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TRANSACTION STREAMS:
DEFINITION AND IMPLICATIONS FOR TRUST IN INTERNET-BASED ELECTRONIC COMMERCE

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Abstract

In this paper we analyze how transactions related to the exchange of goods and services are being performed on the Internet. The adoption of electronic markets in an industry has a disintermediation potential because it can create a direct link between the producer and the consumer (without the need for the intermediation role of distributors). Electronic markets lower the search cost, allowing customers to choose among more providers (which ultimately reduces both the costs for the customer and the profits for the producer). In this paper we contend that electronic markets on the Internet (1) have the opposite effect, resulting in an increase in the number of intermediaries. We introduce transaction streams which model how transactions are being conducted and help explain the types of new intermediaries that are appearing on the Internet. We also describe mechanisms by which companies are exploring ways of extending transaction streams. To illustrate the model and validate our findings, we analyze transaction streams in the insurance industry and review associated concepts such as trust and brands.

(1) We use the Internet as an example of a relatively mature electronic commerce infrastructure. Similar conclusions can be derived in other networks.

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1. Introduction

The market value appreciation of Internet services IPOs YTD (1980-1997) is $4,773M (Meeker, 1997). In only five years, the Internet may reach 150M users. The Internet is used in practically all industries, in ever more global and sophisticated manners. The convergence of industries such as telecom, office equipment, consumer electronics, computers, and media and publishing into emerging information industries is having profound effects on the everyday businesses we take for granted. It is no longer necessary to buy newspapers at the local newsstand because they can be read over the Internet. Encyclopedias are not the mammoth books collecting dust on the shelf, but small interactive CD-ROMS to be enjoyed with a computer. And airline tickets do not need to be reserved through a travel agent for a fee; they can now be ordered directly through a computer.

Understanding the current success stories on the Internet is an interesting endeavor for two reasons. First, it is an interactive environment with the full functionality of any other interactive environment (with some bandwidth limitations which restrict in some instances the exchange of real-time information such as video). This means that by understanding market dynamics on the Internet, one should be able to extrapolate and apply market behavior in other interactive environments. The next section explains the basic functionalities that make the Internet a generic interactive network. Second, it is based on open standards and is largely unregulated. Thus, it is in constant flux, adapting itself to the evolving characteristics of demand. We could say that the Internet is a lead user interactive network similar to Von Hippel's lead users concept (Von Hippel, 1985; 1988).

Including this introduction, this paper has nine sections. In the second section (Internet Functional Properties) we outline the functional properties that characterize the Internet, concentrating on those which impact the way transactions are being performed. In the third section (Electronic Markets) we review the existing literature on electronic markets. In the fourth section, Transaction Processes, we describe the five fundamental steps in performing a transaction. In the fifth section (Transaction Streams), we introduce the transaction stream model and provide diverse examples of real transaction streams. The sixth and seventh sections (Insurance transaction stream) present an application of transaction streams to the insurance industry, and related issues such as trust, confidence and brands. The eighth section (Insurance Industry Configuration) shows an example of the network of company roles that are emerging, as well as the infrastructure underlying transaction streams. The final section discusses the implications of the findings presented.

2. Internet Functional Properties

The Internet is a special medium because it has six properties that facilitate economic activities. In this section we will review each of them. The first property is that it can be used anytime, practically from anywhere, and by anybody. This is a very powerful paradigm. No matter where your customers are, you can reach them. This has enabled the Internet to create communities of people with specific interests and low geographic density. An example is HotHotHot, a store devoted to spicy food. HotHotHot features a very complete selection of books and hot sauces. It includes a search engine and multiple delivery options. Operating a store like HotHotHot in every city around the world would probably not be profitable – however, the Internet enables interaction between the centralized store owner and the scattered customers.

The Internet's second property facilitating economic activity is its capacity for enabling various forms of interactive communication between players (Nissen, 1996; Kosiur, 1997; Armstrong et al., 1996). The medium is extremely powerful as a communication vehicle. Through e-mail (asynchronous one-to-one communication), chat (synchronous many-to-many communication), newsgroups (asynchronous many-to-many communication), even voice and video, it has demonstrated its potential for establishing close personal relations.

Third, the Internet can be used to provide services combining and selecting the offers of various providers. In this sense, it can be used to select the players that one wishes to invite to a given economic activity. This is important because sometimes the selection can be done automatically by a program that helps you navigate through the Internet. For example, one can present the information related to a given sporting event by combining information from different sources, such as the weather report, the stock market, the player information and the event results, all in a single page.

Fourth, a software robot can navigate on its own, performing a sort of "personal butler" role (Negroponte, 1995). This is crucial because robots can be constructed to perform a myriad of relevant tasks, such as selecting vendors for a given product (Guttman et al., 1998; Beam et al., 1997). In other words, robots can reduce the search costs to a simple time delay – the interval required by the robot to query the different stores.

Fifth, the Internet has developed tools such as Java that allow the customization of the offer so that Internet interaction can also be customized with a program running on the client machine. By customization we mean that the interaction between the company and the user is tailored to the user. For example, advertising networks are able to track how many times a user has seen a given advertising banner. This information is then used to customize subsequent banner placements. The issue of customization is becoming important beyond the advertising and interface levels (Noland and Galal, 1998).

Finally, and most importantly, it is very inexpensive for both the user and the service provider. The entry barriers from a technical standpoint are very low. To start an Internet site, one can rent space on an Internet Service Provider for a very low price. In fact, there are some services such as Tripod that offer free web page hosting. Thus, everybody can afford a web site. Because it is based on open standards, there are many competitive products covering most of the possible demand needs. This means that some new business concepts can be tested on a small scale at low cost relative to traditional testing arenas.

3. Electronic Markets

A transaction is the establishment of a contract between a set of agents (such as individuals and firms) to perform a given action. By "contract" we mean an agreement between a set of agents to perform a course of actions (usually with detailed implicit and explicit conditions and alternative paths). Electronic contracting focuses on the negotiating of the terms and conditions of the contract, and the monitoring of contract performance (Lee, 1998). Here, "contract" should be understood in its broad sense as any commitment between parties to perform a given action. For example, purchasing a cinema ticket, placing an add in a newspaper, purchasing a book, etc.

