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## **Economic Aspects of Electronic Commerce in Financial Services and Advantageous Steps to Extended Offers in Internet Bankin**

by

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# Economic Aspects of Electronic Commerce in Financial Services and Advantageous Steps to Extended Offers in Internet Banking

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## Abstract

*In this paper we report on the results of two projects our research group is presently conducting. We start out with sketching preliminary results of a long-term government project geared to reveal efficiency conditions for successful electronic commerce particularly in the financial services field. We address questions relating to the innovative use of new channels for distributing financial services focusing on Internet banking. Our government research funds are devoted to help German financial services firms on their way into the digital economy and particularly to advise German banks in applying Internet technology in novel ways to new and promising applications. Thus, along with the research sketched above, we are engaged in a joint project with an innovative German bank, the Munich-based Advance Bank. This direct banking firm is currently extending its telephone banking technology by simultaneously employing Internet communication for consultation-intensive customer processes such as mortgage loans (intelligently combined with other financial products). Based on our joint project, we present a brief case study of the bank's market and technology strategy and identify some problems encountered when employing Internet technology to open new markets successfully.*

## 1. Introduction

In recent years customers' demands on financial services firms have changed significantly. For example, due to increase in income and improved information on financial services, customers are becoming more price-sensitive, more rational in decision making and thus more challenging to the vendors. As a consequence, the significance of traditional banking products such as low-interest saving accounts decreases when compared to innovative substitutes such as after-tax oriented money market accounts and the like. Moreover, the tradition of one "bank for a lifetime" is rapidly becoming obsolete. In Germany, for example, the percentage of customers with more than one bank affiliation has grown from 36% in

1986 to 49% in 1994 [1]. In the UK, as in other European countries, the market share of the traditional branch banking has dropped significantly (in the same way as the market share of traditional exclusive agents in the insurance market did) [2]. Thus there is decreasing demand for financial services to be offered in a geographically dispersed manner. On the other hand, IT-based demand is increasing and markets serviced by telephone networks, proprietary online networks and the Internet have been or are currently evolving.

The sophisticated choice of products, channels and suppliers available to customers is closely related to the availability and actual usage of novel kinds of distribution channels and information and communication technology by financial intermediaries. Computer integrated telephone (CIT) technology, for example, enables efficient handling of incoming and outgoing telephone calls with limited manpower, accessing stored customer data simultaneously with the voice call. Online banking reduces the need for banking employees by pushing the work of data entry downstream to the customers' home or workplace, giving them the advantages of 24-hours-availability of the services offered in return for doing the work by themselves. This is true for Internet banking on a global scale. This means that such technologies promote a demand-specific and efficient processing of customer contacts and transactions. They help to "bridge the gap" between geographically dispersed customers and centralized financial services firms.

Compared to traditional branch banking, these technological developments make it much easier and cheaper (cf. Section 3) for customers to contact and compare financial services firms and to establish multiple banking connections. The same holds for traditional insurance companies with exclusive sales representatives or exclusive agents in the field. But obviously, the shift of demand structures does not make branch offices redundant, as the case of ATM machines shows. Many banks have already transferred most of the cash transactions to ATM machines. However, branch offices of competitive banking firms are still busy, but doing much more complex transactions than cash deposits and

withdrawals. It can be expected that novel distribution channels in a similar way will complement, but not completely substitute traditional branch banking. "Retail banks will not become obsolete, but their current business definition will" [3] is one of the key messages with respect to the financial services sector of Evans and Wurster in their HBR-paper on "Strategy And The New Economics Of Information". They predict that due to the explosion in the number of people and organizations connected by Internet, Extranets and Intranets with open standards traditional economics of information and organizational forms such as hierarchical structures based on them are being blown up. They recommend that executives "mentally deconstruct their own businesses", analyze their value chains with respect to possible entry points for new competitors and take up the corresponding chances in networked markets by themselves. They conclude that "if they don't, someone else will" [3].

Recent research on the European market also indicates that a large number of customers is ready to consider these new IT-based distribution channels and establish financial service relationships on the markets serviced by telephone networks, proprietary online networks and the Internet. It is expected that the market share of these distribution channels will increase from 5 to 15 or even 50 % ([4], p. 6).

