TILEC was born out of the recognition that the traditional ways of organizing academic research - along faculty lines - are no longer adequate today. Researchers in law strive to draw upon economics and yeam to work with economists, and vice versa. Furthermore, the outside world - market actors, authorities, practitioners - has come to expect researchers from law and economics to work together, putting a premium on research that rests on both disciplines. Given its excellent Faculties of Economics and Law, Tilburg University is in an ideal position to meet the expectations of researchers and the outside world alike. TILEC is meant to be the vehicle for doing so. TILEC will be concerned broadly speaking with the use of both law and economics in research endeavours, even if they do not necessarily fall within ‘Law & Economics’ in the sense of the specific school of thinking which has arisen out of the work of US academics and is now well-established everywhere.

The mission of TILEC is:
- for participating researchers from the Faculties of Law and Economics, to provide support and to stimulate joint research activities, thereby enhancing the intellectual climate for research at Tilburg University in the area;
- towards the outside, TILEC aims to belong to the top in Europe and to be recognized as a leading centre in its areas of activity also in the US.

The Research Paper Series presents scientific research on health care markets and addresses an international forum. The goal is to enhance the knowledge and expertise on the regulation of health care markets.

This paper reflects the personal views of authors, which are not necessarily those of their employers. This paper is not in any way binding the board of the NZa.

NZa
The Dutch Healthcare Authority (NZa) is the regulator of health care markets in the Netherlands. The NZa promotes, monitors and safeguards the working of health care markets. The protection of consumer interests is an important mission for the NZa. The NZa aims at short term and long term efficiency, market transparency, freedom of choice for consumers, access and the quality of care. Ultimately, the NZa aims to secure the best value for money for consumers.

Benjamin Rensmann and Martin Smits
Analyzing the Added Value of Electronic Intermediaries in the Dutch Health Care Sector
Analyzing the Added Value of Electronic Intermediaries in the Dutch Health Care Sector

Benjamin Rensmann, Martin Smits

Abstract
The CareAuction intermediary offers a reverse auctioning platform to support the allocation of individual maternity care patient requests between purchasers of health insurance companies (acting on behalf of their policy holders) and care providers. Since its introduction in 2005, CareAuction has contributed to a small price drop of maternity care and induced competition on the supply-side of the market. This is a result of increased transparency for both (demand and supply) sides. The quality of the maternity care that is provided is monitored by a newly introduced quality evaluation system, which includes the patient and introduces quality as another competitive factor next to price. Next to CareAuction, other (non-electronic) intermediaries are still active in the health care sector, supporting the allocation of care between insurance companies and car providers. Findings indicate that the influence of CareAuction leads to the disintermediation of at least one other intermediary. Theory on electronic intermediaries and market dynamics is used to identify the added values that these two intermediaries (CareAuction and LTZ) create for the purchasers and providers of maternity care in the context of the maternity care market.

Keywords: Electronic Intermediaries, Intermediation, Disintermediation, e-Health, Value Analysis, Market Dynamics

1. Introduction
In the last decade, the health care sector in the Netherlands underwent fundamental changes towards more demand-driven approaches of care allocation, like elsewhere in the world (Mandi and Kohane, 2008). One example of demand-based allocation of care is CareAuction, an electronic intermediary that provides an auctioning platform to buyers and providers of health care services, primarily maternity care. Maternity care is the professional help that women in the Netherlands can claim after having a baby. It typically consists of 42 hours of home care for mother and child during the first week after birth. Most health insurance policies cover about 90% of the costs (about 1600 Euro in total) for this care service.

CareAuction operates in the gap between the (bulk) purchasers of maternity care services (i.e., the health insurance companies) and the providers of maternity care. Its services aim at improving the efficiency of the contracting process of care services, including the quality of the care provided. The contracting process does not directly involve the patient, but takes the preferences of the patient as well as aggregated patient quality evaluations into account to find the best match for a maternity care service request. The contracting of maternity care is done by insurance companies on behalf of the patient. Recent research results have shown that the CareAuction intermediary has substantial influence on the performance of the maternity care market, its structure and the behavior of the market participants, i.e., insurance companies and care providers (Smits and Janssen, 2008). Next to CareAuction, there are other intermediaries that support the allocation of care in the market. This paper focuses on (dis-)intermediation and value creation by (electronic) intermediaries in health care markets and uses insights from the CareAuction case. We aim to contribute to the intermediation debate by adding new observations on how electronic intermediaries trigger market dynamics and add value for market participants. We analyze the conditions under which intermediaries (CareAuction and LTZ) create value for market participants and how intermediaries affect markets. These observations are needed for theory development, to identify opportunities for electronic intermediaries, and to support usage decisions by actors.
Section 2 describes our theoretical framework and research method. In section 3 the case is introduced in more detail. Case and market analysis is done in section 4. Section 5 summarizes our findings and points out future research directions.