Previous work has stressed the roles of markets and hierarchies as distinct mechanisms for coordinating the transactions related to the flow of materials or services through adjacent steps in the value-added chain (Malone, Yates & Benjamin, 1987). Markets coordinate the flow through supply and demand forces between different individuals and firms. Malone et al. (1987) contend that, by reducing the costs of coordination, the evolution of information technology is leading to a shift toward proportionately more use of markets than of hierarchies to coordinate economic activity. They also argue that electronic markets are a more efficient form of coordination for certain classes of product transactions whose asset specificity is low and whose products are easy to describe.

In their view, electronic markets will evolve from electronic single-source sales channels to biased markets where one of the providers uses the market transaction mechanisms in its favor, to unbiased markets, and finally to personalized markets. Personalized markets are those in which customers can use customized aids in making their choices. For example, some airline reservation systems allow the user to set preferences such as departure time, seating assignment and rates, which are then used in subsequent transactions. The airline market is therefore customized to the users - different users have different options depending on their preferences.

Bakos (1991, 1997, 1998) analyses the impact of electronic markets by analysing search costs. Buyers must, directly or indirectly, pay search costs to obtain information about prices and product offerings available in the market. Electronic markets have a vast impact on search costs because of the coordinating effect of information technology. Using economic theory, Bakos shows that the reduction of search costs plays a major role in determining the implications of these systems for market efficiency and competitive behavior. This reduction results in direct efficiency gains from reduced intermediation costs, and in indirect but possibly larger gains in allocation efficiency from better-informed buyers. The benefits realized by market participants increase as more organizations join the system, leading to network externalities (Katz & Shapiro, 1985).

However, Bakos' (1991) argument is based on five economic characteristics of electronic market systems (search costs, increasing return, switching costs, entry costs, maintenance costs) that have been changed by recent market and technological developments around the Internet. The first two characteristics that he analyses have been enhanced. First, search costs, as stated above, are reduced (through browsing or robot shopping); and, second, the benefits realized increase as more organizations join the WWW electronic markets. However, the last three have been drastically changed by the emergence of open standards such as TCP/IP, HTML, and Java, and the vast market adoption of the Internet as a platform for economic activities. Indeed, Bakos' (1991) third argument was that "Electronic marketplaces can impose significant switching costs on their participants". However, in most Internet enabled marketplaces, the switching costs are often reduced (or nil). This is because

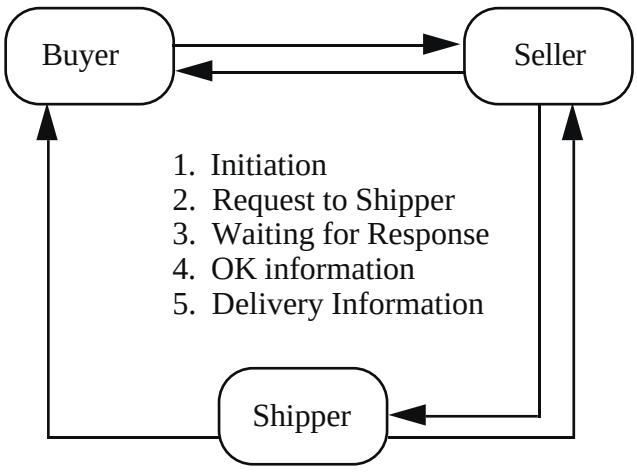
the Internet provides an open standard for information transmission (i.e. a dedicated line is no longer an entry barrier), and Java can be used to create an interface that can reduce the switching costs by translating among alternative interface options (i.e. the interface software is no longer always a switching barrier). The entry costs (point four of Bakos' argument), defined as large system development, and maintenance costs have also been substantially reduced. Many open solutions exist that can be adopted and integrated into a solution with a fraction of the development cost that was necessary in the past. Pre-WWW network technology was expensive and proprietary. This explains why early success stories such as airline reservation and hospital supply took place in markets with a great demand for immediate and distributed coordination.

There is other work related to electronic markets that is relevant (Hagel & Armstrong, 1997) (Rheingold, 1993). Benjamin & Wigand (1995) evaluate how the emergence of a national infrastructure such as the Internet can change the different segments of an industry value chain. The analysis is centered around the National Information Infrastructure initiative (NII) and evaluates the vision described in an Office of Technology Assessment report "The network will, in many instances, serve as the market. When this occurs, market structure will depend as much on network characteristics and the economies of networks as it does on relationships among firms" (OTA, 1994).

4. Transaction Processes

In this section we will give a definition of what constitutes a "transaction" and present a novel five-stage model of transaction processes. Defining these processes will enhance our understanding of the different types of transaction streams to be presented in the following section. By "transaction" we understand the establishment (or cancellation) of some form of contract between different parties which includes a given economic activity (Haanes & Lowendahl, 1997). For example, when a customer makes a flight reservation, a contract is established between him and the airline. The economic activity involved in this contract is the air transport of the passenger. Electronic markets such as airline reservation systems have been developed to facilitate such transactions. Often, an intermediary operates the market – in the case of air travel it is a CRS (Computer Reservation System) such as SABRE or Amadeus.

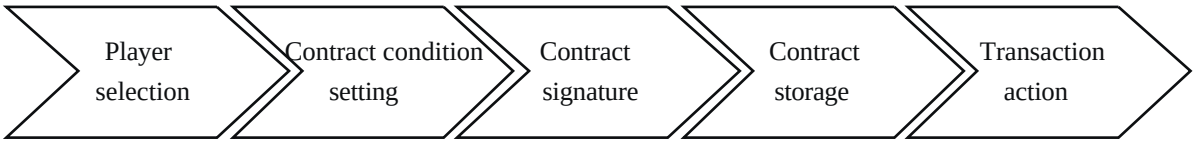
Figure 1: Exchange procedures according to Schmid and Lindemann (1994)



An on-line transaction involves at least three roles (see Figure 1): buyer (customer), seller (supplier) and shipper (distribution service). A market transaction corresponds to a finite number of interaction processes between market participants in various roles. Information technology systems hold the potential to change interactions between participants by helping to leverage buying power and to streamline complex and inefficient processes (Gebauer et al., 1998). The goal is to initiate, arrange and complete a contractual agreement for exchanging goods and services in the most efficient manner. The interaction processes involved can be grouped into classes to form the phases of a market transaction (Schmid and Lindemann, 1994).