The remainder of the paper is organized as follows. The focus of Section 2 is to suggest promising supply strategies for new entrants to markets on networks as well

as for traditional banks. A brief case study of the Munich-based Advance Bank illustrates the bank's market and technology strategy of extending its telephone banking service by simultaneously employing Internet communication (Section 2.2). Based on these considerations the vision of a physically decentralized, but virtually centralized banking firm will be outlined in Section 2.3. In Section 3 an analysis of economic factors such as search costs reduction over time and a discussion of market implications is given. Section 4 summarizes the paper and gives an outlook on further research. Figure 1 presents an overview of important terms used in this paper.

## 2. Supply Strategies

The changing demand structures discussed in Section 1 and the technical availability of electronic distribution channels like the ones outlined above offer various options for suppliers of financial services to design their distribution system. At first sight the advantages of establishing new distribution channels with respect to costs, market-reach and potential penetration seem to be promising. But obviously a "blind" investment in novel forms of distribution can also have severe disadvantages: A traditional branch based bank establishing a separate direct banking firm with lower margins could suffer negative externalities by

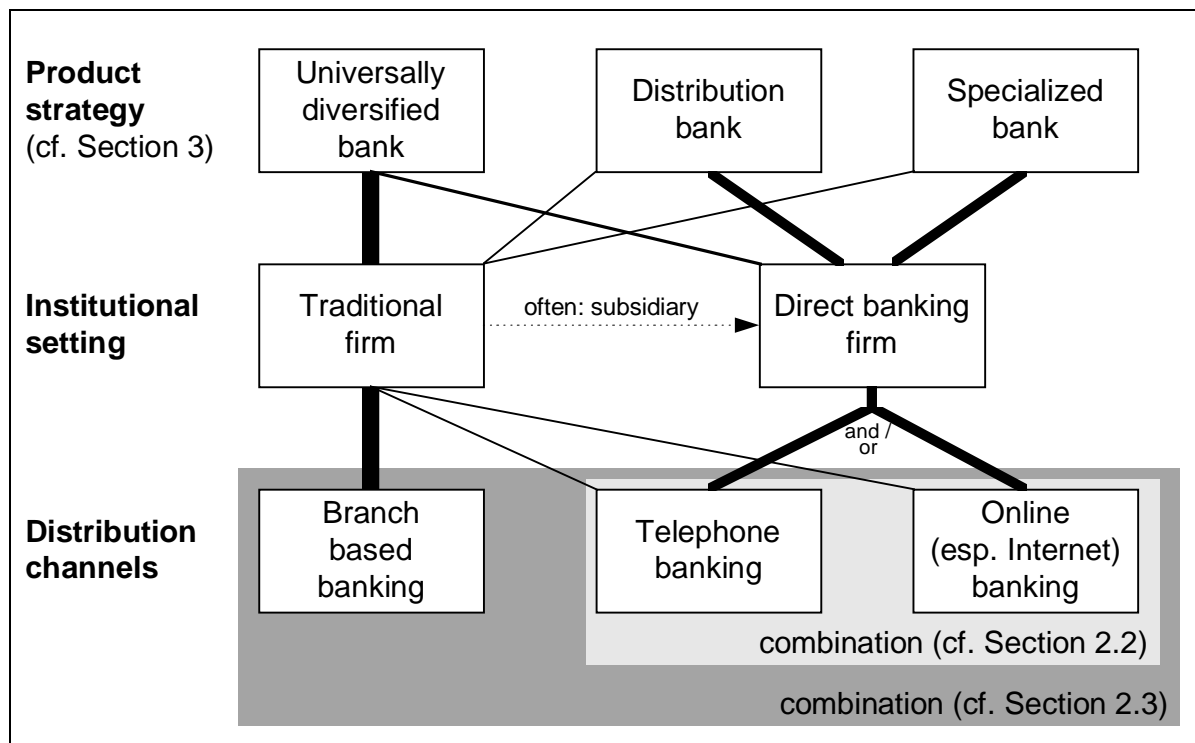


Figure 1. Types of banking and distribution of financial services

cannibalizing their traditional market and jeopardize overall profits. On the other hand, new entrants will also consider how to make best use of various distribution channels including the question of whether or not it might be advantageous to combine innovative forms of distribution with (the advantages of) traditional ones, and if so, in what way the banks should proceed. Thus, in the following sections we will address the question of which factors influence these decisions and make some suggestions for the appropriate choice and design of distribution channels.

