

***Measuring Transaction Costs in Spatial Data
Infrastructures:
Examples of Sweden and Germany***

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Overview

What are transaction costs?

Can we measure them?

Geoinformation transaction costs

Experiments

First results

Conclusions and further work

Based on a True Story...

Approximately 10 years ago..... in Vienna

I just needed a simple street network dataset and thought it would be easy to acquire it;

- I checked the website of the national mapping agency;
- Found their phone number (but this was not the number of the responsible person);
- I gave them a call, actually several calls, until I finally found the responsible person;
- Visited them and spend 2,5 hours in their office, and
- Got a copy of the data, which I couldn't use....

At the end: I digitised the needed streets/districts by myself.

What was I dealing with?

- **Transaction:** an exchange of spatial data is a transaction; it involves parties e.g. the seller and the buyer who have to exchange information about the product.
- **A transaction can be costly:** an investment in time and effort.
- **Special characteristics of spatial data:** characteristics of an experiential good; the user/buyer is able to estimate the fitness of use of the dataset for an application after testing it.

Transaction Cost Theory

Neoclassical Economics: completely ignores transaction costs.

Institutional Economics: Coase (1937) first introduced the concept of transaction costs; article „The Nature of the Firm“.

According to Cheung (1992) the transaction cost exists when there are transactions.

Every exchange of the product entails costs that result from both parties attempting to determine the valued characteristics of the good (North 1997).

Quantifying the Transaction Costs

Empirical studies trying to quantify transaction costs measure the economic value of resources used in locating trading partners and executing transactions (Wang 2003).

Another common measurement of transaction cost is the difference between the prices paid by the buyer and received by the seller.

Some studies are concerned with the cost of government regulation imposed on market entry and transactions, which either reduces the market size or eliminates the market.

Quantifying Transaction Costs

Quantifying the absolute level of TC

Wallis and North (1986) estimated the TC in the U.S. “transaction sector”; insurance companies, wholesale, retail trade, and banking; 45% of the national income (GNP) was devoted to transacting in 1970.

Dollery and Leong (1998) studied TC in Australia; growth from 32% in 1911 up to 60% of the total cost in 1991.

Quantifying the non-marketed TC

Cost of waiting, getting permits and licenses: Situation in Peru (North 1997); Gabre-Madhin (2001) quantified the cost of transaction faced by the traders in the Ethiopian grain market: 19% of the total cost.

Quantifying the environmental TC

Setting up the Experiment

Can we quantify the transaction cost of spatial data?

- Two selected European SDIs: Sweden and Germany
- Selected datasets
- Definition of the geoinformation transaction costs
- Definition of the measurement categories
- First results

European SDIs: Sweden and Germany

The situation in both countries is very different-two different organisational forms on the national level:

- **Sweden** has a central institution (Lantmäteriet) providing basic geographic data
- **Germany** offers a distributed network of state geoinformation and surveying agencies: the services are offered by 15 cadastral and surveying authorities which act rather independantly

Selected Datasets

Basic spatial data

Sweden: Malmö and Göteborg

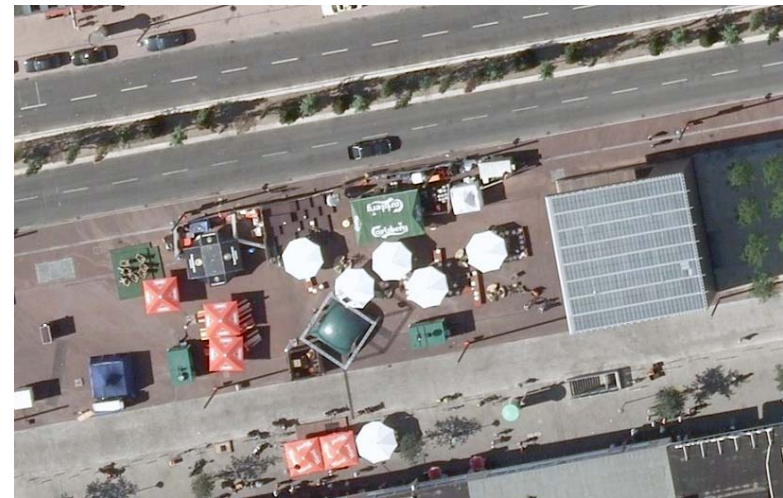
Germany: Hamburg

Real estate data

Germany: Hamburg



Sweden: GSD localities map



Germany: real estate data

Geoinformation Transaction Cost

Transaction costs include (North 1997):