In (Subirana, 1998) we claim that before a transaction is completed, five processes need to be enacted: player selection, contract condition setting, contract signature, contract storage and transaction action. We will refer to them as the transaction processes (Subirana, 1998). These transaction processes can be represented graphically as shown in Figure 2:

Figure 2: Transaction processes



We shall now review each of these processes in turn. Player selection involves the selection of the economic agents that will be involved in the transaction. This is a critical component because it narrows the number of firms that will compete to get the contract to perform the action. CRS select the airlines that are connected to their systems and, in a given transaction, display only those that are relevant for preset travel itinerary conditions.

Contract condition setting refers to the process by which the involved parties negotiate the details of the action that is to be performed. Negotiation is defined in electronic commerce as the process by which two or more parties multilaterally bargain resources for mutual intended gain, using the tools and techniques of electronic commerce (Beam et al., 1997). In order to support current business practices as well as new ones on the Internet, electronic commerce needs the ability to enable negotiation between parties. For example, in the airline reservation system, SABRE provides the choices for given itinerary parameters. It has long been noticed that information that is needed in order to determine the exact nature of a transaction contract is important for understanding the market mechanisms involved. In other words, the process that details the clauses of the contract has implications for the way the market operates. In the case of air tickets, the contract parameters and conditions are very standard and simple to state and compare. If one is in the market to purchase a house, however, the complexity of the transaction contract has, so far, made it very difficult for electronic markets to participate in the process. Before a house purchasing transaction can be completed, procedures involving various tax forms, price negotiation, loan applications and registry verifications need to be performed. Before a final price is agreed upon, the seller and the buyer often engage in a cumbersome pricing discussion in which pros, cons, trust and other factors come into play. The buyer is often involved in a similar discussion with the bank to establish the loan conditions. In addition, even if the conditions were clear as in a repeat purchase, many of the above steps, as of yet, would have no legal force if performed on line. Negotiation is difficult, and automated negotiation is even more so (Beam et al., 1997). In other words, house purchasing transactions are, in general, too complex for current electronic market models.

The last three processes of the sequence have to do with the contract and activity execution. Contract signature refers to the binding step in the process in which the transaction players agree on a course of action that clarifies how the transaction activities will be performed. This can be a short and standard agreement or a long, detailed and customized contract. Often a market intermediary sets some conditions to ensure contract validity (identification, down payment, etc.). For example, a travel agent uses a CRS to close a travel contract by confirming the reservation in the system. Once this has been done, in the traditional CRS the contract (ticket) is issued as a paper document and stored in the airline database. Finally, the transaction action is the process by which the activity referred to in the contract is executed.

5. Transaction Streams

In this section, we will introduce transaction streams. First, we will present an example of a transaction stream related to the book distribution industry market. Then we will describe different schemes that people use to enable transaction streams.

There are thousands of bookstores on the Internet (Subirana & Zuidhof, 1996). Their initial modus operandi appears fairly simple. An entrepreneur decides to make his database available on the Internet in the hope that customers will start surfing through his site and orders will land on his desk. This arrangement appears very similar to the sale of airline tickets through a traditional CRS, and is pretty much what Jeff Bezos (founder of Amazon) did when he left his job as a principal at D.E. Shaw in early 1994 to pursue retailing on the Internet. Music and books are two of the categories best suited to Internet consumer retailing. There are more titles than any physical store can stock, and a selection can be easily made by querying a title database. Books are also well-known commodities and easy to ship. In fact, in its first 30 days, Amazon shipped books to customers in all 50 U.S. states and 45 countries around the world. The book market is also highly fragmented from the point of view of distribution, authoring and production. Some threat exists from large presence-based retailers such as Barnes & Noble and Borders because they may leverage their brand recognition with their warehouse and book logistics experience.

The market values Amazon more than other retailers. With comparable sales, the Internet Bookshop received only marginal market appreciation. With 1996 sales of $17M and $6M in losses, Amazon had an IPO market value of $540M. This difference therefore cannot be explained through an NPV analysis of book distribution based on a simple database and a warehouse. Indeed, there is more to book distribution on the Internet than most would have predicted only 2 years ago. For example, one of the novel and effective tools that Internet bookstores such as Amazon.com are exploiting is Associate Program membership. Through its Amazon Associates Program, Amazon provides the opportunity to link associate Internet sites to their own database. This means that users of the associate site can purchase books pre-selected in the associate site. For example, in Netscape’s developer area, there is a section with reviews of different books. The user can select a book and be redirected to the page that sells the book. Netscape has become an independent bookseller at practically no additional cost. The transaction profit is shared and Amazon gives a 5% to 15% share to the “Associates Program seller”. So far it claims to have over 150,000 sign-up associates.

Note that the associate program changes two of the five processes described in the previous section. First, the player selection is performed by the associate partner, Netscape in our example. Then, in the condition setting, Netscape performs a prescreening of the 2.5

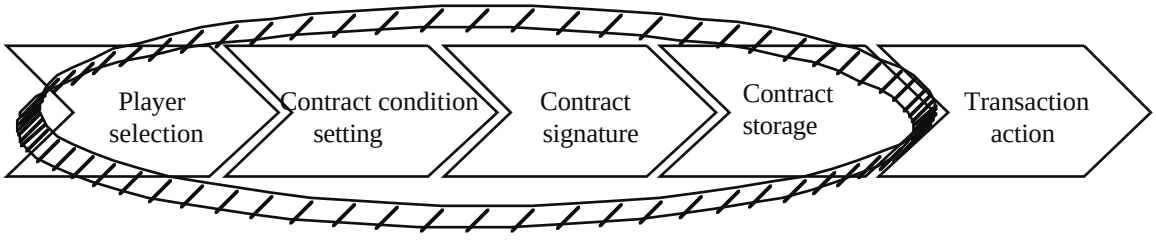
million books in the Amazon catalog. By sharing part of the revenue, Amazon benefits from a very inexpensive and enthusiastic sales force. The arrangement is also very attractive for organizations such as Netscape that have access to a customer base interested in specific titles and can give access to the appropriate books when its customers want it. In some way, this can be considered a response by providers to reverse markets. To prevent the power shift to the customer, providers work together on a combined sales effort.

In fact, when Amazon buys advertising space in a search engine such as AltaVista, the combined effect is often that of converting AltaVista into a sort of up-front paid partner. Advertising banners can now be very targeted. For example, when a customer searches for the word “Netscape”, an Amazon banner could display the amount of Netscape-related books that are on its database. Furthermore, Amazon can create a banner with a search space so that the customer can choose to search either on the Altavista site or on the Amazon database. This case is interesting because the user is provided with alternative transaction paths while the firms involved are competing for his or her attention. The paper equivalent of directory search does not enable the dynamic player selection and condition setting exhibited by successful Internet companies.