## 2.1. Physical Centralization

Traditional branch based banking is characterized by physical decentralization. Financial services firms are ubiquitously present by maintaining a close net of locations. This structure allows these firms to offer a regional or even nationwide homogeneous service level - at the cost of a large number of staff and high fixed costs for running offices. Above-average demand variations need to be met by each location separately implying on the average suboptimal "capacity utilization" and "excess staff".

Telephone and online banking provide the option of physical centralization. A financial services firm or a business unit using these distribution channels can centralize consultants and / or information systems in one single location, the call center in the case of telephone banking. Nevertheless, the firms are able to maintain the same or even much larger presence (i.e. an ubiquitous availability) as firms using traditional channels only. This is particularly true in Germany where business hours of bank branches are limited by legal provisions, whereas telephone and online banking services can be offered 24 hours a day and 7 days a week.

Obviously, neither for a branch office nor for a physically centralized call center it will be optimal to provide a constant capacity over time. Since a branch's capacity planning is restricted by business hours and collective agreements that strongly limit market responsiveness, sophisticated tools for capacity planning in telephone banking have been developed. Based on detailed records of incoming calls, call centers cope with demand variations over time by flexible assignments of human resources, e.g. shift-work, part time employment, outsourcing of demand peaks to "overflow call centers" [5]. More formally, one can analyze this problem by employing queuing theory. In [1] the following is shown: Due to the fact that demand variations over time combined in one single queue are always less than the sum of variations in a larger number of queues, it is always cost optimal to route total demand to one logical queue. The effect is well known from inventory control for stochastic demand, i.e. that a single stocking location always requires less inventory for equivalent service

levels. In our case this means that less human resources are needed for equivalent service levels in the centralized case. Moreover it can be shown, that in this case the profit maximizing firm provides a higher optimal service level than in the decentralized case. Thus, in the central case firms can optimally operate with extended business hours and / or with reduced staff.

In reaction to the changing demand structures and increasing costs of operating branch systems, many European banking firms have already pursued a strategy of diversifying into telephone and online banking. Most of the major banking firms have done both, establishing direct banking firms exclusively offering telephone and online banking and complementing the traditional distribution channels by additional telephone and online offers. A major advantage of the direct banking firms stems from the independence from their parent companies. A customer and service-oriented corporate culture can be formed, free from the collective agreements of the traditional firms. New information systems can be designed without the traditional firms' burden of legacy systems. In Germany, some firms such as Dresdner Bank's direct banking subsidiary underestimated this problem. Now it faces major disadvantages with respect to product flexibility in general and particularly with respect to time to market due to legacy systems integration, probably resulting in not entering the market at all. The choice of "best-of-breed"-partners and products allow direct banking firms to provide high quality services more effectively than traditional banks. On the other hand, these firms, as new entrants on the market, have to invest significant effort to establish their reputation and customer trust, two key factors in a successful distribution of financial services.

Due to financial restrictions, for new entrants the only way to enter the market is establishing a single, physically centralized firm for telephone and/or online banking. For traditional universally diversified banking firms, as dominating in many European countries and in Japan, this is only an option among others. Obviously, at present the time to market and other advantages of separate direct banking firms are valued higher than the advantages of an integrated approach probably improving the synergy of the services portfolio. We will discuss the option of integrating traditional and the novel electronic distribution channels in Section 2.3.

Technologically and organisationally, telephone banking and online banking have mainly been used as strictly two separate ways to contact customers at present. This is true for both traditional banks and direct banking firms. Thus, in the following section we will describe a direct banking firm employing the concept of combining telephone and Internet banking to achieve an integrated "Two-channel-distribution".