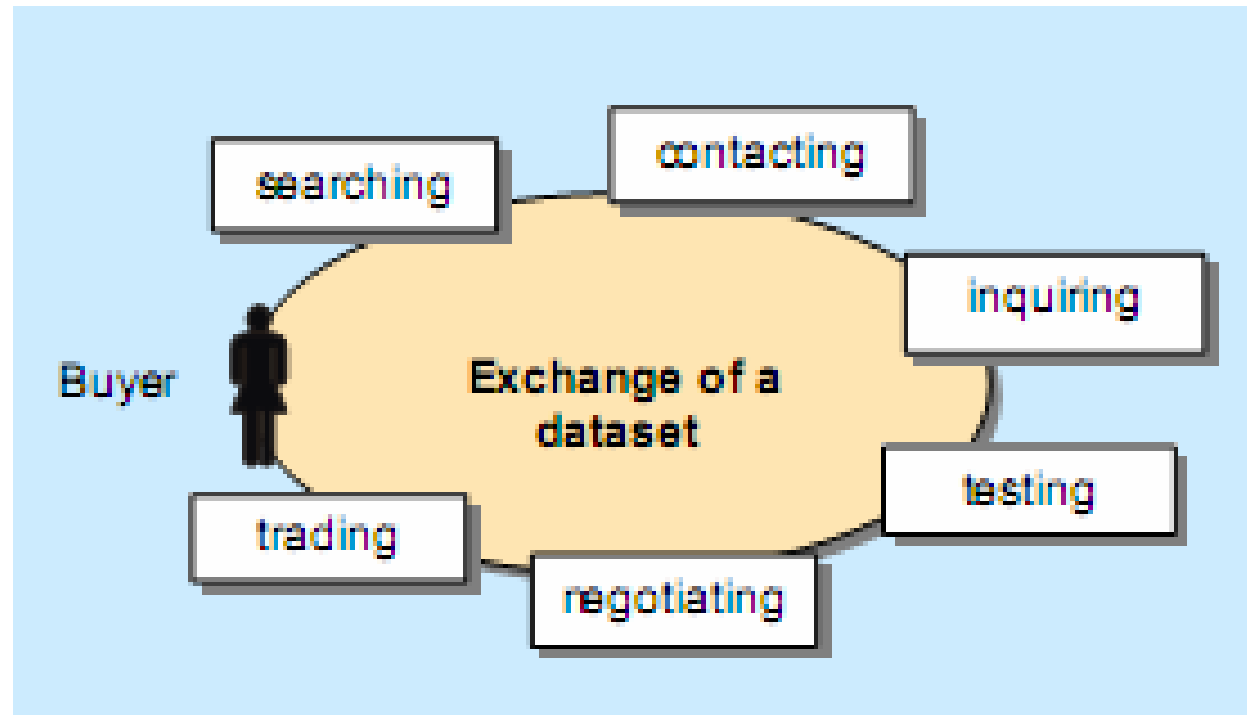
- the cost of measuring what has been exchanged (measurement TC)
- the cost of protecting rights, plus policing and enforcing agreements (enforcing TC)

The geoinformation transaction cost appears on the seller's and buyer's side:

- demand geospatial transaction costs
- supply geospatial transaction costs

Geoinformation Demand TC

Geoinformation demand TC appear on the buyer's side and include the costs related to the data acquisition.



Geoinformation Supply TC

Geoinformation supply TC appear on the provider's side and include the cost related to:

- explaining the complex rules about the use of data,
- copyright issues,
- non-transparent pricing,
- non-transparent licencing conditions,
- rules of sale imposed to the buyers by national mapping agencies or other organisations, providing an access to spatial data infrastructures.

Definition of the TC in our Study

We apply the definition as suggested by Wallis and North (1986) and Niehans (1987).

According to them, the transaction costs are

”all costs borne by the consumer that are not transferred to the seller of the good”.

In our experiment we focus on the demand geoinformation transaction costs.

Measurement Categories (12)

Category	Description
Finding the providing organization	Searching for the providing organization and its contact information
Finding the needed dataset	Searching for the information available on the Internet and contacting the provider via phone and e-mail
Finding the actual seller	Time is spent in this category in case several distributors sell the same or similar dataset
Searching for the contact information of the provider	Searching via Internet, contacting people that might have this information

Measurement Categories cont.

Category	Description
Searching for the contact person	In case this information is not transparent, the buyer has to spend some time in searching for the right responsible person
Correspondence with the provider	Includes writing emails and reading the provider's responses
Contacting the provider via phone	Phoning, waiting for the responsible person, getting information about the availability of the responsible person
Studying the trade conditions	Reading licensing conditions, copyright rights, terms of use

Measurement Categories cont.

Category	Description
Studying the pricing policy	Searching for information about the price, talking to the responsible person about the price, defining the subject of the trade
Free sample data acquisition	Downloading the free samples from the website, talking to the responsible person about sending the free sample data
Testing the Fitness of Use	Testing the data quality, format and other characteristics within the application Not included in this study
Actual data acquisition	Not included in this study

First Results

.....based on our “ limited“ number of experiments (need to be additionally proved and researched)

The organisational structure of a national SDI does matter:
the TC for searching the data provider is almost 0 in Sweden due to the monopoly of the national provider

The TC depend on the buyer’s pre-knowledge about the geoinformation market and possible dataset providers.

First Results cont.

Geoinformation demand TC differ substantially between the basic spatial data and real estate data.

The geoinformation demand TC is higher for the specific dataset, which is not in the standard offer of the data provider; real estate data for example.

The highest geoinformation demand TC was found in the categories of :

- searching for the providing organisation,
- correspondence with the provider, and
- finding the right seller.

Conclusions

We demonstrated our research methodology for quantifying the geoinformation demand transaction costs.

The experiments in Sweden and Germany resulted in our first estimations of the geoinformation demand TC and helped us to improve the methodology.

Further research questions:

- How to design the SDIs in order to reduce transaction costs for the buyer?
- How to measure transaction costs of the provider and how to reduce it?

Further Work

Further research agenda includes:

- increased testing samples; including additional potential buyers
- differentiate between a novice and a knowledgeable potential buyer,
- including different datasets,
- study the dependence of the geoinformation demand TC and the organisation of a SDI
- study the dependence of the geoinformation demand TC and technical characteristics of a web service.

Thank you for your interest!

Questions?

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