Altavista also has an Associate Program to stimulate use of its database. Companies around the world perform specialized queries into the database. The logic behind this kind of program is that associate companies have better information about the user than Altavista. This means that they can use their information to design better queries while retaining the customer’s attention. Note that here Altavista is only involved when the transaction action is performed. Since this program can be combined with Amazon’s Associate Program, the number of players involved in each transaction multiplies. In fact, some of the queries delivered by Yahoo! are managed directly through an associate program by AltaVista (owned by Digital).

Transaction streams are electronic markets in which more than one organization control the first four transaction processes. For example, in the Amazon Associate Program, the referring Internet site controls the player selection while Amazon controls the rest of the transaction processes.

Figure 3: First four transaction processes



Underneath each process many related actors take part and create more relations and transactions as well. For example, Netscape is involved in the player selection and the contract condition setting. This transforms the traditional model described in Figure 1 into a series of transaction streams, in which more than one organization control the first four transaction processes.

Advertising is another area where transaction streams are common. An Internet advertiser is anyone who promotes their product/service via the Internet. This is normally accomplished by placing banners (small advertisements which link to the advertiser's home page) on sites throughout the Internet. Advertisers normally pay the publishers of the sites on which their banners appear for banners which are placed on the site. Individual advertisers, traditional ad agencies and cyber-ad agencies are all active advertisers on the Internet.

DoubleClick (founded March 1996) provides Internet advertising sales and management, and manages an Internet advertising network. DoubleClick's objective is to bring its network sites, Internet users and Internet advertisers together. In order to do so, it has created a comprehensive database of Internet user and organization profiles, which are used for ad campaign targeting purposes. Additionally, DoubleClick categorizes every Internet page displaying DoubleClick ad banners in order to promote affinity targeting.

When an advertiser wants to place banners on the Internet, it must select among a host of available media – in the tens of thousands in most cases. Making this selection is not as straightforward as selecting the airlines that are available to perform a given itinerary. Issues such as medium affinity, availability, etc. must be taken into account. AdSmart provides a service that is tailored to this process. It contains a database of demographic and media data that can be used to select what are the most desired media. It enables also the creation of a full media plan, which is then used to select the appropriate banner placement locations. In the case of banner placement, the individual media (sometimes directly, sometimes through advertising networks) provide the availability of the different desired services.

There are various types of emerging models that companies use to stimulate transaction streaming. Here are five of the most common:

- Associate programs: As described above with the Amazon example, this functionality allows companies to extend their reach by sharing audience and revenue with other Internet sites. For example, HotHotHot (described in an earlier section) allows third party sites to provide links into the HotHotHot home page. It offers 5% of the revenue generated by customers coming through these links. The HotHotHot associate is involved in player selection (by redirecting suitable customers) and in contract condition setting (by redirecting to the relevant product page).

- Interest links: The special-interest mail-order world has received renewed impetus with the Internet. The player selection process used to be very ineffective, as customers had to find a special-interest publication, subscribe, order a catalog, choose the merchandise, and mail order it. The process took weeks, if not months. The Internet, however, allows transaction activity players to trigger the player selection process via links in specific Internet pages. Associate programs can be seen as one special way of sharing the revenue of Interest links where the associate program managing company is the one performing the contract signature. Interest links participate actively in the player selection process.

- Yellow pages: The All-Internet Shopping Directory provides extensive listings of Internet stores. Categories include Hobbies, Malls, Services and Business to Business. Just like with yellow pages, the directory provides various levels of services, ranging from free hyperlinks to "focus" listings and banner

advertisements. In its robust implementation, one could conceivably peruse a yellow page service for information up until the actual product description. This is what robots are best at. Some Yellow page services, such as the GTE Yellow pages, are trying to host extensive product information and selling services, which results in their involvement in the contract signature process.

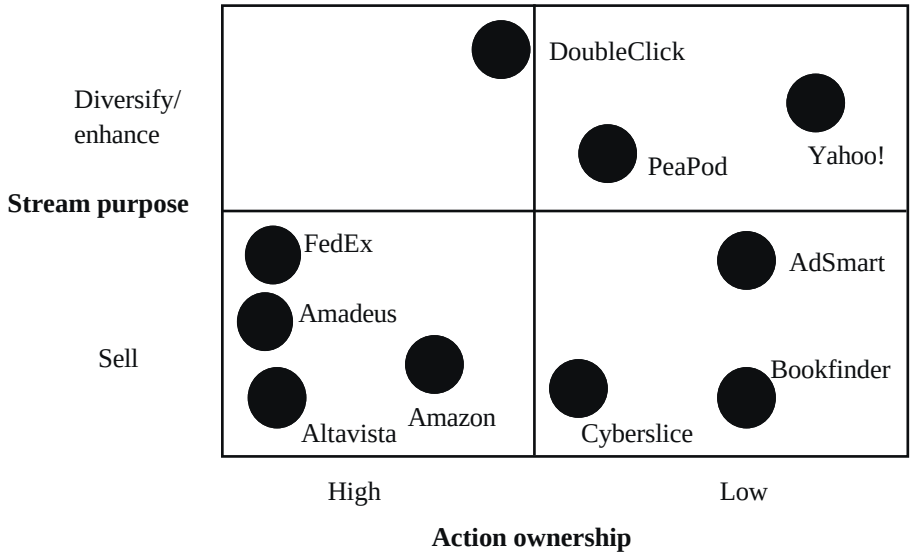
– Robots: Robots are programs that can perform "intelligent" tasks such as finding the cheapest publicized price for a given product, or the most up-to-date zip code for a certain address (Koster, 1997). Shopping robots come in two varieties, as browsers running on client machines or as server software (Subirana, 1997b). Robots can be used to extend and automate the functionality of all transaction processes. Robots' basic involvement is in the player selection and contract condition setting.

– Profile information: www.ffly.com claims to have a database of over 1M users. Each user has a Firefly Passport that includes detailed user profile information (preferred movies, food bought, etc.) which is permanently updated as the user performs transactions. The Passport contains user information that can be carried to other sites to tailor server response. This technology can be used to lower search costs and can insure anonymity for certain transactions. This is very relevant as it can serve as the basis for the reverse markets discussed above (Hagel & Armstrong, 1997). In the future, FFly may be involved in negotiating, closing and storing the contract. In the most extreme case, the seller may not know the true name of its customer. FFly may develop two separate transactions, one with the customer and one with the provider. In this reintermediation model, Fly would be involved in all five transaction processes.