## 2.2. Case Study: Germany's Advance Bank

Experience with direct banking has shown that selling banking products without advice at discount prices attracts price-sensitive high-income customers [6]. While this works well for less complex and standardized financial products, customers increasingly ask for complete solutions to their individual financial needs. As individual solutions often require the combination of several complementary products [7] this implies the need to offer a wide range of financial services. Because of interdependencies between different products and the complex know-how involved, consulting services become the key to successful implementation of such a sophisticated cross-selling-strategy with intelligent product combinations [8].

Thus, the focus of Advance Bank, a Munich based direct banking firm targeting at high-income customers, is not a pure discount strategy, but the 7-days-a-week-at-18-hours-availability of experienced consultants via telephone. Obviously, sophisticated system support is needed for producing and distributing complex financial services.

The idea taken up by Advance Bank as a result of a brainstorming session with our research group, is to offer the system support shown in figure 2 [9] to both telephone consultants and customers simultaneously. Technically, the system architecture is based on an agent oriented

approach (developed in the project ALLFIWIB [1], [7]), where different lines of business are represented by separate software agents cooperating via a centralized blackboard to construct a bundle of financial services specifically tailored to the needs of a customer and presenting the results online to the customer. The blackboard is resident on the bank's LAN. The customer can access the system via Internet / WWW. When a session is started, a JAVA based "customer agent" is automatically downloaded to the customer's computer supporting him by formally specifying the problem and its parameters such as tax rate and time preference rate. When the problem is specified and then transmitted and stored on the blackboard, the software agents cooperatively solve the problem by successively writing partial solutions and eventually the complete one onto the blackboard. For example, a customer asks for financing a private home. Software agents for home loans, for leasing contracts, for life insurance, and so forth, may participate in the process of solving this problem, each contributing parts of several feasible solutions to the problem. The customer agent reads the solutions, evaluates them, and presents them to the customer.

The consultant uses the system via a JAVA application. For a close interactive contact, both customer and consultant can simultaneously work on a consultation. Integrated with the telephone, the system