2. Theoretical Background and Research Approach

First we review theories that address the evolution of intermediation in electronic markets and the roles of electronic intermediaries (also known as 'cybermediaries') to add value. The next subsection describes theories we use to analyze the positions of intermediaries in market structures. A framework by Klein and Teubner (2000) incorporates other factors next to roles that are important when analyzing electronic intermediaries. The model of industrial organization by Shepherd (1985) serves as broader context for analysis.

2.1. Roles of Electronic Intermediaries

Markets (electronic and traditional) have three main functions: (i) The matching of buyers and sellers, (ii) the facilitation of transactions and (iii) the provision of an institutional infrastructure (Bakos, 1998). Each of these functions support the several functions of markets as described above. Table 1 summarizes the potential roles and values that intermediaries add within each of the market functions.

Intermediaries "bring together customers and suppliers and facilitate demand and supply activities for the exchange of goods, services and information" (Fielt, 2006). From an economic point of view, they set prices, provide immediacy, search, match and serve as agents of trust by guaranteeing and monitoring transactions (Spulber, 1996). Holding these roles, intermediaries support the several sub functions of markets as described above. Table 1 summarizes the potential roles and values that intermediaries add within each of the market functions.
questioned by several researchers. Sarkar, Butler and Steinfield (1995) showed that the direct link between sellers and buyers is not necessarily cheaper in terms of transaction costs than the intermediated link (Sarkar et al., 1995). The rationale behind this argument is that intermediaries can also create an added value for their customers, i.e., for the buyers and sellers.

Especially in a world in which information plays a more and more vital role for doing business and the amount of information available on electronic markets is enormous, intermediaries can play a crucial role. Terms like infomediary or cybermediary became popular to describe electronic intermediaries that deal purely with information (Grover and Teng 2001; Sarkar et al., 1995). Electronic intermediaries leverage information technologies to aggregate supply and demand and enable advanced searches for both sides based on different criteria. New pricing mechanisms like electronic auctions lead to better matches between buyers and sellers (Smits and Janssen, 2008). Information about products can be presented on websites and product comparison and bundling becomes easier. Customer profiles can be created based on shopping behaviour and used for recommendations. Another important task for infomediaries is privacy protection: Infomediaries can control the kind and amount of information that gets from one side of the market to the other. As agents of trust, infomediaries can assure the correct execution of transactions via their systems, enable customer evaluations about suppliers and products and offer community services like customer forums (Grover and Teng, 2001; Resnick et al., 1995).

2.2. Context-dependent Success Factors for Intermediaries

Due to the dynamics of markets and the dependence of intermediary-success on a specific industry context, other factors besides roles have to be taken into account too, when analyzing the success or failure of intermediaries. Klein and Teubner (2000) suggest a framework that provides factors to help in analyzing different market situations in terms of opportunities for electronic intermediaries (Klein and Teubner, 2000). Next to intermediary characteristics, the framework takes into account characteristics describing the industry context. The framework provides basic factors that help in analyzing different market situations in terms of opportunities for electronic intermediaries.

Table 2: Factors determining the success of intermediaries in certain industries

<table>
<thead>
<tr>
<th>Feature</th>
<th>Transaction / Service</th>
<th>Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediary characteristics</td>
<td>Presence of information exchange</td>
<td>Competitor's content</td>
</tr>
<tr>
<td>Transaction characteristics</td>
<td>Transaction characteristics</td>
<td>Presence of information exchange</td>
</tr>
</tbody>
</table>

The framework includes channel characteristics, product/service characteristics and transaction characteristics to describe the industry context that the intermediary is operating in. Channel characteristics are important because the channel determines whether there is enough space and need for an intermediary. Factors like the supply-demand-ratio, power of the stakeholders and transparency are included. Product and service characteristics like the service and quality of products and services provided by the intermediary can also play a role in determining the success of the intermediary. Social characteristics, like the network of suppliers and buyers in the market, are also important. The framework provides a useful tool for analyzing the success or failure of intermediaries in different market situations.
2.3. Market Dynamics

In order to put the development of the intermediation at focus into the context of the development of the health care market, the analysis is extended to a broader perspective, focusing on the development of the market and the influence of the introduction of CareAuction in this market. A second phase of the case study started in 2005 with looking at the maternity care contracting market. The external case is investigated using a qualitative and exploratory case study approach.

