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WHAT ARE TRANSACTION COSTS AND WHY DO THEY MATTER?

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Abstract: An exchange of geographic data is a transaction and involves transaction cost. Transaction costs consist of the cost of measuring valuable attributes of what is being exchanged and the cost of protecting rights, policing and enforcing agreements. The costliness of information of what has been offered to the potential users of a geographic dataset is the key to the cost of transacting. The geographic dataset seller should be aware of the transaction cost and offer the dataset in such a way as to reduce them for the potential buyer.

1. INTRODUCTION

Imagine that the potential buyer of the geographic dataset has to find the right dataset in order to buy it for the purpose of his application. Information about the dataset is asymmetric which implies that the seller knows more about the characteristics of the dataset than the buyer. The value of an exchange to the parties is the value of characteristics of the geographic dataset for the parties involved in trade.

The transfer that occurs with an exchange of the good entails cost that result from both parties attempting to determine what the valued characteristics of the good are (North 1997). It takes resources to measure these characteristics and additional resources to define and to measure the rights that are transferred with the exchange of the good. The cost associated with these efforts is called transaction cost (Coase 1937, Williamson 1985, North 1997, Sholtz, 2001), and is generally independent of the price of the contracted good or service. The cost of transacting is the cost of defining, protecting, and enforcing the property rights to goods; the right to use, the right to derive income from the use of, the right to exclude, and the right to exchange. In this paper, we look at the transformation and transaction cost and analyse them on the case of a geographic dataset.

The concept of transaction cost was first introduced by Ronald Coase (1937, 1960) who was studying why some industries are organized into only a few large firms, while others are organized very differently. In his analysis he considered the organizations as alternative modes for organizing transactions and not as technologically determined entities. Comparative transaction costs were held to be mainly responsible for the coexistence of different forms of organizations. Today, transaction cost economics is used largely to explain phenomena such as corporate governance, outsourcing, and vertical integration (Williamson and Masten 1995). Wallis and North (1986) measured the size of transaction cost in the U.S. market. They looked at cost associated with insurance, wholesale, retail trade, banking and cost in terms of occupations such as lawyers, accountants. They found that more than 45 percent of national income was devoted to transacting, and that this percentage had increased from approximately 25 percent a century earlier.

The transaction cost that incur on the side of the dataset buyer include the cost of phoning to the potential seller, the time spent for inquiring about the characteristics of the datasets such as availability, data format, geographic area acquired, level of detail, quality, trade conditions and the price. The dataset is an "experienced" good (Nelson 1970) which

means that the potential user has to invest some additional resources in testing and reviewing the dataset in order to be convinced that it can be used in his application. Finally, the exchange parties have to agree on property rights, trade and delivery conditions, and copyright.

2. CASE STUDY

As a case study, we take an example of a potential buyer that needs a street dataset for the city of Vienna which will be used to support the location based service application. In the first phase the potential buyer has to find the appropriate seller or producer of the dataset. This involves cost of searching for the information about the possible data sellers or producers, finding their addresses and contact persons and trying to reach these persons. In the next phase the potential buyer has to contact the possible providers of the dataset in order to inquire about the availability of the needed street network dataset. Once the contact is established the parties involved in trade have to exchange the information about the characteristics of the dataset, such as format of the dataset, geographic area for which they were collected, level of detail, quality, and characteristics of the attributes. In order to be able to evaluate the usability of the dataset the buyer has to acquire the test data sample and invest additional resources in testing and reviewing the dataset. The parties involved in trade have to define and agree on the trade conditions such as price at which the data will be sold, property rights, and copyright. This most often involves negotiating the contract that causes additional transaction cost on both parties involved in the exchange.

In our case study we measure the time that has been spent by a potential user for acquiring the information about the dataset, choosing the dataset provider, negotiating the contract and other conditions of trade such as price of the data, and copyright. This gives us a concrete number of hours spent in the whole process that we can transform in monetary value and compare with the price set for the dataset. Such study can give an answer why potential users rather invest in the new data collection than in buying of an existing geographic dataset. The study is in the first stages of development and we present in this paper theoretical principles of the transaction cost. We follow the analysis in North (1997) where he distinguishes between the transformation and transaction cost that makes up the total cost of a dataset.

3. TRANSFORMATION COST

The transformation cost is the cost of transforming resource inputs such as for example land, capital, paper maps into the physical attributes of a good. The transformation or production cost of producing a digital geographic dataset is transparent and relatively easy to determine. The data collection itself is very costly and the experience indicates that it accounts for 60% to 80% of the total cost of a full operational system (Bernhardsen 1992). This cost is fixed and represents a high percentage of the total cost of producing a dataset that is in general a characteristic of information good (Shapiro and Varian 1999). The fixed cost is high mostly because of the high labour cost of capturing the data from data sources or measuring them with measurement techniques, the cost of data transformation, analysis, and modification. The cost of making another copy of the product or marginal cost is for the geographic dataset very low or zero. It is very easy and costless to make another copy of already collected data. The dataset producers are aware of the transformation cost and they are trying to cover them with cost-recovery pricing of their products that can represent a barrier for the potential users of the dataset with low willingness to pay.

4. TRANSACTION COST

The cost associated with choosing, organising, negotiating, and entering into contracts is called transaction cost (Williamson and Masten 1995, North 1997). It arises because

information about the good is costly and asymmetrically held by the parties to exchange (North 1997). The potential buyer has to acquire information about the good that is a subject of exchange, which requires resources and causes additional cost to the buyer. The buyer and the seller have to agree on the conditions of trade. Transaction cost include also the cost that is hard to measure, such as time needed for queuing, bribery, as well as the losses due to imperfect monitoring and enforcement.

