GI Marketplaces

- Tools of new business models in the GI market - [1]

Geographic information is needed for planning and decision making everywhere. But it is too rarely sold and used. Technical, human, organizational, and institutional services have to be added to the raw material of geographic data in order to create requested products. For adding these services, there is a need of new business models for the cooperation in geospatial value chains, and an extended use of the medium Internet by e-commerce and e-business. This paper identifies electronic marketplaces for geographic information as main components of new business models for an expanding market for geographic information.

By Christoph Brox and Werner Kuhn

Learning from non-spatial economic sectors

Traditional business models of the market for geographic information (GI) are monolithic, i.e., one single company offers heaps of products and services: data, data mining, data adoption, software applications, system integration, consulting, and training. This business model is reminiscent of general stores in 19th century: they offered flour, bread, soap, meat, clothes, nails, tools, and machines, distributed the post, and sometimes repaired the roof. Today's business models look differently, e.g., for the case of the production and delivery of yogurt. Milk is produced on farms in North Germany. A farm cooperative organizes the collection of the milk; a transport company carries the milk to a yogurt producer in South Germany. The yogurt bacteria are coming from Switzerland; the ready-made yogurt is brought for bottling to East Germany. The yogurt cup lid is produced in Lithuania, the plastic cup in Poland. From East Germany the yogurt is distributed to wholesales in North Germany, from here to the shops in that region. In modern business models many companies work together in order to produce the desired product. Each company has a specialized core competence and contributes with its special intermediate product and/or service. Though ecologically disastrous, this business model seems to work: yogurt is sold – geographic information is not or only rarely.

There is a need for an interoperable production infrastructure for spatial applications. The following sections point out, why an expanding GI market needs

[1] This paper is a revised version of our AGILE 2001 paper „Marketplaces for geographic information", see http://www.agile-online.org/.

- Services applied to data
- Process-oriented business models
- E-commerce and e-business mediated by GI marketplaces as tools for cooperation and coordination.

Services applied on data

The vast majority of potential users of geographic information are not asking for the data sets they are mostly offered, but for information services that are tailored to their needs and ready-to-use.

For a while geographic base data, e.g., ATKIS (Authoritative Topographic Cartographic Information System) in Germany, were considered as the breakthrough in the use of geographic information. The next approach was to add services to data – in a technical sense. The idea was to add functionalities, e.g., selection or view, to data sets.

But this is not sufficient. For example, an insurance company plans to establish a controlling and marketing system for its agencies, based on geographically referenced enterprise and demographic data. For this, the insurance company needs a very complex product consisting of various services of different producers and providers, such as

- Human service of a insurance and marketing consulter for defining needed information
- Human service of a GI consulter for defining needed data sets and functionalities
- Technical service for searching data sets
- Technical service for selecting data
- Organizational service for ordering and paying
- Technical service of a software provider for providing analysis tool
- Human service of an integrator for integrating software and data into enterprise system
- Human service of training of employees to work with the new tool
- Organizational service of GI marketplace to create the network of business partners
- Institutional service of GI marketplace to provide standards for the exchange and access services.

