

INTERNET-BASED INTERMEDIARIES - THE CASE OF THE REAL ESTATE MARKET

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ABSTRACT

This paper examines the role of intermediaries in the age of emerging technologies like the Internet and the World Wide Web. After a brief reflection on the differences and similarities between traditional and Internet-based markets and intermediaries from the perspective of economic theory, we outline the case of an Internet-based intermediary in the real estate market. We evaluate its economic success with the help of a decision model and use this evaluation to analyze the need for intermediaries and their future role in the Internet world.

Keywords: *Information networks; electronic markets; Internet-based intermediaries; real estate market; economic evaluation*

1. INTRODUCTION

When the Internet started to establish itself in the corporate world, some observers foresaw a diminishing role for if not the end of, intermediary functions, i.e., market players located between manufacturers (sellers) and end consumers (buyers). Benjamin and Wigand, for example, illustrate that the elimination of wholesalers and retailers from the existing value chain system in the high quality shirt market would reduce the retail price by more than 60% (Benjamin and Wigand 1996). Consequently, it has been argued that manufacturers will use the Internet and related technologies to cut costs and to establish closer links with consumers by bypassing organizations that currently play an intermediary role in the traditional value system. The network would serve as the market, enabling the direct exchange between sellers and buyers.

Computer maker Dell represents a typical success story for the idea of cutting middlemen out of the value chain (Briody 1997). Since the company went public in 1988, it experienced phenomenal growth rates of more than 50% per year with its business model of selling low cost, custom made PCs, laptops, and workstations directly to their customers. Recently, it started using the Web to push its model even further along. The Web is quickly replacing Dell's 800-number as the main entry point for customers. \$2 million in sales (5% of the company's business) are now conducted through Dell's Web site, which allows users to configure their own model and then watch as their customized PC is priced by features on the screen. Big corporate customers can even get their own private and customized areas on the Web site. Although each PC is made to order, the whole process from phone call to loading onto a delivery truck takes just 36 hours. With the help of a sophisticated information technology (IT)-enabled just-in-time delivery model, Dell manages to keep its inventory almost at zero. It also uses the Internet for after sales services. There are plans to give customers the option of including "cookies" on their machines to automatically access Dell's server for BIOS updates and software patches particular to that desktop. The day might come when Dell's support team will be able to monitor end-users' desktops via phone lines for troubleshooting.

Dell is not the only example. But although the Internet is new to the corporate world and although the pace with which technical developments and organizational changes are happening is rapid, the predicted trend towards the elimination of middlemen cannot be observed on a broad scale. A wealth of "counter"-examples is casting at least some doubts on the possibility of ever eliminating the middleman (Wilder 1997).

Pharmaceutical wholesaler McKesson, no longer considers its primary task as being the delivery of drugs and related products to pharmacies and hospitals. The company rather sees itself as being in the business of delivering value and business solutions, consisting to a significant part of software, to its customers (CMIT 1996). Having a tradition of using IT strategically, McKesson today deploys the Internet and related technologies in various ways to connect to customers, whether it be substituting for traditional EDI links, or establishing

an Intranet in support of its sales force. Long-term customer relationships as well as its experience with emerging technologies help McKesson to keep its position as an intermediary in the ever tighter pharmaceutical market, even in the age of information networks.

T-shirt manufacturer Fruit of the Loom uses the Internet to even strengthen the position of intermediaries in its value chain. The company put forth huge efforts to help its major product distributors get started on the World Wide Web and provides support to set up catalogs and implement online purchasing. The distributors display Fruit of the Loom's logo on their Web site, but also have the option to include other manufacturers' products in their catalogs. The manufacturer hopes to increase product and ordering availability without having to establish direct links with its thousands of small customers and to fulfill the logistical tasks related with it (Radosevich 1996).

In this paper we examine the role of intermediaries in the age of emerging technologies like the Internet and the World Wide Web. After a brief general reflection (Section 2), we introduce Abele's Owners' Network, an intermediary in the real estate market, and evaluate its success applying a decision model (Section 3). This allows us to draw some conclusions on the changing role of Internet-based intermediaries (Section 4).