The above are not isolated examples (Cronin, 1996; Subirana, 1996, 1997a,b,c,d; Subirana & Zuidhof, 1996; Granoff, 1997; Subirana & Palavecino, 1997; Subirana, Oghuledo, Santomá, 1996). Figure 4 shows a sample of companies that are involved in transaction streams (1). The companies are organized around two dimensions: transaction activity ownership and stream purpose. By high transaction activity ownership we mean that the company providing the tools that enable transaction streams is the one which is in charge of delivering the transaction activity. The transaction stream purpose is divided into two categories depending on the objectives sought by the company involved: "sell" if the intention is to obtain more business, and "diversify/enhance" if the company is seeking to improve its offer.

(1) Amadeus, one of the large CRS, has an associate program – in contrast with SABRE, which has started its own system called Travelocity. Note that SABRE is not in the figure because it does not enable transaction streams. PeaPod, the on-line supermarket retailer, is targeting producers for selective advertising, and supermarkets for pricing and delivery information. FedEx has developed software for direct package information querying, while Cyberslice partners with multiple pizzerias around the US to facilitate pizza home delivery and has an ad banner program through referral.

Figure 4: Stream purpose versus transaction action ownership



So far, in this section we have described various examples of transaction streams. Note that most of the examples shown involve two companies. However, often more players are involved. Figure 5 shows three transaction stream examples and the five processes involved in the transactions. The first is a CRS reservation system based on a single market operator. In the second we have included a transaction stream with only one associate program, which we call a single transaction stream. In this example, the agency sells travel reservations, enabled by Amadeus' associate program. The third is a transaction stream for a banner placement transaction. We call this last example a "multiple transaction stream" because the number of players involved has grown.

Figure 5: Three transaction examples

Description / Type: Process Initiator	Electronic Market: Airline Reservation	Single Stream: Airline Reservation	Multiple Stream: Banner Placement
Player selection	SABRE	Agency	AdSmart
Contract alternatives	SABRE	AMADEUS	Adv. Agency or Pred. Modelling Co.
Contract signature	SABRE	Agency	DoubleClick
Contract repository	SABRE	Airline	Distributed
Transaction action	Airline	Airline	Altavista

6. Confidence, Trust, Brands and Insurance

One area in which transactions are becoming more streamed is in the insurance and endorsement of the contract signature and contract storage processes (Hodges, 1997; Markey, 1997). In the presence-based world, consumers rely on endorsements provided by third party entities such as the American Automobile Association or the Michelin guides. On computer systems that span multiple administrative boundaries, and especially on the Internet, such trust has proven difficult to establish. So far, global brands have been useful to provide assurance to customers. The lack of effective ways of managing the need for endorsement, security and insurance is a well recognized barrier to the full acceptance of transactions on the Internet (Tapscott, 1996: Schwarz, 1997). To respond to this transaction endorsement need, distributed approaches have been developed (Lai, Medvinsky, & Clifford, 1997). We will review them in the next section because they are good examples of transaction streams.

It can be noticed that there is a lack of confidence in on-line products and services (Choi, et al., 1997). Security poses serious challenges to the growth and widespread adoption of electronic commerce (Bhimani, 1996; Froomkin, 1996). In order to respond to aspects related to security, technological tools have been developed such as cryptography, firewalls and digital certificates. Even if there are solutions in some of these areas, they have not gained users' interest or trust so far (Pernul et al., 1997).

The lack of confidence stems, in part, from time asymmetry and information asymmetry. In effect, even if Internet does reduce the time it takes for some transactions to be completed, most real world transactions require some form of movement of goods or services, thereby introducing time asymmetries in the process of exchange of assets between transacting parties. Time asymmetry brings the notion of risk (perceived or real) to each of the agents involved in the transaction who must invest resources before receiving a return (Salam et al., 1998). In many situations, information asymmetry has significant implications for the operations of markets (Caillaud, 1990; Greenwald, 1990). Information asymmetry also affects the on-line market; in electronic markets the physical product is not examined, only a representation of it. Information asymmetry in this case means that the seller has more information about the product than the buyer. This situation imposes certain limitations on knowledge of the product and, therefore, uncertainty regarding its quality or that of the vendor (Choi et al., 1998; Grace, 1998).

Confidence is pervasive throughout the client relationship process. The notion of confidence implies the deposit of resources (money, time, personal information) into the hands of another party for use for his/her own benefit, or of the buyer, or both. Without the appropriate level of confidence, the exchange of information between individuals and organizations will be limited (OECD, 1997, 10). There are three essential aspects related to confidence: to be led to a selection in which the end is foreseen as a happy or a painful event, to realize that the outcome depends on the behavior of the other party, and finally to perceive the intensity of the negative event as greater than that of the positive event.

The management of confidence has historically been affected by brand-name recognition. In the non-virtual world, the mere presence of a brand name is sufficient to create confidence in relatively unimportant decisions, such as the purchase of small amounts of products or repeat purchases, and in easily specified generic products. In effect, brand name recognition performs different functions: a) An identification function: the brand identifies the product according to its main characteristics. It also leads to a specific configuration of attributes. Therefore, the brand itself constitutes valuable information about the characteristics related to a specific product offer. b) A reference function: the brand helps

the buyer to identify himself, brand contributes to structuring and organizing the market offer. c) A guarantee function: the brand is a public commitment to quality and performance. It is a promise that has been given. It assures the permanence of the quality that is expected of the product. d) A personalization function: the choice of certain brands allows individuals to place themselves in relation to their desired social status. In the choice he makes, a person shows his desire to be different from his peers or, on the contrary, to be integrated. e) A playful function: it corresponds to the pleasure that is experienced when purchasing. The presence of multiple brands fills certain buyers with a feeling of excitement and acts as a stimulus. f) A practical function: instead of having to repeat a complete decision process on each occasion, the brand makes it easier to memorize previous selection processes and the conclusions of consumption experiences. The brand is, in this sense, a summary of information related to past purchasing experiences. As the brand name is memorable and easy to recognize, it gives the buyer the possibility of following repetitive processes and so generates confidence.

