occurs on a: **LOCAL** vs. **REGIONAL** level

The local scenario involves a **relatively small set-up**, where information is shared with more **external stakeholders** **Versus** The regional scenario, which involves quite **an extensive set-up** and where information is shared more between **internal stakeholders**.

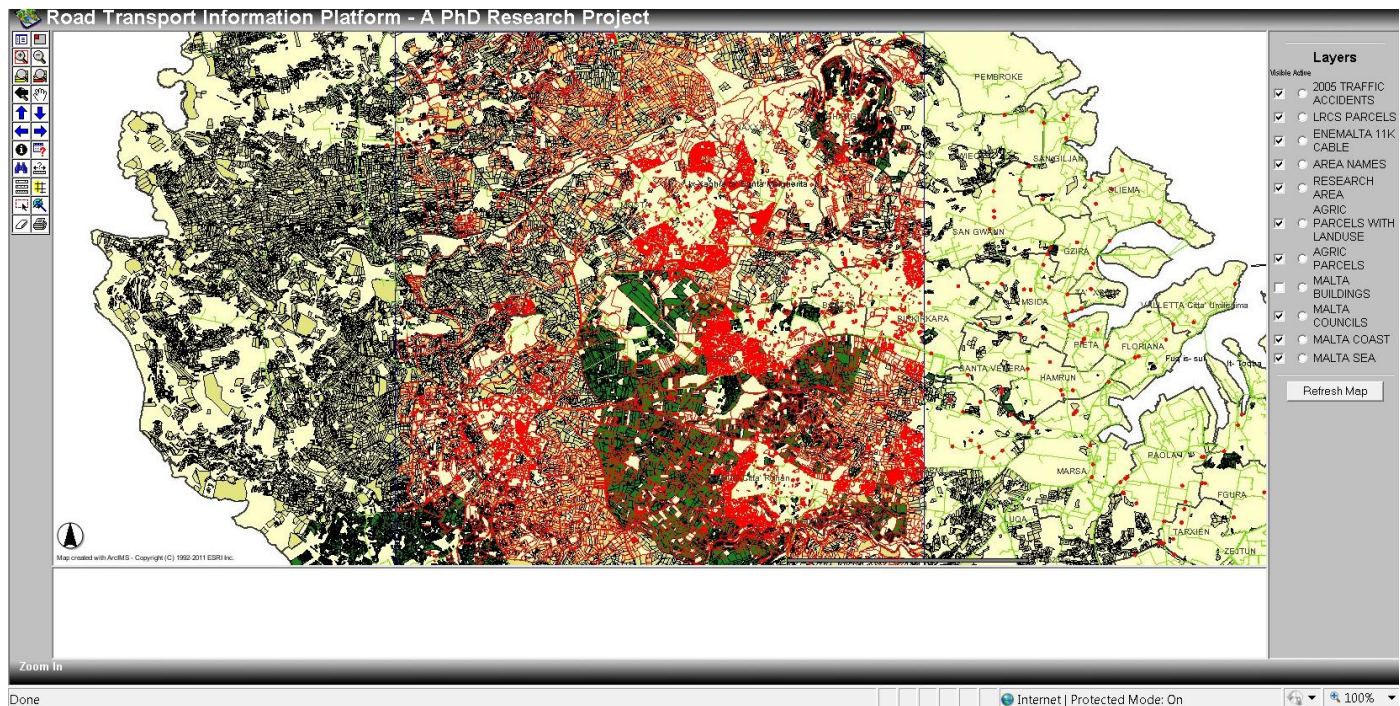
In the local scenario the **central actors** originate from **both within and outside** the Administration of the city of Siegen **Versus** The regional scenario, where the **central actors** originate **within** Straßen.NRW.

In the local scenario information is shared more due to **asset management reasons** **Versus** The sharing of **more strategic information** on a regional level.

# Road Transport Information Sharing – Stakeholders’ network analysis

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**PREVIOUS RESEARCH** included the development of a prototype road transport information platform for Malta, where data from various stakeholders was presented on one platform. This platform was also evaluated by a number of stakeholders working in this field.