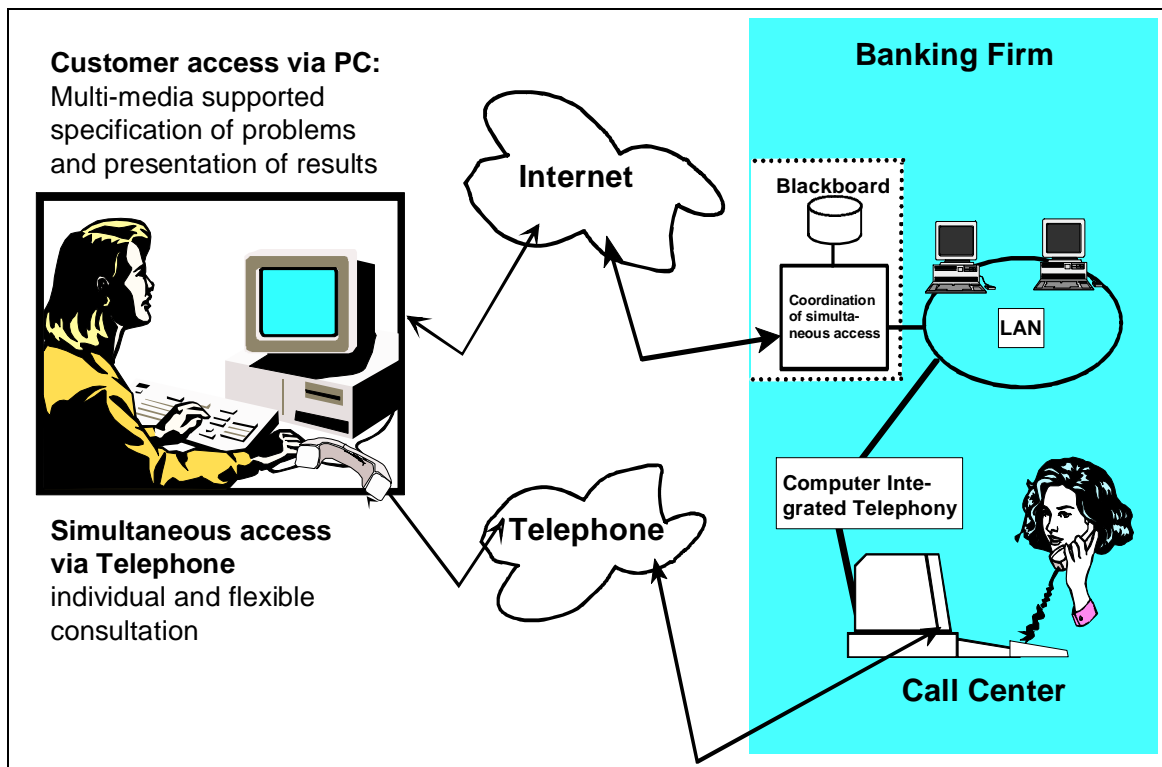


Figure 2. Integrated Internet and telephone banking

offers the opportunity of a parallel data and voice communication of customer and consultant. Thus, the advantages of the telephone communication such as individual and flexible contact can be used at the same time as the advantages of the WWW such as the multimedia support for specifying problems and presenting results.

In a joint project, Advance Bank, Andersen Consulting, our research group and other partners are implementing this approach for the first time in Germany to support customer consulting for complex financial services, namely customized home loans for high-end customers. The use of ISDN (featuring two separate channels for e.g. voice and data communication; more than 3 million connections in Germany) and cellular phones (to be used for voice communication, while the traditional analogue telephone connection serves for data communication via modem) is rapidly growing. Thus, Advance Bank expects to successfully introduce this novel distribution form by 1998. Experiments and prototype-based field tests have shown that consultation time can be reduced significantly compared to pure telephone consultation. This is mainly due to the fact that errors of data entry are reduced because personal and problem data can be entered by the customer himself instead of communicating these data to the consultant on the telephone, and due to the advantages of simultaneous data and voice communications with the consultant.

This study illustrates the fascinating prospects of combining the advantages of two distribution channels at the same time, the telephone and the Internet, while eliminating the problems of the channels when used separately. Such troubling issues include the lack of clearness and the complicated "data communication" via telephone, and anonymity and missing individuality via WWW) [1].

### 2.3. Further Steps: Virtual Centralization

Looking ahead, another option for using telephone and Internet banking outlined above could be its re-integration with traditional branch banking (not only the separate use, but parallel to branch offices as many banking firms are offering today). The idea is to establish a distributed call "center" structure where consultants are located decentrally for personal consultation in branch offices as well as providing consultation via telephone and Internet in times of below average local demand. If intelligently designed, this option could combine the advantages of both, branches and direct banking: If telephone consulting is accessible via a unique telephone number, incoming calls can be allocated to one queue allowing an easy levelling of local demand peaks by routing the calls to free consultants with below average local demand - in the same way it works in a centralized call center. On the other hand, when the consultants in a branch office are

confronted with peak local demand, telephone and Internet demand is routed to other branch offices shifting total human capacity to the demand for person to person communication in the branch office.

This approach of virtual centralization and physical decentralization provides a number of additional options. Specific customer demand via telephone and/or Internet for his personal consultant or a consulting team (if the banking firm decides to employ an Ownership of Customers - approach [10], [11]) can be routed to this consultant with top priority. Only if the personal consultant is busy due to person to person consultation in the branch office or due to online consultation, this excess demand has to be re-routed to other branch offices or a central overflow call center. If there are regional or cultural differences to be considered, it can be ensured that the customer is routed to a consultant speaking the required language. Most of the time this will be the one that is close to the customer with respect to local accent, culture etc. In the case of many European countries where telecommunication costs depend on distance, this approach additionally reduces telecommunication costs. It is obvious, that these aspects are already important for firms operating on the national level, but they are key for an international strategy. At least in Europe with the common market and a common currency evolving by 1999 it is crucial to combine such an internationalization strategy with regional differentiation at the same time. For the US market, a strategy of virtual centralization and physical decentralization may be one promising response to the liberalization of the banking industry and the implied reduction of functional and geographical separation.