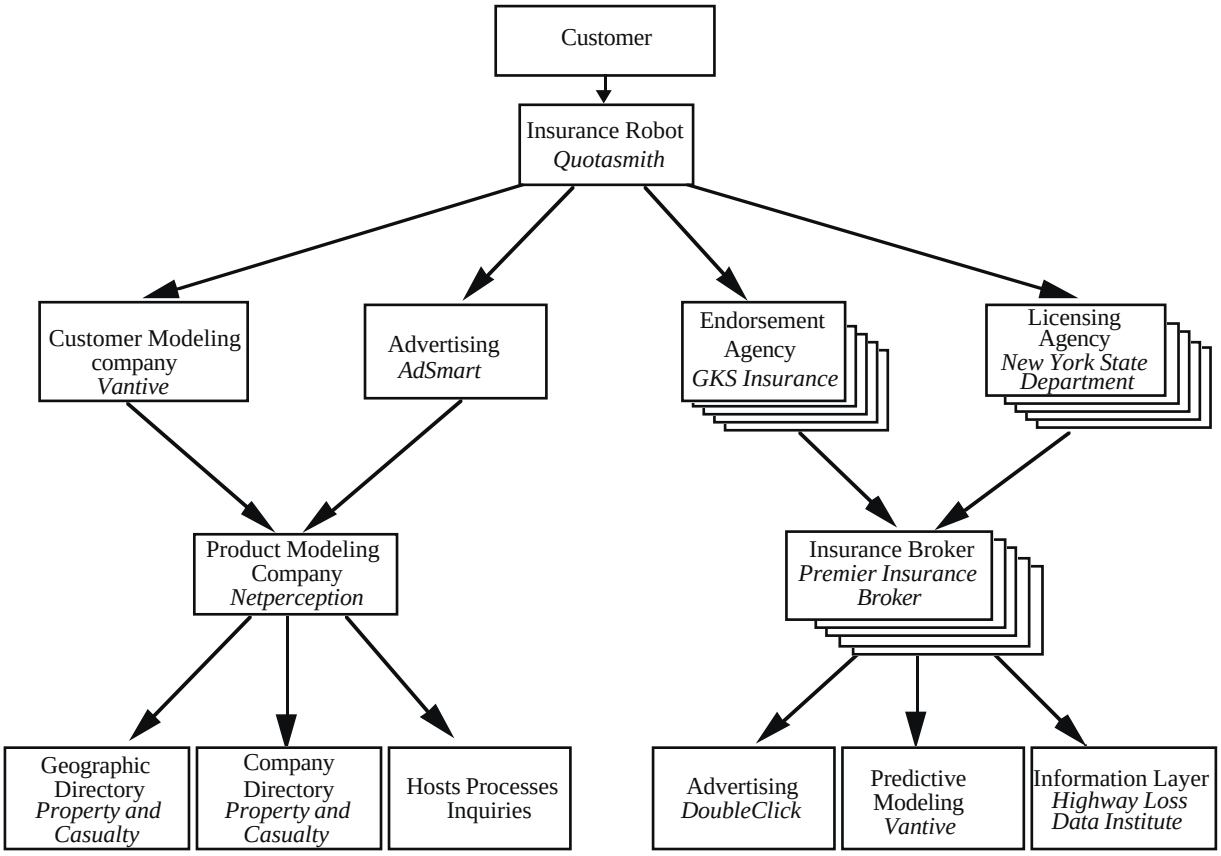
When confidence is lacking, users try to make up for it with endorsements, licenses and insurance. In the non-virtual world such practices are used in important transactions (involving large sums of money) or to complement the brand. In the virtual world, however, we can see how these endorsements and insurance are used even in small transactions of no great importance or volume. Confidence management in the virtual world is bringing about fast and sustainable growth in the role of insurance, a development that goes against global brands. In this paper we will analyze new models of confidence management.

7. Insurance Transaction Streams

In this section we will illustrate the application of the five transaction processes (player selection, contract condition setting, contract signature, contract storage and transaction action) to the insurance industry. We will then analyze the electronic representation of endorsements, licenses and insurance policies, in order to elicit how an atmosphere of confidence between the insurer and the insured party can be achieved with transaction streams that support a closer and richer client/insurer relationship.

Figure 6 provides an example of insurance transaction streams.

Figure 6: Cascading Effect in Transaction Streams



In the example, we have plotted the players involved when our sample user “clicks” on an insurance robot to purchase an insurance product. The robot itself calls a set of licensing agencies, endorsement agencies and other companies such as modeling and advertising firms. Licensing and endorsement agencies in turn search for insurance brokers, who, through third-party predictive modeling and endorsement agencies, assess what risk premium should be used. The robot then collects all the answers and provides the aggregated response to the user. Note that insurance brokers nurture their systems with information provided by other companies as well. This makes it possible to optimize their hit-ratio while minimizing risk (Subirana & Carvajal, 1998).

Player selection involves selecting the economic agents that will be involved in the transaction. An insurance contract represents an agreement between the service provider and the insured party. It can also represent an agreement among three parties: the surety, the obligee and the principal. This contract is called a policy and specifies the obligations of the parties involved. The policy covers damage inflicted by the insured party upon a third party if the damage is caused by an accident or occurrence (with exceptions as specified in the policy). The insurer does not relieve the policyholder of responsibility for malicious acts.

Contract condition setting refers to the process by which the parties negotiate the details of the action to be performed. This activity is related to the interactive exchange of messages between the players involved (Runge, 1998). When an insurance policy is requested, insurance providers calculate the risk to be assumed by the insurance policy and

fix the premium at an appropriate level to reflect this risk. Insurance providers will need to assess applicants' past behavior to determine risk. Drawing up policies requires an assessment of risk, and settling claims requires judgment, neither of which are easily automated. In other words, policy purchasing transactions are, in general, too complex for current electronic market models.

Contract signature refers to the binding step in the process, in which the transaction players agree on a course of action that clarifies how the transaction activities will be performed. This can be a short and standard agreement or a long, detailed and customized contract. Policies are agreements certified by the signatures of the parties. The electronic representation of a policy will include the following information:

1. The names of the parties: The name of the insurance provider, the name of the service provider, and a description of the obligee (if needed).

2. The subject of the insurance and the insured risks.

3. The period during which the policy will be in force.

4. The limits of liability (an individual limit, an aggregate limit of liability, or possibly no limit in the case of endorsement or license).