2. TRADITIONAL VS. INTERNET-BASED MARKETS AND INTERMEDIARIES

To put it simply, markets are places (physical or in a figurative sense) where goods and services are exchanged between buyers and sellers (Fourie 1991). The exchange of goods and services between a buyer and seller is called a *transaction* (Williamson 1985). Independently of the nature of the goods and the type of markets involved, transactions can be broken down into three basic steps. First, prospective buyers identify and evaluate their needs and sources to fulfill them, while potential sellers arrange to provide their goods and identify potential customers. Although the exchange of information between the participants of a transaction plays a major role throughout the whole process, it is at the core in the first step, which we therefore call *information* phase. It is followed by the step of *negotiating* the terms of a deal, such as prices and quantities, eventually finalized by a contract, e.g., in the form of a purchase order. Finally, the transaction is *executed* with money and goods being exchanged according to the conditions previously stipulated. Some sort of mutual performance *monitoring* accompanies this step to conclude the deal.

For the purpose of this paper, we use the degree of centralization to distinguish between two basic forms of markets. In *decentralized* markets, buyers and sellers interact directly with each other as is depicted in Figure 1.a. Farmers markets or bazaars as they are found in the Orient are examples. Their usual liveliness demonstrates the high number of direct contacts between market players that are necessary before a transaction can take place.

In *centralized* markets, one or several third parties act as intermediaries between sellers and buyers, such as brokers, retailers, or auction houses (Figure 1.b). They provide prospects with information about the opposite market side and offer additional services like the categorization and evaluation of products, thus assuring quality (Sass 1984, Hänchen and v. Ungern-Sternberg 1985) and establishing trust between the market players (Bailey 1996). They frequently also support or even execute transactions (Hacket 1992). By matching supply and demand, intermediaries improve the coordination between the market participants and help markets to reach what economists call the "market equilibrium." They often act on their own behalf, establishing themselves as a neutral third party. In other cases, intermediaries represent either the seller or the buyer.

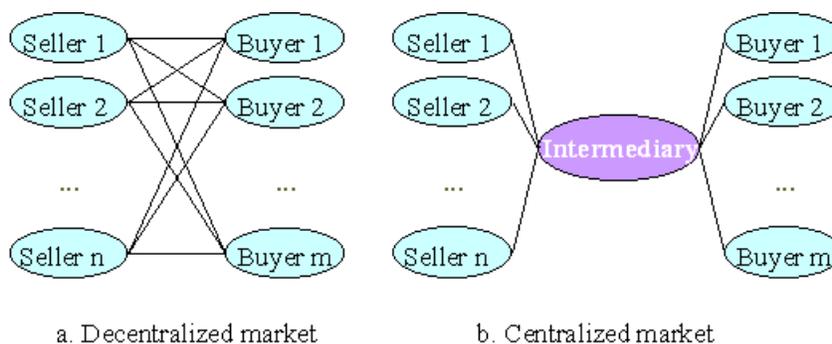


Figure 1 - Basic Market Forms

Figure 1 depicts the basic difference between centralized and decentralized markets: intermediaries reduce the maximum number of contacts that buyers and sellers have to establish in order to gather all possible information (Baligh and Richartz 1967). This may consequently reduce overall transaction costs.

For intermediaries, the number of customers (sellers and buyers they service) plays a different role as a measure of success than it plays e.g. for manufacturers. While for those, the number of customers is important in the way it relates to sales volume, intermediaries are more likely to experience some sort of snowball effect. The sheer number of sellers and buyers already participating in a market may attract new participants, once a critical mass is reached (Markus 1987). In that way, intermediary services show some characteristics similar to network products: the more buyers an intermediary serves, the higher its value for sellers who want to use it as a distribution channel. The parallel holds for the buyer, where the value that the intermediary offers depends on the probability to find an appropriate good, which again increases with the number of suppliers to be reached through the intermediary.

By their very nature, the Internet and World Wide Web support the exchange of information. As a consequence they also offer rich support for trans-

actions which is applicable to any kind of market place - with or without intermediaries. Here we come across an interesting phenomenon. The same argument that is held against the survival of intermediaries, namely that the Internet facilitates direct contact between sellers and buyers and therefore eliminates the need for intermediaries, can also be held in their favor. Innovative information networks facilitate the offering of intermediary services by lowering some of the barriers of becoming an intermediary. In order to determine whether we move towards a world with an increased or rather a reduced number of intermediaries we need to look closely at the situations in different markets. For a further discussion and specification of different kinds of intermediaries in the context of emerging technologies see (Hoffman, Novak, and Chatterjee 1996) and (Sarkar, Butler, and Steinfield 1996). We will discuss the future of Internet-based intermediaries in Section 4 of this paper. In the next section we examine the case of Abele's Owners' Network, an Internet-based intermediary in the real estate market.