Table 2 summarizes some important properties.

![Figure 1: Adapted model of industrial organization.](image)

External determinants are e.g. the product and service characteristics, transaction characteristics, information technologies and public policies. Especially information technologies change markets fundamentally in the way they support certain market functions and enabled services that were previously not possible. The performance of the market intermediaries can be described by channel characteristics, the market structure, market behaviour and market performance. For our case study, market structure, market behaviour and market performance are specified in external determinants on the dynamics of the health care market (see Figure 1). For our model of industrial organization (Shepherd, 1995; Simons and Jiang, 2000), the model of industrial organization (Shepherd, 1995; Simons and Jiang, 2000) of care delivery and the services that the intermediation can possibly offer to the market and the influence of the introduction of CareAuction in this market. The external case is investigated using a qualitative and exploratory case study approach. Table 2 summarizes some important properties.

Customer price and quality sensitively (unique service offerings vs. commoditization, service offering and pricing, etc.) influence the services that the intermediary can possibly offer to the market. The transaction characteristics mainly comprise drivers of transaction costs, like uncertainty, opportunism and asset specificity.
Qualitative case study research is a widespread and useful research method in the IS research domain (Benbasat et al., 1987; Galliers et al., 2007). Several sources of evidence are used to triangulate the data basis (Yin, 2003): Semi-structured interviews, documents and relevant websites of organizations. At the time of writing, several semi-structured interviews have been conducted with the CEO of CareAuction, a (former) member of the board of directors of LTZ, who is also CEO of a bigger maternity care provider and several decision makers at insurance companies and care providers. In addition to the analysis of these interviews by means of qualitative data analysis, several websites have been investigated and some documents given to us by the companies were analyzed. Furthermore, material from the first phase of the case study (2005 – 2007) is used.

3. Introduction to the case

Maternity care is contracted by the health insurance companies via two different ways: Frame contracting and individual contracting. In the Netherlands, maternity care is contracted on an individual basis. CareAuction and LTZ are both active in the geographical region they operate in. In order to be allowed to participate in CareAuction, care providers need to have a frame agreement with one of the health insurance companies. For their peripheral areas most insurance companies use an intermediary for allocating patient's requests to an appropriate care provider.

Intermediary Services in 2008

CareAuction is an electronic intermediary that started operations in March 2005 and supports maternity care allocation between the health insurance companies and the providers of maternity care. CareAuction maintains a web-based, reverse English auctioning platform on which individual care requests are auctioned. At present, only two big insurance companies are using CareAuction for maternity care contracting for their customers. These two insurers have a market share of together more than 50%.

In order to be allowed to participate on CareAuction, care providers need to have a frame agreement with CareAuction. CareAuction is an electronic intermediary for allocating patient's requests to an appropriate care provider. Care providers can bid reductions, thus lowering the price per hour they can offer maternity care for. However, the lowest bid does not necessarily win the auction, as the client can give a preference to a certain care provider. In CareAuction, care providers can register their locations, but they are obliged to bid on a request that is located in their geographical region. The winning bid is awarded to the care provider.

Our analysis focuses on the individual maternity care contracting.

CareAuction provides typical facilities in the context of electronic auctioning, like filtering and sorting of the requests and bids, bidding agents and news services. Furthermore, CareAuction and LTZ (Landelijk Transferpunt Zorg, “National Intermediary for Transfer of Care”) are both active in the geographical region they operate in. LTZ was set up by some of the bigger care provider organizations and focuses on the individual contracting of care. Our analysis is concerned with the provision of maternity care contracting and individual contracting between the health insurance companies. The term ‘care’ refers to maternity care and care providers.