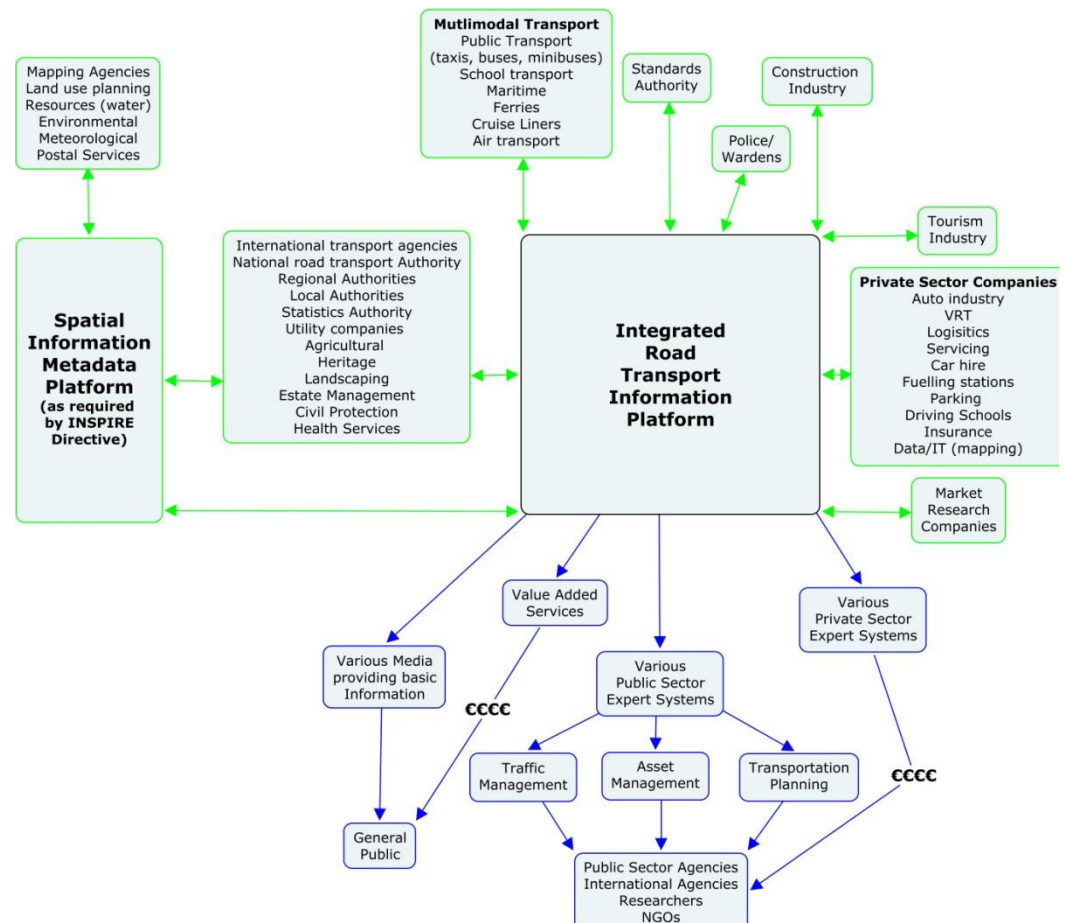


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## FUTURE RESEARCH

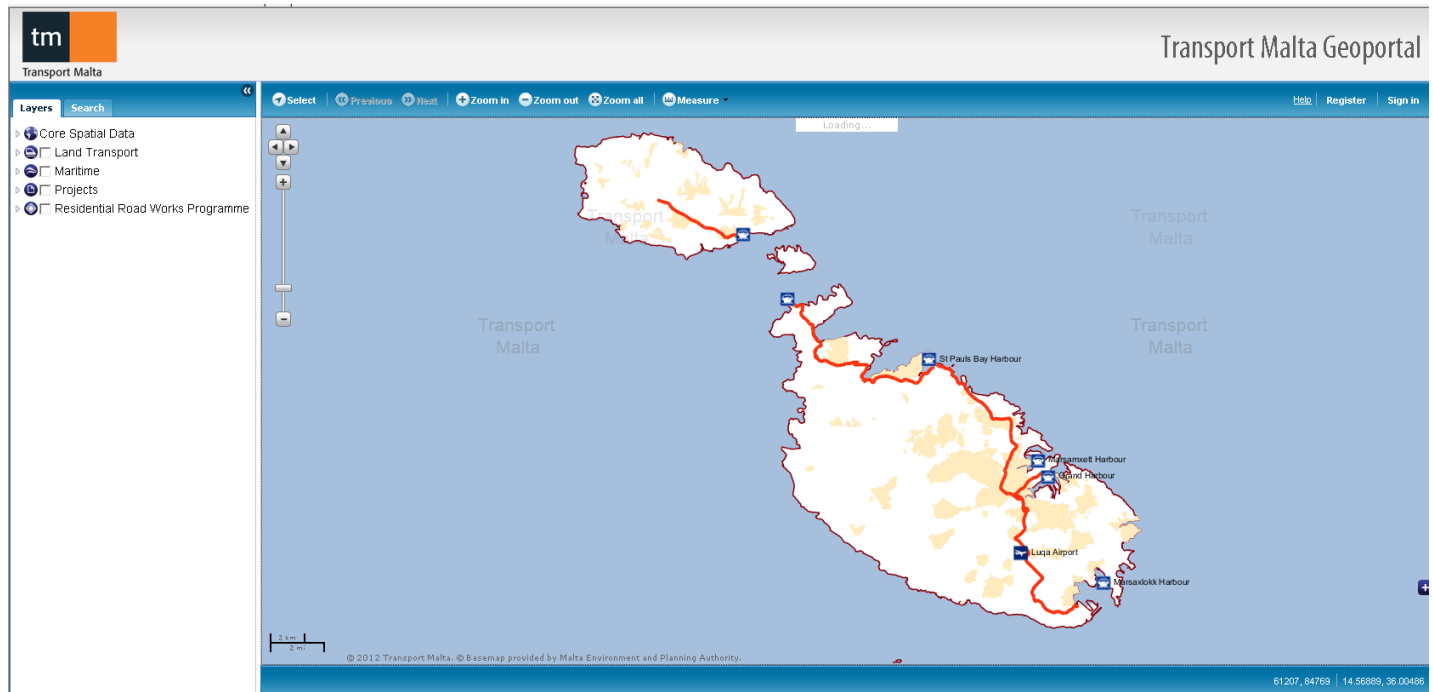
Further to the analyses carried out in these case studies, **collaboration strategies** will be proposed with the aim of developing an integrated road transport information platform.



# Road Transport Information Sharing – Stakeholders’ network analysis

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This implies that existing platforms such as **TM’s GEOPORTAL** can be extended and developed so that information from a greater number of stakeholders can be more easily **accessed** and **shared** via one Transport Platform .



# Road Transport Information Sharing – Stakeholders' network analysis

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Internationally such portals are being developed especially in the environmental field due to the requirements of the **INSPIRE** directive.  
**Infrastructure for SPatial InfoRmation in Europe**

German  
Environmental  
Information  
Portal  
**Portal U**

The screenshot shows the German Environmental Information Portal (Portal U) website. The header includes the Portal U logo and navigation links: Home, myPortalU, Site Map, Help, Contact, and English. Below the header is a search bar with the text 'Enter a query' and a 'PortalU Search' button. The main content area is divided into several sections: 'SEARCH' with a search bar and 'Advanced Search', 'History', 'Options', and 