3. AN ATTEMPT TO REVOLUTIONIZE THE REAL ESTATE MARKET

3.1 The Traditional Real Estate Market

Real estate is considered "land, that which is affixed to the land, that which is appurtenant to the land, and that which is immovable by law." (McKenzie and Betts 1996, p. 3) A bundle of rights is included with the ownership of a real estate, such as the rights to use it, possess it, exclude it or dispose it. These rights might be restricted or modified by private restrictions, government regulations or laws. Real estate markets show some specific characteristics that distinguish them from other market and from what is usually called a perfect market by economists (McKenzie and Betts 1996).

- Very few people purchase more than four or five private homes during their lifetime, i.e. compared to other kinds of transactions, private persons are only very infrequently involved in real estate transfers.
- Buying a house is usually the single most expensive investment for the average family.
- The government plays a rather dominant role through fiscal or monetary tools and by use of other controls, such as zoning, environmental, and health codes. No two parcels of real estate are exactly alike and it requires some experience to determine the correct value.
- Usually there are only few participants on either side of the market.
- Because the location of the parcels is fixed and properties are usually not movable, real estate markets are rather local than regional or national.

Altogether, the exchange of real estate objects is legalistic, complex, and expensive and requires legal and technical knowledge often not possessed by the average citizen. In addition, buyers and sellers are often uninformed about trends in the marketplace and the resulting lack of transparency can distort the prices paid. It is also less likely that market power is equally distributed than in the case of other markets with more market players on either side. Although real estate prices are indeed influenced by the interaction of supply and demand, the interaction between the market players is usually not smooth.

In order to overcome the imperfections and complexity of the real estate market and to deal with its requirements, market participants often refer to intermediaries (McKenzie and Betts 1996). Eighty percent of all real estate transactions in the U.S. involve some sort of realtor or real estate agent and about a fifth are done by what is appropriately termed as "for sale by owner" (FSBO). Realtors usually perform a variety of tasks and help participants throughout all phases of the transaction, often representing either the buyer or the seller of a real estate object (Berston 1994).

Agents do market research for their customers and provide them with current information regarding selling prices, rents, and other information about specific areas, such as crime rates, schools, or recreational opportunities. Some conduct comparative market analyses and advise sellers of how to prepare their house for selling, e.g., tour the house with the seller and help them prepare disclosure forms. They also market properties, help to set up advertisements or publish the listing in the classified ads section of newspapers. Subsequently, they answer ad calls and qualify buyers. Realtors also advise clients and customers on investment and financing opportunities, and in many cases, they even make them enter the market in the first place, i.e. they solicit prospective sellers and purchasers. Besides, realtors frequently establish personal relationships with real estate owners of a specific area.

In the negotiation phase realtors provide help including open house management, support in stipulating the terms of the deal, writing offers, and setting up contracts. In addition they support the negotiation of property loans, deals with borrowers, lenders or note holders in connection with loans.

Realtors finally provide information and active support for correctly closing a transaction and executing the exchange (McKenzie, Anderson and Battino 1997). They also offer escrow, referrals, insurance, and support to find adequate methods of financing, respectively investment.

95% of all realtors in the U.S. act as "wholesalers" offering complete service packages that cover most of the functions mentioned above. Most of them operate regional, i.e., within a limited geographical area.

3.2 The Approach of Abele's Owners' Network

Abele's Owners' Network was launched in May 1996 with startup money from Angel financing. The Network provides a virtual marketplace that lets buyers and sellers of private homes bypass at least some of the services that

traditional realtors offer. Sellers have the opportunity to market their homes, condos, townhouses or vacant land nationwide on Owners' Network's public web site (www.owners.com) using three different types of listings. Buyers can enter the web site and search for properties down to the city level choosing parameters such as price range and bedrooms. Listings are then rated on the depth of property information.