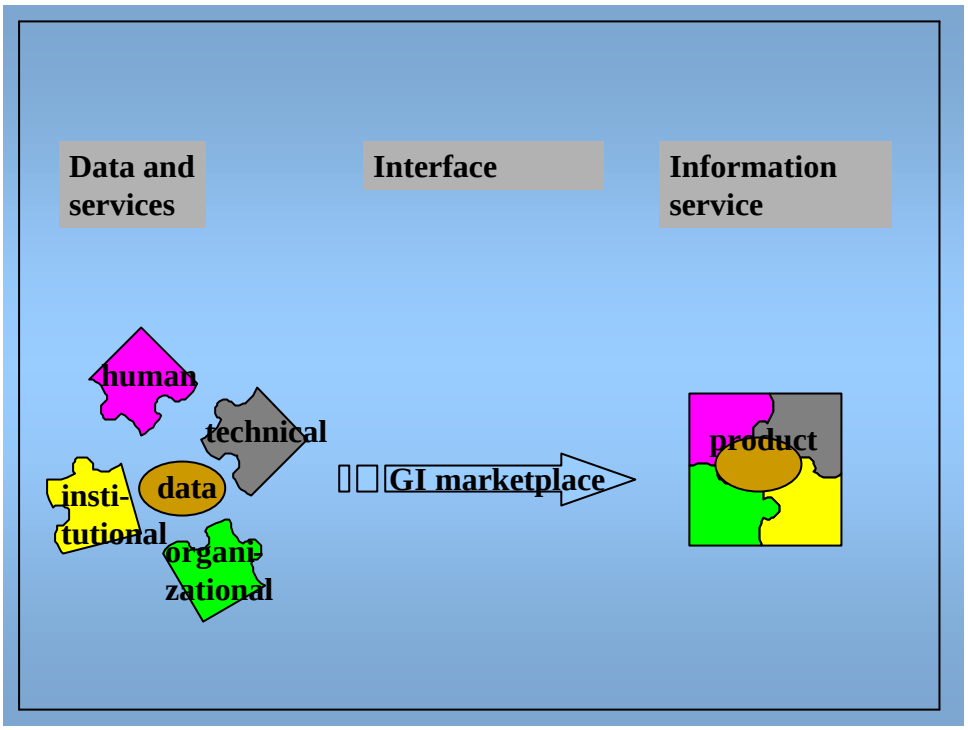

Fig. 1: Applying services to data

The insurance company does not want to and cannot put all these pieces together. The combination of data and *services* ("interoperation") is a key concern to develop a GI business. The future market for geographic information is not a market of data but a market of *information services*. An information service is generated by applying technical, human, organizational, and institutional services on data sets. Marketplaces of geographic information mediate this process.

Process-oriented business models

The generation of information services requires a networked cooperation of the entire geospatial value chains of producers, service providers, integrators, service enablers, and end-users *(Niedzwiadek 1999)*. This requires new forms of business models we call *business networks (Brox and Kuhn 1999)*. Traditional and new providers of the GI market with complementary core competences and core products (= services) find together on users' demand and generate the desired information services. Only the cooperation of the entire geospatial value chains can add the necessary services to the raw-material geographic data set.