'Tips' links; 'TOPICS' with a list of categories including Agriculture, Air and Climate, Animal Protection, Chemicals, Construction, Energy, Environmental Economy, Environmental Information, Forestry, Gene-Technology, Geology, Health, Nature and Landscape, Noise and Agitation, Radiation, Soil, Soil Pollution, Sustainable Development, Traffic, Waste, and Water; 'NEWS' with a list of recent news items, including 'Tack würdigt mit Naturschutzpreis ehrenamtliches Engagement' and 'Steilshoop wird attraktiver'; 'PortalU informs' with information about the journal 'Zeitschrift "Umwelt"' and an infocampaign; and 'WEATHER WARNING' with a map of Germany showing weather conditions.



## CONCLUSIONS

In order for this to materialise, a different approach shall be taken to the sharing of road transport information:

- Multi-disciplinary approach including different government departments and authorities
- User needs on a locality level vs. a national level shall be taken into account
- Local councils can thus be more involved in providing information about :
  - condition of their infrastructure assets
  - traffic management schemes
  - parking management schemes
- This should lead to **better informed decision makers, planners and network managers**. In turn the general public will benefit from a **better maintained and efficient** road transport network, which reflects the concepts of **SUSTAINABLE MOBILITY**.







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**THANKYOU FOR YOUR ATTENTION**