In June 1997, Owners' Network started to charge potential sellers to have data listed in the database. The fee ranges from \$0 for limited information displayed for a short period of time (category 1) to \$115 for a four-month "ad" displaying extensive information and several pictures of the property (category 3). Subsequent access to the data is public and free of charge to all Web users. In August 1997 about 30,000 homes were available online, equaling \$6 billion in properties.

Apart from making information about homes for sale available online, the Web site offers a number of additional services and information to its visitors. Users can access comparable sales information, run mortgage calculations, obtain maps of the property address, check current weather conditions, and access a customized business directory including information about schools in the neighborhood. The Network also serves as a repository for buyers, sellers, and professionals, e.g., providing transactional information for market participants on the verge of "closing" a deal. Most of the additional services are linked to the Owners' Network Web site but provided by companies other than Abele's Information Service. Plans for the future include the selling of information and other products (e.g., books on real estate issues), as well as advertisements through the Web site.

Located in a renovated factory building in San Francisco's trendy South of Market area, Abele's Information Systems is still in startup mode: In August 1997, staff included four full time employees and five interns. Setting up and maintaining the database accounts for 60% of staff time. Marketing as well as initiating and improving business to business relationships comprise two other major chunks of the company's activities.

PC Magazine acknowledged the quality of the site by awarding Owners' Network as one of the top 100 Web sites in its August 1997 issue, granting it an enormous boost in the number of visitors. The company's CEO names the Web site's ease of use as its number one success factor.

So far, only very few and comparatively small companies are offering services similar to Owners' Network. The company is nevertheless penetrating strongly into other market players' areas. For example, it covers a very important part of traditional realtors' services. With listing information being one of their core assets, real estate brokers naturally refrain from publicizing it freely. Owners' Network makes this information available to end-users that those could not easily access until now. Since traditional realtors are usually not Internet based it also uses a new distribution channel for its services. Newspaper classified ads sections are the second major group of competitors touched by Owners' Network services. Again only a part, albeit a very important one, of

their business is affected. Newspapers generate about 30% of their advertising revenue from real estate ads. With 85% of these revenues coming from realtors, close relationships between realtors and newspapers are a logical consequence.

Owners' Network tries to establish and maintain relationships with both groups and pays attention to carefully balancing each party's interests. Since it covers only a part of traditional realtors' services, it considers the 5% of the realtors who are willing to unbundle their services as their natural partners and plans to team up with some of those realtors. They would offer services complementary to those currently provided the Owners' such as open house management and other functions that are hard to deliver over the Web. Links to these realtors would be added to Owners' Networks Web site, help gain greater attention, and eventually win new customers. The relationship with newspapers' classified ads sections is somewhat more delicate, since traditional realtors account for a significant part of newspapers' business. Eventually, Owners' Network will offer partnering newspapers to add some of their ads to the data base, increasing newspapers' customers range of attention and at the same time enlarging the scope of the data base and boosting its value.

3.3. Economic Evaluation and Success Factors

This section evaluates the approach of Abele's Owners' Network and identifies some of the factors that are critical for its success. For the economic evaluation we use a model based on investment theory. We had the chance to solve the issue of data collection, which is often a major problem to the application of models from investment theory, by conducting three structured interviews with the company's CEO and CFO. For the evaluation we will consider the following parameters:

- One-time costs for setting up the Web-based infrastructure
- Current operating costs
- Revenues, determined by the number of customers

Let us first consider the one-time costs an Internet-based intermediary has to bear to set up the infrastructure necessary to run its business. Estimations of the cost to rebuild the Web site of Owners' Network range from \$500,000 to over \$1 million. These figures include manpower and tools to set up the database, to integrate it with its front end, to develop the graphical user interface, and to enter data into the database. They do not include server services, which were provided by external vendors. The Web solution is based on an SQL Server, and the Web pages are automatically generated from the database. Given the importance that the number of customers has for any intermediary, the volume of data entered into the database is a major success factor for this business. To use a more conservative figure, we will evaluate the setup cost with \$1 million. In the following, a_0 will denote the one-time costs for setting up the business (in period $t=0$).

Major cost components for operating the business fall into categories such as staff, rent, and communication, the latter including Internet access, data base maintenance, and server space.

In the case of Owners' Network, the business operating cost amounted to \$432,000 per year, including \$360,000 for staff, \$48,000 for rent, and \$24,000 for communications. We will assume that these figures will remain constant over the periods $t=1,2,\dots,T$. In the following, c denotes the annual operating costs. The assumption that the operating costs remain constant allows us to omit the time index.