Qualitative case study research is a widespread and useful research method in the IS research domain (Benbasat et al., 1987; Galliers et al., 2007). Several sources of evidence are used to triangulate the data basis (Yin, 2003): Semi-structured interviews, documents and relevant websites of organizations. At the time of writing, several semi-structured interviews were conducted with the CEO of CareAuction, the CEO of LTZ, the CEOs of other care providers and several decision makers of these care providers. Our analysis focuses on the individual maternity care contracting.
helps insurance companies to find free capacities on the care provider side. It has individual fixed hour tariffs of maternity care for each insurance company and keeps a margin on each hour of care that is contracted. Upon request at a call center, the insurer contacts LTZ in order to find the right care provider (taking the preference of the client into account). There are no specific contractual relationships between LTZ and the care providers that regulate the allocation of maternity care. This is done on the basis of rather "informal relations", according to the interviewees.

Future (Planned) Services

There are two recent developments that CareAuction tries to push further: First, CareAuction wants to increase the amount of general homecare that is allocated via its platform. General homecare belongs to the so-called "first-line" health care and comprises services such as meals on wheels and housekeeping for elderly people. It is a promising market with a budget of about 2.8 billion Euros. Homecare-related services are usually purchased by the local municipalities upon request of their citizens. Until now, two municipalities are using CareAuction for this purpose. CareAuction plans to heavily increase the number of municipalities using the platform for general homecare purchasing.

The second recent development of CareAuction is an electronic contracting module. The module allows for efficient contracting of many different kinds of health care providers on a big scale for the health insurance companies. Health care providers like psychologists, physiotherapists and speech therapists have to fill in a form on a website, requesting a variety of information about the services they offer, their specializations, their surgery and opening hours. Based on weights for these different criteria, the health insurance companies calculate the tariff for allocated care.

4. Case analysis

In this section, we analyze the added values that CareAuction and LTZ create for the market participants and their influence on the dynamics of the health care market. First, we will describe the external factors that determine any intermediation activity and properties of the market structure. The services that the intermediaries offer are part of market behavior, and we will describe market performance by looking at the added value that the intermediaries provide to the different parties and how these values influence performance characteristics. Finally, we will explain reverse effects on market structure and behavior.

External Determinants

For our analysis, we regard two factors as external determinants that influence intermediary activity: (i) The characteristics of maternity care as a product and (ii) the characteristics of the transactions being made to allocate the care requests. While the price is the most important aspect of maternity care for the insurance companies that purchase the care, patients care about the quality of the service. Until now, the care services that are provided have not been very varied. However, these opportunities are available, and the interviewees hope that the care services will become more varied. The most important characteristic of the transactions that are made to allocate the care is the amount of information exchanged in the negotiations. The characteristics of the transactions that are made to allocate the care itself are regulated by the Dutch law.

Market Structure

The channel characteristics as explained in section 0 have to be taken into account when describing market structure and the positioning of the intermediaries between insurance companies and care providers. In the maternity care market, demand for maternity care is strongly related to the birth rate and thus relatively stable, but demand (i.e. births) and supply (the care providers in the different regions) are quite scattered. This creates a lack of transparency for both sides of the market and makes efficient allocation of care more difficult. However, this is a situation that may change if more individual health care providers are contracted. The interviewees suggest that this could happen in the near future.
CareAuction is, up to now, the only electronic intermediary in the market. Next to CareAuction, there are a limited number of traditional intermediaries that support the allocation of maternity care, with LTZ being one of them. Another example is ATCzorg. Table 3 summarizes external determinants and factors that describe market structure.

<table>
<thead>
<tr>
<th>External determinants</th>
<th>Market Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search functionality</td>
<td>Quality evaluation</td>
</tr>
<tr>
<td>Transaction structure</td>
<td>LTZ</td>
</tr>
<tr>
<td>Market performance</td>
<td>CareAuction</td>
</tr>
</tbody>
</table>

**Market Behaviour**

The market behaviour of CareAuction and LTZ is described by the functions they fulfill with offering their services. CareAuction aggregates demand for the insurance companies by listing each request for care individually and enabling searching and filtering for the care providers on this data. Furthermore, CareAuction provides a (recently launched) quality evaluation system. The quality evaluation system allows customer evaluations about care providers to be entered into the system and being included in the auction.

The auction mechanism of CareAuction supports the exchange by determining best matches on the basis of preference, quality, and price. On the basis of this match, both parties are notified by the system. LTZ also aggregates demand, but in a different way. Call centers contact LTZ upon having a request from a client. LTZ then allocates the request to one of the connected care providers. The linkage between LTZ and the care providers is not completely clear, though. There are no contractual relations, but "work relations" that developed through the years, more on an informal basis. According to our interviewee, requests were allocated on the basis of preference and price. However, LTZ has one fixed price per insurance company and keeps a margin on each hour of care that is contracted.