North (1997) distinguishes between the measurement and enforcement cost. Measurement cost is the cost of measuring the valuable attributes and characteristics of what is exchanged. Searching for the right datasets and acquiring the information about the level of quality and usability for the specific application is very costly. Enforcement cost is the cost of protecting rights, policing and enforcing agreements. It includes resources involved in defining, protecting, and enforcing the property rights to goods which are the right to use, the right to derive income from the use of, the right to exclude, and the right to exchange. Enforcement costs include uncertainty that the other party will find it in his interests to live up to agreements. The inability of societies to develop effective, low-cost enforcement of contracts is the most important source of the historical stagnation and underdevelopment (De Soto 2000). Enforcement poses no problem when it is in the interests of the other party to live up to agreements. This happens when the exchange parties get involved in repeat dealings, and have a great deal of information and knowledge about each other. In these cases it pays off to live up to agreements (Axelrod 1997).

The cost of transacting is very often neglected. Neoclassical economic theory ignores transaction cost; the buyer is perfectly informed about the good that is a subject of exchange. In the case of perfect information we have an example of zero transaction cost. The notion of zero transaction cost is another reason why neoclassical economic theory cannot be directly applied for analysing the economic aspect of geographic dataset. The producers of datasets would have to be aware of this cost incurred mostly on the buyer's side. The datasets should be offered in such a way as to reduce the cost of transaction for the buyer.

5. THE IMPACT OF THE INSTITUTIONS ON TRANSACTION COST

Coase (Coase 1937) in his essay "The Nature of the Firm" asked the question why is it costly to transact? What is about transacting that is so costly? He argues that transaction cost is the basis for existence of the firm, which is a form of organization. North (1997) defines institutions as the constraints that human beings impose on themselves. The constraints can be formal such as rules that human beings create (political and judicial rules, economic rules, contracts) or informal such as conventions and codes of behaviour. Constraints reduce the cost of human interaction because they provide the structure for economic exchange. Institutions affect the performance of the economy by their effect on the cost of exchange and production. Together with the technology employed, they determine the transaction and transformation e.g. production cost that make up total cost.

Because the market is imperfect, institutions are composed of those that lower cost and those that raise them. Institutions that raise them are the institutions that provide barriers to entry the market, encourage monopolistic restrictions, and impede the low-cost flow of information. The National Mapping Agencies have faced some transformations and reorganisations recently, especially known is the liberation process which has started with the reorganisation of the Ordnance Survey in Great Britain.

No institutions are necessary in a world of complete information where the cost of transacting is zero. In this case the parties exchange costlessly, know everything about the other party and the enforcement is perfect. The greater the specialization and the number and variability of valuable attributes, the more weight must be put on reliable institutions that allow individuals to engage in complex contracting (North 1997).

6. THE IMPACT OF THE INTERNET ON TRANSACTION COST

On the Internet, the transaction cost associated with most forms of commerce largely disappears, or at least substantially decreases (Sholtz 2001). The electronic network and new technologies are changing the availability and access to the products. Appearance and the use of electronic media for exchange and electronic payment schemes change the way the transactions are done. Placing an order via electronic network is a very comfortable interaction between the exchange parties. It saves time, involves less administration, paper work and less human resources. New possibilities of finding the product are becoming more widely used in recent time, gathering information about the product and paying is done over electronic network. Books, CD's and even pizzas are successfully sold over the Internet.

The geographic datasets can be easily assessable, copied and transferred over the electronic network also by a less knowledgeable buyer. In spite of that, selling the datasets over electronic network has not been widely used. The problem is that the seller in this case has no control over the usage of the datasets such as combining different datasets, different accuracy and quality, from different sources and cannot prevent misuses of the datasets or misinterpretation of the information extracted from the data. The key issues for the dataset sellers are still not clearly defined mechanisms of ownership, copyright, security and intellectual property rights.

7. CONCLUSIONS AND FURTHER WORK

The costliness of information about the good that is a subject of exchange is the key to the cost of transacting. Geographic dataset sellers should be aware of the transaction cost and offer the products in such a way as to reduce them for the potential buyers. Searching for information about the datasets and their characteristics, estimating its quality and usability, defining and measuring the rights that are transferred raises the transaction cost for the potential buyer.

In this paper we looked at the theory of transaction cost and analysed the impact of the institutions and the Internet on the cost of transacting. The institutional framework affects the transformation and transaction cost and according to Coase (1937, 1960) institutions exist because it is costly to transact. They reflect the costliness of measurement and enforcement. In further work, the role of National Mapping Agencies has to be analysed from the perspective of transaction cost economy. What are the constraints that are imposed by the National Mapping Agencies on the potential buyer of the datasets? Do they support and encourage the data exchange or do they provide the barriers to entry the dataset markets? How can the institutions help to reduce the transaction cost for the potential buyer of a dataset? Do metadata systems and services reduce this cost? The buyer considered in this paper can be a final user of the dataset or an organization that buys the raw data and transforms them into a form that is usable by the final user of the dataset.

The Internet has a substantial effect on the cost of transacting. Sholtz (2001) argues that the most significant and lasting impact of the Internet on the business community has been the steady and relentless reduction of transaction costs. The Internet has not been widely used for selling the geographic datasets.

In our further work we attempt to measure the transaction cost and present the quantitative results. We will select several datasets that can be used in different applications, structure the buying procedure and measure the transaction cost. We will then compare the transaction cost with the prices of the geographic dataset. In another study we plan to analyse the constraints that are imposed by the National Mapping Agencies and look at how do they affect the transaction cost imposed on the potential buyer of the dataset.

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