Revenues are basically gained from customers subscribing to Owners' Network's service. The prices for subscription are zero for service category 1, \$65 for service category 2, and \$115 for service category 3.

Let x_{1t} denote the number of customers who sign up for service category 1 in period t ($t=1,2,\dots,T$). x_{2t} and x_{3t} denote the numbers for customers in categories 2 and 3 respectively. Since the revenues gained from service category 1 are zero, we will omit this category in subsequent calculations. $r_t(x_{2t}, x_{3t})$ denotes the business revenues in period t ($t=1,2,\dots,T$), and i represents the internal rate of discount. Therefore, the net present value (NPV) is given by:

$$NPV = -a_0 + \sum_{t=1}^T (r_t(x_{2t}, x_{3t}) - c) \cdot (1+i)^{-t}$$

Because estimating the number of new subscribers to the service is somewhat difficult, we use current figures as a basis. Currently, there are approximately 4,000 new entries per month, i.e., 48,000 new entries per year. Category 2 and 3 each account for about 7,200 entries; seventy percent (33,600) of the subscribers choose category 1. With these figures we can calculate the net present value of Owners' Network's business model.

$$NPV = -1,000,000 + \sum_{t=1}^T (65 \cdot x_{2t} + 115 \cdot x_{3t} - 432,000) \cdot (1+i)^{-t}$$

The model is based on a number of assumptions:

- We assume a perfect capital market, which is needed to apply the concept of net present value.
- We do not consider expansion investments.
- We assume that the operating costs remain constant.
- We also assume constant subscription the prices.

An extensive economic analysis is necessary to overcome these shortcomings. However, the model does provide the basis to gain some insights on the economic value of Owners' Network' business approach. To estimate its busi-

ness success, we set up a scenario with an internal rate of discount of 10%. Assuming that the number of new subscribers will remain constant, we calculate 7,200 entries per year for each, category 2 and 3. As a result, we retrieve an estimated payback period of a little less than 2 years (Figure 2).

In a rapidly changing environment like the Internet, even such a relatively short payback period has to be considered critical. A highly unstable setting like the Internet also aggravates the prediction of future growth rates. In our case, this task is made even more difficult by the short time that Owners' Network has been doing business. September 1997's figure of about 4,000 new entries per month went up from about under 200 at the launch of the Web site in May. PC Magazine's award in its August 1997 issue accounts for much of the 200% average growth rate per month over the first quarter year.

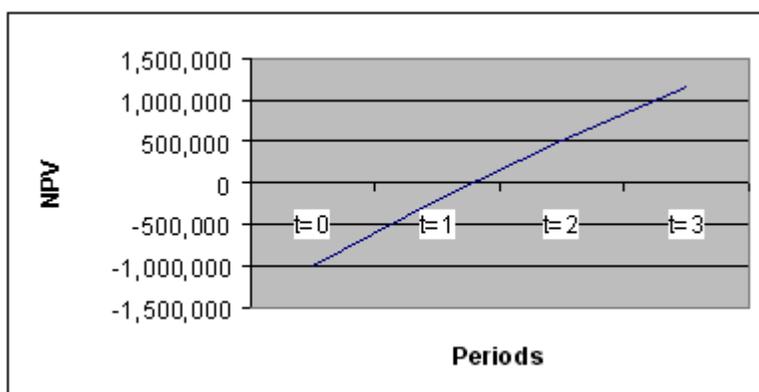


Figure 2 - Business Scenario Based on Net Present Value

Further sensitivity analysis shows that the number of subscribers is the main success factor for Abele's Owners' Network. For example, if we assume that there will be just one competitor in the future taking a share of 25% of the subscribers, the results show that, other things being equal, Abele's Owners' Network would need almost a 3-year payback time. It turns out that the economic evaluation and consequently the company's success is very sensitive to its growth rate. We will have to keep this issue in mind when identifying some of the critical success factors.

Owners' Network has the potential to change the way sales of private homes are conducted today in several ways. By making use of the ubiquitous information network, which is the World Wide Web, it achieves global reach for a type of service that used to be oriented rather locally. The multimedia capabilities of the Web add additional functionality to traditional communication media. For example, Owners' Network could provide services such as an online three-dimensional walk through properties. Hyperlink-technology allows pointing the

user to additional sources of information, including links to services from business partners.