### 3. Market Implications

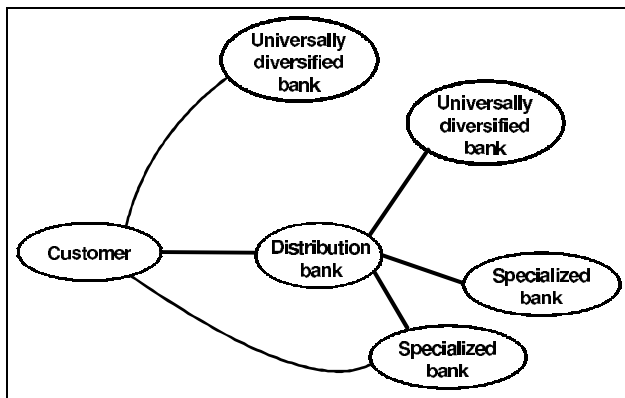
A financial services firm's choice of an appropriate mix of distribution channels is closely related to the question of what products should be offered by the firm. Buying from a branch based bank, customers will probably prefer a "one-stop-shopping", due to high search and transportation costs, and thus expect a broad range of products offered by the bank. For a customer searching for products in a market on a network such as the Internet, it may make no difference finding the products from several different firms if the search costs of finding them are sufficiently small (e.g. by bundled complementing offers of several firms on a value-added Web site).

A look at the current European situation reveals three basic types of suppliers (cf. figure 3):

1. *Universally diversified* banks can be traditional branch based firms as well as direct banking firms. They operate as "multi-specialists" [12] offering a broad range of financial services produced in-house. The main advantages of these suppliers stem from their economies of scale, from synergy between the

different lines of business in producing financial services and from risk reduction due to diversification.

2. *Specialized* banks are offering solutions to distinct financial problems. These firms operate as direct banking firms (for example brokers offering telephone or online discount brokerage services) or as pure production banks without retail distribution system (for example banks offering home loans distributing their products via realtors). These firms' competitive advantages are mainly their economies of scope and, as they are comparatively small, their performance oriented corporate culture.
3. *Distribution* banks bundle and sell (the best) offers from several producing banks. They have the opportunity of unbiased consultation, without any interest of selling products produced in-house. This makes it much easier for these firms to create a good reputation and earn customer trust. Thus, for new entrants onto the markets, the concept of the distribution bank can mitigate their problem of the customers' missing confidence in their performance.



**Figure 3. Types of suppliers**

It is often argued that the presence of financial intermediaries will become obsolete on markets on networks such as the Internet due to decreasing search costs for consumers seeking appropriate offers. Although some examples of disintermediation has been observed, such as issuing shares via the Internet or bypass trading [13], this argument ignores the fact that intermediaries are much deeper involved in financial contracting than just "technically" linking the appropriate partners. For example, they secure the solvency of the parties involved and so forth. Thus, in general it is highly unlikely that financial intermediaries will become obsolete in general [14]. Those however, which make no use of these novel technologies as platforms for their business, will actively contribute to their own obsolescence.

Under which conditions will suppliers from the types outlined above be successful in the long run, or will other types emerge, or will the role of intermediaries change [15], [16] ? These are questions that our research group is

attempting to answer while working on a long-term government funded project designed to reveal efficiency conditions for successful electronic commerce, particularly in the financial services area. A very special question arising out of this work is, what is the influence of increasing market transparency, indicated by decreasing search costs, on market structure and price level, as well as whether or not even low quality suppliers have a chance to survive on ever more transparent markets residing on networks.

To find an answer to these questions we consider the idea of a simple equilibrium model (cf. [17], [18]). We assume a market with two suppliers of financial services: a supplier of good quality G and a supplier of bad quality B; in other words, G is able to produce a higher value for its customers than B. As an example, a bank G selects for each customer individually from all investment funds available on the Internet, while bank B only offers its own funds. G and B both charge a consultation fee  $f_G$  and  $f_B$ , respectively. Customers buy 1 unit of the service from either G or B. They face the choice of either finding G or buying randomly from one of the two suppliers. If customers perform a costly search process they will find G with probability  $p=1$ . If they do not search they will buy from G or B with probability  $p=.5$ , respectively. Thus, a customer will search and buy from G if the value of G's service minus search costs is higher than the average value of the G's and B's service that is expected when buying randomly. Customers are assumed to be heterogeneous in their valuation of search costs (including communication costs and search time spent): They suffer individually different disutilities of search. As it can easily be shown, under the plausible assumption that G produces a sufficiently high value and its marginal production costs are sufficiently small, a unique (Nash) equilibrium of consultation fees  $f_G^* > f_B^*$  exists, maximizing profits of both suppliers.