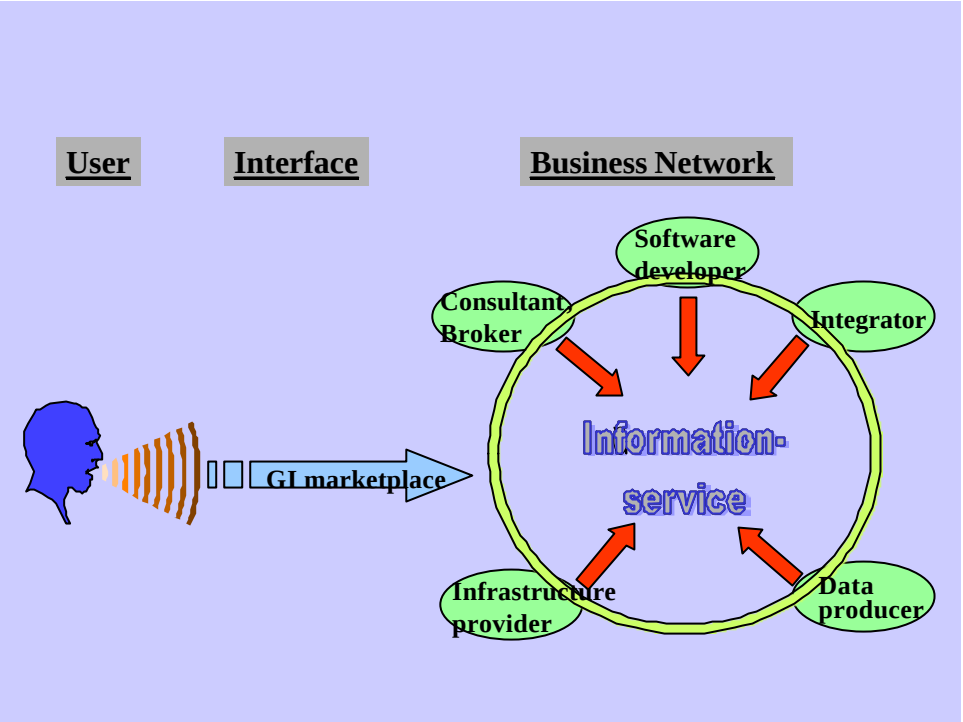

Fig. 2: Business Networks

Most business models, however, are still monolithic. There are many examples for companies that cover all tasks of a geospatial value chain: produce data, adjust data, produce software, adjust applications to users' needs, integrate systems, consult users, and train users. A lesson we learned from the technical aspects of monolithic systems is: these systems can do a lot, but never exactly what you need and not always correctly or usefully. The future generation of products will be process-oriented *(Malone and Laubacher 1999)*. Companies in the value chains with their specific core competences and core businesses find together in ad hoc projects in order to generate the desired product.

E-commerce and e-business mediated by GI marketplaces

In all economic sectors the transition to e-commerce and e-business is *the* success factor. Today's GI market targets e-commerce and e-business, but until now just a small percentage of the annual turnover is transacted via the Internet. Currently, the goal of the GI market in e-commerce and e-business is to search, order, deliver, and pay geographic data sets via the Internet. The challenge is to exploit the further potential of the medium Internet: the process-oriented production of services, the exchange and the integration of services to information services, and the coordination and cooperation of the business players of the GI market. In addition to pure information, marketplaces initiate transactions between buyers and sellers and offer mechanisms for transactions via the

marketplace *(Spiller and Wichmann 2000)*. Marketplaces can be considered as a middleware, particularly in an organizational sense but in the technical meaning as well.

In the general economy, solutions for business-to-business (B2B) e-commerce are more advanced than within the GI market. The focus is shifting from mostly sell-side solutions or buy-side solutions of single companies to the selling and buying of goods via B2B marketplaces. B2B marketplaces are successful and promising in businesses worldwide. A ten-fold increase until 2002 leading to 600-800 electronic marketplaces in Germany, with an expected volume of up to US$ 15 billion is estimated *(Berlecon_Research 2000)*.

The most promising chances for marketplaces are expected in fragmented markets with many actors and low transparency *(Spiller and Wichmann 2000)*. This is particularly true for the GI market, because geographic information is relevant and applied by many communities of interests.

GI marketplaces support the specific requirements of the GI market for:

- An extended cooperation of providers with providers;
- An extended possibility of exchanging and integrating services (technical, human, organizational, and institutional), coordinated by an institutional, organizational, and technical framework, i.e., standards, access rights, usage;
- An extended customizing of GI products by an easier access of buyers of geographically related products and services, and its providers.

What are GI marketplaces?

Marketplaces for geographic information are tools for the coordination and cooperation in the market for geographically referenced products. We identified the following key issues of GI marketplaces:

1. Players of B2B marketplaces: The idea of marketplaces extends traditional forms of e-commerce. Traditional approaches are, for example, making the catalogues of *single* companies available to the client in the web (shop solutions), providing information and access (portals), or buy-side-solutions of big companies (extranets). Marketplaces integrate *various* buyers and sellers into a single framework.

2. Horizontal and vertical marketplaces: Two types of B2B marketplaces can be differentiated: Horizontal marketplaces target the requirements of several sectors. They reflect the need of a framework that connects all players of the fragmented market for geographic information. The users of horizontal marketplaces for geographic information will mostly be experts of companies in the GI-business. Vertical marketplaces target the requirements of a specific sector. They are community-oriented and are based on a deep knowledge of the specific sector. Business partners as insurance companies, banks, telecommunication companies, or public utility organizations are not experts in geographic information. Therefore, a completeness-oriented horizontal marketplace will

not match the requirements of the non-GI-business partners. They require vertical marketplaces for geographic information, where their language is spoken and where an insight knowledge and sector-specific solutions will be provided.