The company's success is based on several factors. Our economic evaluation showed the importance of appropriate growth rates. The company depends on a sufficiently high diffusion of the Internet and World Wide Web into private households and the willingness of people to use it for the services offered, including payment. Although Internet-based commerce is growing at rapid pace the time might not be ripe as yet: about 60% of U.S. households still don't own a computer, and about 85% don't have a modem. According to America's Research Group, currently only 5% of the population has any interest in using the Internet as a retail outlet, and more than half of the consumers who have purchased something online say they are not sure they will do so again (Investor's Business Daily 1997).

Owners' Network's concept to offer additional services can help generate additional revenues and overcome the need to achieve payback by merely boosting the database. However, this means to overcome additional hurdles. The collaboration with other information specialists requires reliable business partners providing high quality services and the ability to maintain up-to-date and online around the clock. Partnering with realtors for open house management and to establish personal relationships in a neighborhood requires realtors who are willing to unbundle their services. Finally, revenue generation from setting up a comprehensive pool of information requires users who are willing to pay for information services. This means a major change in the so far mostly "free" world of Internet information access, in the case of Owners' Network, especially concerning the buyer side. Generating revenues through advertising might be a more realistic option, putting the Network into company with a fast growing number of fellow advertisers. Analysts expect that Web advertising will approach the \$1 billion milestone by the end of 1997 with consumer brands constantly reducing the almost monopolistic share tech products hold so far (Business Week 1997).

4. OUTLOOK: CHANGING MARKET STRUCTURES AND THE FUTURE OF INTERNET-BASED INTERMEDIARIES

The basic function of Internet-based intermediaries does not differ significantly from their traditional counterparts: by creating a central point of reference for buyers and sellers, they reduce the maximum number of potential contacts between trading partners, subsequently reducing transaction costs and improving the matching between supply and demand. With the Internet cutting information cost and facilitating direct connections between businesses and consumers world wide, the question arises whether a replacement of intermediaries might be the result (Gellman 1996).

Figure 1 (Section 2) visualizes the basic effect that intermediaries have on the maximum number of contacts market participants have to establish in order

to gain complete market information. In a market with n sellers and m buyers, an intermediary reduces this number from $n*m$ to $n+m$ (Baligh 1967). Assuming that information costs are the same at all edges, it is obvious that intermediaries provide overall value as long as these costs are above zero. Even if the Internet does reduce information costs, we can hardly imagine that these will become zero. Additionally, if we consider time and efforts necessary to search for an offer or special information, we can conclude that at least one intermediary per market will remain necessary, even in an "Internet world."

Additional factors have to be taken into consideration. The model of Baligh and Richartz only draws upon the costs for matching supply and demand. Additional services (add-ons) that intermediaries offer are not part of the model. In an increasingly complex and global business world, however, the importance of such additional services seems to increase. From there, we can derive maybe an even stronger value proposition for intermediaries.

The ubiquity of the Internet and the ease of market entry allow the spread and integration of so far geographically separated market places. As a result, the number of buyers and sellers entering the market space might increase. Lower transaction costs and the availability of higher quality information would encourage potential sellers and buyers to actually join the market which, in turn, might positively influence market characteristics such as size, purchasing frequency, and in the case of the real estate market maybe even people's overall mobility.

Our case study clearly demonstrates two differences between Internet-based and traditional intermediaries: the ubiquity of the Internet makes it easier to offer services on a global basis and innovative communication and IT allows easier collaboration with business partners to provide complementary products or services. This will probably increase competition in the short run as new players such as Owners' Network enter markets with long-term established intermediary structures. Intermediaries facing global competition might not be able to compete in several different fields, and in order to offer a world-class service, they might have to specialize. The unbundling of services and more outsourcing of functions to digital actors could be the consequence with the result of an increase in the number of market players. On the other hand, these players would then have to act on a broader, even global basis, potentially reducing the number of players necessary to saturate the market.

The analysis of specialization in networks is not a new research area. Piore and Sabel (1984) coined the term *flexible specialization* for networks that are characterized by an extensive horizontal and vertical division of work among relatively flexible companies, which tend to concentrate on their core competencies (see also Prahalad and Hamel 1990, Sydow 1993). Networks characterized by flexible specialization seem to have experienced a major push in recent times, with the Internet replacing some of the importance that geographical proximity used to play to glue the network participants together.