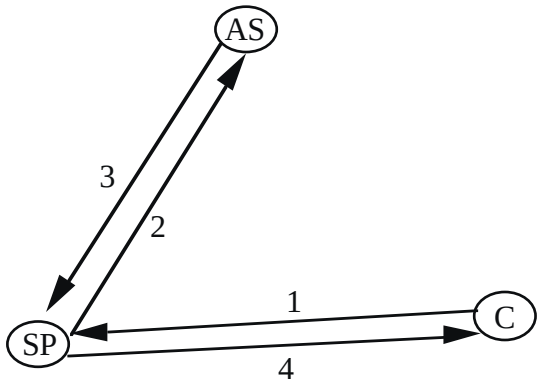
Licensing and endorsements are mechanisms that may be used to build confidence in the service provider and play the role, described by Ba et al. (1998), of a trusted third party for electronic commerce transactions. A license is a credential that indicates that a service provider is legally authorized to provide a service. It indicates that the service provider has been found to meet certain minimum qualifications required by law, and that it is subject to regulations and sanctions if it violates the law. An endorsement provides assurance that a service provider meets more rigorous requirements determined by the endorser, and usually provides information about the quality of a service provider. A person's confidence in an endorsed service provider depends in part on his or her confidence in its endorsers. Endorsements do not provide compensation for damages incurred while interacting with service providers. They provide a mechanism for clients to better evaluate and reduce the risk involved in dealing with service providers. The concept of an insurance policy, licensing and endorsements are related, differing only in the limits and source of compensation in the event of a loss. Insurance policies provide a contractual responsibility to the insurance providers. The development of "institutional trust" will lead to a decrease in the consumer-perceived level of risk of transactions over the Internet (Salam et al., 1998; Sarkar et al., 1998).

Before a transaction contract is signed, an assurance credential is granted to a server after meeting requirements imposed by the server issuing the credentials. The credential mechanism can be more tailored to the transaction needs than standard official licenses. They can also be tailored to the user so that the transaction risk is managed dynamically by the user and not by the regulatory environment exclusively. Furthermore, proxies can be set in such a way that all the transactions realized by a given organization are endorsed and certified by an independent and trusted firm. Observe that the mechanism behind this process is similar to the FireFly passport mentioned earlier but with a different purpose: instead of exchanging user demographic information to manage the transaction stream, the system exchanges endorsement and certification preferences. Insurance credentials can be defined as proxies. Furthermore, proxies can be set in such a way that all the transactions carried out by a given organization are endorsed and certified by an independent and trusted firm.

The verification of the insurance credential is an example of how transaction streams are implemented. When an insurance credential is received from a service provider, the client validates the credential in two steps. First, the proxy is verified cryptographically. This may require further interactions with others servers. Second, the information presented in the proxy is extracted and compared against the user's and application's policy for server selection. Furthermore, the service provider must authenticate itself to the client using the authentication protocol used by the system (Lai et al., 1997).

Figure 7 shows an example of the streams of messages exchanged to retrieve and verify assurance credentials.

Figure 7: Obtaining Proof from Service Provider
according to the example presented in (Lai et al., 1997).
AS is the authentication server, SP the service provider and C the customer

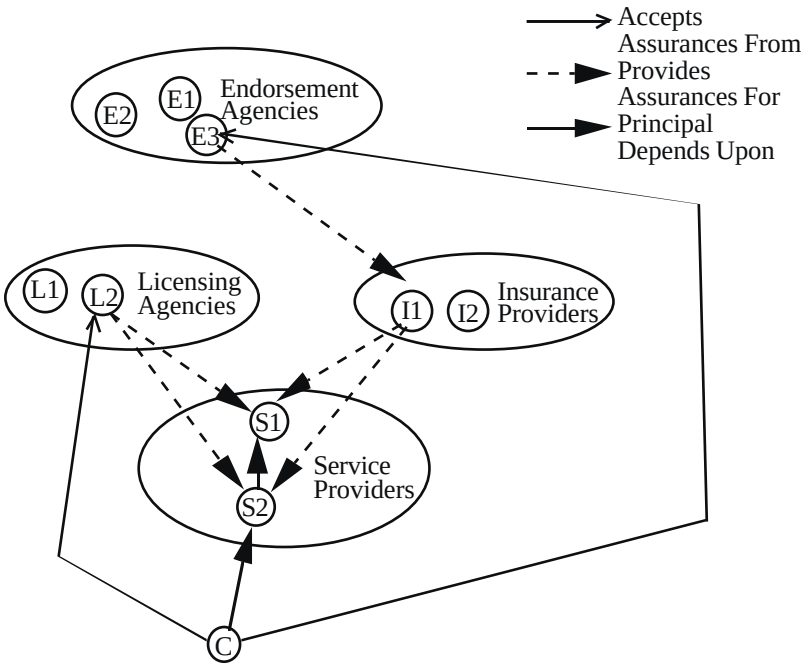


In message 1, the client requests proof of assurance from the candidate service provider. The assurance is presented to the client in message 4 (the form varies with different proxy implementations). If the service provider requires a separate credential for each client (conventional cryptography), it requests and retrieves it in messages 2 and 3. The authentication server returns a new credential derived from the original one, encrypted in a key that may be verified by the client (Lai et al., 1997). After validating credentials from the service provider, clients may keep them until its expiration.

8. Insurance Industry Configuration and Transaction Streams

The presence of insurance credentials is a first step to improve confidence in a service provider. This confidence must depend in part on the confidence in the endorser or insurance provider. An extensive network of relations can be activated to create confidence. Lai, Medvinsky, & Clifford (1997) propose a system based on a network of trust relationships that includes service providers, licensing agencies, insurance providers and endorsement agencies.

Figure 8: Example Network of Trust Relationships
Source: (Lai et al., 1997)



In this example (Figure 8), client C requests service from service provider S2. To provide this service, S2 subcontracts to service provider S1. C's confidence in the composite service depends on the assurance provided for both S1 and S2. To improve customer confidence, S1 and S2 obtain a liability insurance policy from insurance provider I1. As long as C has confidence in I1, it is assured that C will be compensated in the event of damage caused by S1 or S2. In this example, C does not have confidence directly in the insurance provider, but will accept the endorsement of E3, an organization that rates insurance companies. Client C will also find that service providers S1 and S2 are licensed by licensing agency L2, indicating that L2 has found each server competent in offering its services. The licensing authority L2 has not been endorsed directly, but is recognized as the appropriate licensing agency by C (Lai et al., 1997).