3. Public and private: GI marketplaces can be run by public or private organizations. A public organization, e.g., a national infrastructure initiative, targets the expansion of the entire GI market. This evokes a participation, cooperation, and competition of all players of the market. A private organization, e.g., a data producer, will not allow competition within its core business. But they will enforce the participation and competition of producers and providers with other core businesses in order to expand the use and sale of geographic data sets.

4. Open market: Marketplaces have to be open for new providers and new products, i.e. services. Especially within the GI market connected value chains for the generation of information services are missing. It will be crucial to integrate a critical mass of providers within the marketplaces for geographic information. Therefore, the impediments for new providers to enter the GI market and to participate with the marketplaces have to be kept as low as possible, furthermore, the integration of new providers and new products has to be actively facilitated. This requires consensus procedures of as many potential participants of the GI market as possible.

5. Standards: An open market corresponds with the need for standards, e.g., technical agreements, and rules, e.g., legal regulations about offering products within marketplaces. Too little standards and rules will not allow for a successful co-operation of providers and providers or providers and customers. A too high degree of standards and rules will increase the costs and the organizational efforts for the business within a GI marketplace and could prevent the integration of new, innovative companies and products *(Merz 1999)*.

6. Categories of services: The definition of a marketplace is given by the services it offers. We identified services needed for buyers and sellers of GI marketplaces in the following categories:

Tab. 1: Services of GI marketplaces

1. Matching buyers and sellers
2. Support cooperation within the geospatial value chain
3. Facilitation of transactions
4. Marketing
5. Provision of an institutional, organizational, and technical infrastructure
6. Provision of additional services

First, the market has to support *matching buyers and sellers*. Main components are determining

product offerings, search, and price discovery. The focus of this category is on information.

A particular requirement of the GI market is to *support co-operation within the geospatial value chain*. For this, a GI marketplace should provide mechanisms and services for the connection various providers to geospatial value chains and their co-operation.

Marketplaces offer, in addition to the services of shop solutions or portals, the *facilitation of transactions*. A GI marketplace facilitates B2B transactions between buyers and sellers of geographically referenced products. B2C transactions might be included for special reasons, e.g., marketing initiatives.

Marketing within a GI marketplace covers two aspects. Firstly, a GI marketplace provides services for the marketing of the products offered by the companies and organizations. Secondly, we think it crucial to initiate marketing initiatives for the GI market and the GI marketplace. This includes an extended awareness of customers to the potential use of geographic information and an extended co-operation of business partners within the GI marketplaces.

The GI market consists of a great variety of players, is fragmented, and lacks of standards and tools for cooperation. To improve the use of geographic information, the co-operation of business networks, and transparency of the market, GI marketplaces need to *provide an institutional, organizational, and technical infrastructure*.

The *provision of additional services* extends the marketing of products by future-oriented initiatives. For example, the significance of international cooperation increases; the bigger non-geospatial marketplaces in Germany employ 25 % of its personnel abroad, smaller marketplaces employ at least some staff in a foreign country *(Spiller and Wichmann 2000)*.

Conclusions and further work

This paper suggests marketplaces as core components of the expanding, internet-based GI market and its infrastructures. Successful products of this market are not data sets, as has long been believed, but services and information services tailored and configurable to the users' needs. GI marketplaces support the process of integrating data and services to information services.

We see GI marketplaces as a platform for business-to-business relations. Marketplaces are tools to connect the value chains of the GI market. There is a need for horizontal marketplaces as well as for vertical marketplaces for various sectors that fulfill the specific requirements of buyers of geographically referenced products, e.g., insurance companies, telecommunication, or logistics.

Further research will detail and test the proposed services by a (re)design of specific marketplaces for geographic information.

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