This phenomenon can also be illustrated with our case study. Abele's Owners' Network specializes in a rather narrow segment of a well-established mar-

ket. It uses innovative technology for global reach as well as for connecting with business partners. By integrating its services with other similarly specialized market players, it helps to create a one-stop transaction network servicing a global user community. Some of the services included in the network will always imply physical presence, such as open house management, while others will make use of the Internet's global nature. Ultimately, customers will find the same range of services they would have access to by using traditional realtors. The Internet provides the medium to access real estate broker services, which are offered in modularized way by several market players linked with the help of technology and other bonds (Figure 3).

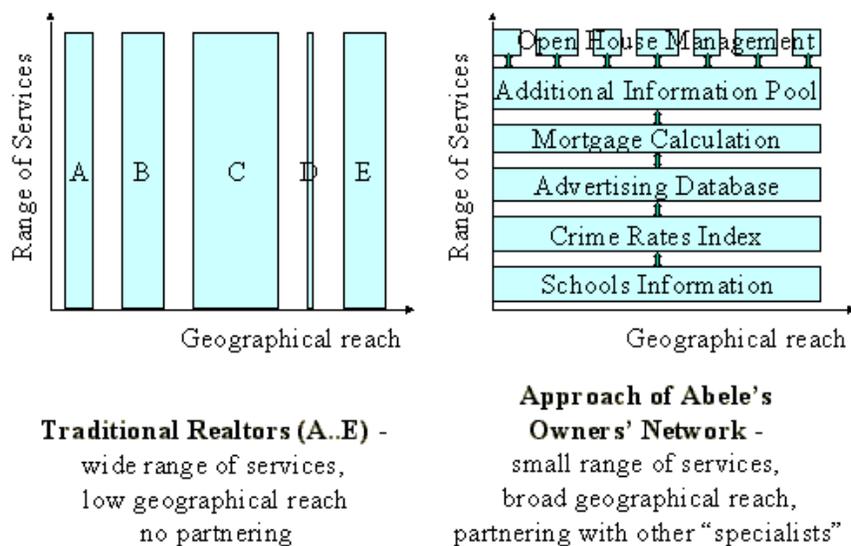


Figure 3 - Changing Industry Structures?

Like a stone forming wider and wider rings when thrown into calm water, changes initiated by Internet-based intermediaries like Owners' Network might have broader consequences than it is obvious at first glimpse. For example, Owners' Network could have a two-fold effect on the cost of conducting a real estate transaction. By only offering part of traditional realtors' services, it is able to charge far less for its services. That means customers save at least part of the brokers' fees. Ultimately, the majority of realtors could see a need to unbundle their services, intensifying this development and letting customers choose the services they want to pay for. Moreover, by decreasing coordination costs, the emergence of Internet-based intermediaries could increase market transparency and market participants' product knowledge.

There are many indications that intermediaries will continue to offer economic value in the Internet age. Their role will change, however, and more research is necessary to determine the likelihood that the scenario depicted in

Figure 3 will play a significant and lasting role in future markets. Other important research issues will include the overall impact of emerging technologies on the number of market players, market transparency, levels of product standardization and specialization of the market players, and the question whether we see a move towards more perfect markets.

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An electronic version of the real estate industry, internet real estate is the concept of publishing housing estates for sale or rent, and for consumers seeking to buy or rent a property. Often, internet real estates are operated by landlords themselves. However, there are few exceptions where an online real estate agent would exist, still dealing via the web and often stating a flat-fee and not a commission based on percentage of total sales. Internet real estate surfaced around 1999 when technology. Additionally, real estate investing often involves expensive intermediaries such as fund managers, further raising the barrier to entry. However, blockchain technology is looking to disrupt real estate investing by providing a way to decentralize the process through crowdsourcing and tokenization. Tokenizing real estate assets refers to a process in which a property owner can offer digital tokens that represent a share of their property. Using a blockchain to track these investments, with each transaction being time-stamped and immutable, makes it possible to limit the risk of fraud. This approach makes it easier to establish a market for property "micro-shares," creating the potential for a property to effectively have numerous co-owners with a stake in potential returns.