Another notable issue of market behaviour is the development of CareAuction as described in section 3. With the introduction of the Electronic Contracting module, CareAuction expands its influence in the health care market by addressing new business segments. With its attempts to increase the number of municipalities that are using the platform to purchase care, CareAuction tries to get more market share in a promising market. Table 4 shows an overview of functions that CareAuction and LTZ fulfill.

**Market Performance**

The services that the two intermediaries offer create added value for the market participants and influence market performance. The added value for one party can at the same time create negative value for another party. Below we describe the added values and their influence on allocation efficiency, prices, and quality.

### Table 4: Overview of roles of the two intermediaries.

<table>
<thead>
<tr>
<th>Role</th>
<th>CareAuction</th>
<th>LTZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand aggregration (search)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market behaviour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market performance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Influence on allocation efficiency, prices, and quality.

3. summarize external determinants and factors that describe market structure.
The most considerable role of CareAuction is the aggregation of individual care requests on its auctioning platform. This creates a high demand-side transparency for the care providers that are using CareAuction. The filter and search functionalities enable them to find potential patients in their regions and support their planning. Insurance companies can publish care requests for their customers with low administrative effort. Furthermore, CareAuction creates supply-side transparency because insurance companies can see who bids on the requests, including quality ratings from former quality evaluations. Next to these added-values, the aggregation of demand brings along some disadvantages for the care providers. The allocation of care via the auctioning platform creates additional administrative burdens for them, as they have to monitor the auctions and fill in details from the auction manually into their own systems. Also, there is limited information about the client available, like region and period of care. However, this can also be seen as privacy protection and thus as a value for the customers.

The reverse auctioning mechanism contributed to a price drop between 2% and 4% in the maternity care market (Smits and Janssen, 2008). This has a direct added-value for the insurance companies (lower costs) and a negative value for the care providers (less revenue). With the quality ratings for every care provider, purchasers of care in insurance companies can distinguish care providers with low prices but also low quality from care providers with a good price/quality relation. However, the patient can only get this information via the call center of her insurance company. The quality evaluation system means less administrative work for the insurance companies, as the quality forms filled in by the patients are processed by CareAuction.

The newly introduced electronic contracting module increases supply-side transparency for the insurance companies in the general health care market by collecting details about offered services, conditions, and other information from a high number of care providers. This comes at a very low additional effort for the insurance companies.

Table 5: Added values of the functions of CareAuction and LTZ for buyers and suppliers.
Our findings contribute to the theory on electronic intermediation by addressing new observations on the added values of electronic intermediaries and the disintermediation of traditional market models. The increased transparency on the provider side enables patients to select better providers and thereby the quality of the provided care services will not suffer from to their side. Moreover, the price impact on the supply side is dependent on whether the insurance companies (are) able to pass the lower prices on to their providers and whether the providers can absorb the lower prices. However, the market power of the providers is not equally distributed, as some providers are more capable of absorbing lower prices than others. Our study shows that electronic intermediation can largely influence market prices through price transparency, as observed in the health care sector. However, the increased transparency also affects the behavior of the service providers, as they adjust their pricing strategies to match the new market conditions. The increased transparency also enables new players to enter the market, as they can offer lower prices or provide new services that are not available from the traditional providers. This results in a disintermediation of traditional providers, as they are forced to reduce their prices or provide new services to remain competitive. Our findings contribute to the theory on electronic intermediation by addressing new observations on the added values of electronic intermediaries and the disintermediation of traditional market models.
intermediaries. The application of a framework that includes industry context next to intermediary characteristics enables analyses of intermediation–disintermediation scenarios on a broader conceptual basis. However, theory on electronic intermediation still lacks systematic approaches that enable identification of opportunities for intermediaries and analyses of the added value they create (Rensmann et al., 2008). This theory enhancement could support decisions concerning the usage of a certain intermediary and the identification of opportunities and threats for electronic intermediaries.

The next step in our research will be the analysis of patient-directed e-health platforms, which create provider transparency for the patients. While CareAuction can be seen as a B2B electronic intermediary, these patient-platforms are B2C or even C2C oriented. This analysis will create a more complete picture of electronic intermediation initiatives in the triangle of markets between patients, insurance companies and care providers.

References