Now suppose that search costs decrease at the margin. Then, as shown formally in [18], price dispersion  $f_G^* - f_B^*$  decreases due to the increased transparency of the market. The economic reason for this result is that, in order to maintain market equilibrium, B has to decrease its fee  $f_B^*$  more than G. The more transparent the market in terms of low search costs, the more the low quality supplier has to "pay" for its inferior quality by a reduction of fee as well as by a reduction of the number of customers. The supplier of high quality responds to the decrease in search costs by an increase or at least by a lower decrease in  $f_G^*$ . Thus, price dispersion  $f_G^* - f_B^*$  becomes larger with decreasing search costs.

Looking at the equilibrium profits of B and G shows that B's profit decreases with decreasing search costs in any case. G however, might lose or profit by the reduction of search costs, depending on the heterogeneity of the customers. If customers are comparatively homogeneous, G responds to a decrease of search costs by an increase of

its fee  $f_G^*$  or by a small decrease, being compensated, in terms of profit, by a larger number of customers. If customers are comparatively heterogeneous, the necessary reduction of  $f_G^*$  can not be compensated by the increase of the number of customers buying from G. In this situation neither B nor G are interested in introducing a search cost reducing technology such as search engines or electronic shopping malls. Both suppliers would suffer from decreasing profits (for details cf. [18]).

Of course, this model is very simple and has several limitations, including the dichotomy of searching or not. But at least we learn that statements like "Markets on networks like the Internet are characterized by a steady decline of search costs. Therefore, price dispersion will disappear from these markets" are not as obvious as they seem at first glance.

#### 4. Summary and Outlook

After a preliminary analysis of both the changing demand structure and supply strategies on the market for financial services, we briefly presented the case of Germany's Advance Bank. It illustrated how a physically centralized direct banking firm can establish closer contact to their customers by combining the advantages of two channels, namely Internet and telephone, so that both the customers and the bank can profit from this form of "two-channel-consultation". Based on theoretical investigations with respect to queuing aspects resulting from varying local demand, we presented a vision of virtual centralization and physical decentralization and discussed a number of organizational options in changing markets both in the US and Europe. In the discussion of market implications we took a closer look at the effect of reduced search costs on market equilibria and showed that plausible and widespread expectations are contradicted by the analysis. The current and future work of our research group is conducted in close cooperation with partners from the scientific community and the German banking industry. It will focus on problems such as posed above and will address, but is not limited to, the following questions:

- Given that Internet technology is both, ever more cheaply accessible and available globally, under which conditions will margins in the digital economy keep decreasing? Is there even a long-term tendency to a perfect market with margins converging to zero?
- If so, under which conditions, how and to what extent should a financial services firm invest in such a low-margin market and jeopardize or even cannibalize traditional high-margin markets? Given that the digital economy is becoming increasingly global, under which conditions do firms even have a choice to cannibalize their current high-margin businesses or not?

First results of current work in progress related to these questions indicate, that global competition may imply an innovation rate far too high not only for the incumbents acting on traditional high-margin markets, but also for the society as a whole, with respect to its social welfare function. In a closed economy, government can slow down the innovation rate to the socially optimal level by choosing appropriate tax rates and terms of depreciation. In the open global economy with firms acting on competitive markets this is impossible: The rate of innovation is determined by entrants acting under best investment conditions worldwide. Thus neither firms nor governments of open economies have a choice of slowing down the innovation rate if they want to stay in the market. Further questions addressed include the following:

- Considering the Internet's potential as a platform for both selling and producing intelligent combinations of financial products, which are the preconditions for more or less financial intermediation?
- What are the success factors for banking firms versus software firms to successfully attack these emerging digital markets?

In the presentation at the HICSS conference, we are able to provide some more answers to these questions as a result of current work in progress.

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