9. Conclusion: The Transaction Streams Landscape

This paper describes a fundamental shift in industry structure for transaction-based economic activities. The shift is demonstrated by the fact that player selection, contract condition setting, contract signature, contract storage and transaction actions are being performed on the Internet by different players. When a user purchases a product or a service, a transaction stream is triggered. We have argued that electronic markets are evolving from an intermediary based model into a transaction stream model in which more than one agent controls the transaction contract process. The number of players in a transaction stream is bound to increase. In some cases, each transaction stream is generated through a customized sequence of processes.

The Internet provides tools to facilitate the streaming process. It enables different transaction participants to establish protocols to perform each of the five basic transaction processes in a myriad of different ways. Associate programs, interest links, yellow pages, robots and profile information are just a sample of the tools being used. Different players add value through content, editing, navigation and distribution. As transaction streams evolve, new needs will appear. Currently, one of the greatest barriers to the full development of transaction streams is the lack of certification, security, licensing and endorsement authorities.

Transaction streams are present in many industries (book distribution, advertising, company directories, etc.). Managers must seek to benefit from these streams by integrating them into their current business models. The marketing arena is expected to be one of the first to be affected. Traditionally exclusive distributor arrangements must be complemented with Internet presence by adopting some of the transaction streaming schemes presented above. The pricing policy through each of the transaction stream players will demand increasing attention. Practices tend to be fairly simple at present, but will become more complex as competition intensifies and experience is accumulated.

Companies participating in existing electronic markets must question whether benefit can be derived from operating the market within the Internet context. Internet compatibility would bring transaction stream opportunities that may increase the amount of transactions being performed. However, the broader reach may also attract new players and bring profits down.

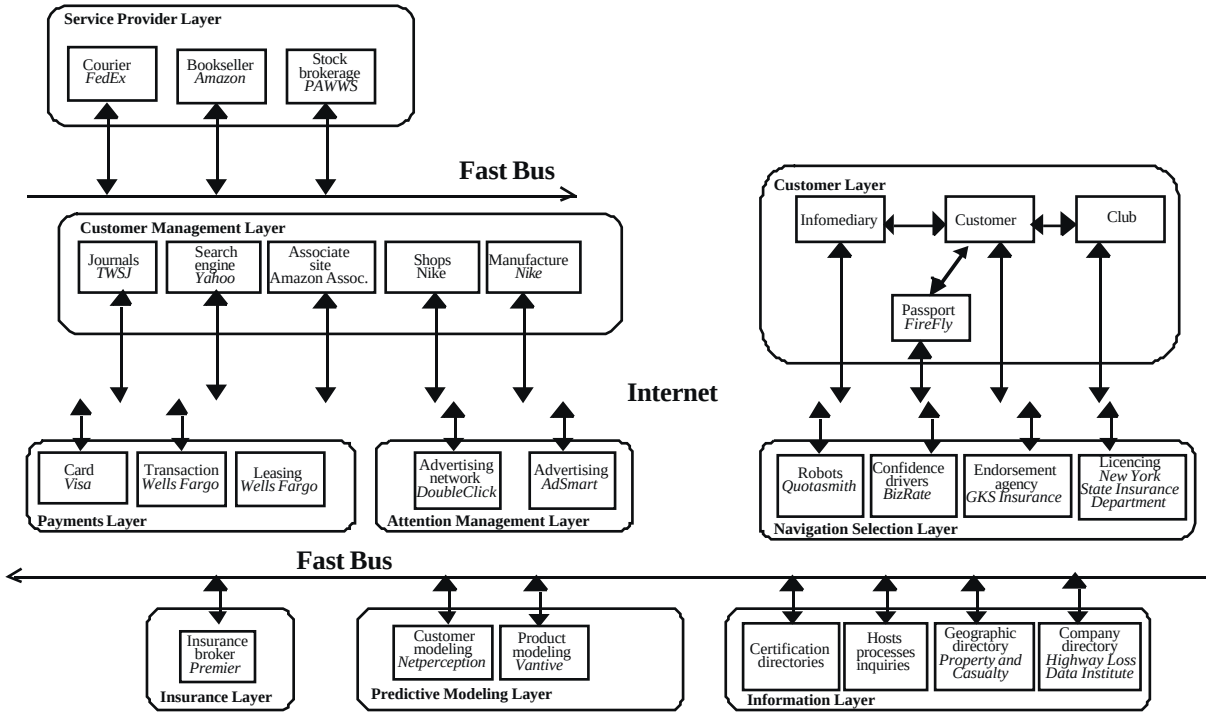
Transaction streams may become increasingly competitive. Companies must find ways to add value in their transaction streaming activities. Dell claims to sell over $4M daily through in-company associate programs which rely on their “business center solution”. This service currently supports over 100 companies in managing their PC ordering needs. Furthermore, Dell is working to increase the value added to each customer by customizing current functionality offerings such as company reports, account team information, product information gathering, and budget composition. These custom sites support the entire selling cycle, from pre-sales to post-sales. Using this in-company associate program, Dell is gradually transforming supply chains into seamless direct relationships between suppliers, manufacturers and their customers. Dell could provide the tools to foster third party players to develop modules that enhance transaction streams involving Dell’s products.

The need for confidence is generating a rapid and sustainable growth of insurance, which has the potential to diminish the value of global brands. There is a boom in companies constituted as confidence drivers, such as Bizrate.com and @guard. Licenses, endorsements and insurance are mechanisms that can also increase confidence in a system. In a stable system built on these contributors to the confidence management model, it is clear how the insurance industry can help the formation of a trustful ambiance between insurer and insured, with the potential to create transaction streams and, ultimately, facilitate a closer client/insurer relationship. Through this process a new model of confidence management is being formed, and as a result, a new role is expected to appear: that of the Insurance Agent.

Transaction streams configure a new model of confidence management. The need for confidence is generating a fast and sustainable growth of insurance, with the effect of diminishing the value of global brands. Figure 9 illustrates an infrastructure that could underlie transaction streams. As can be seen, many players are involved in simple, routine transactions. Nine layers have been identified: customer layer, customer management layer, service provider layer, payments layer, attention management layer, navigation selection

layer, insurance layer, predictive modeling layer and information layer. The insurance landscape can provide means of managing confidence both from user-centered and provider-centered views. Insurance providers should seek opportunities in linking their products and services with transaction stream layers. Ultimately, insurance providers may perform many of the current brand roles. A more detailed analysis is a subject for future research.

Figure 9: Transaction Streams Diagram



The transaction streams diagram also illustrates transaction streams related with advertising. In the attempt to capture attention, advertising networks maximize their advertising effectiveness by leveraging audience profiles with predictive modeling techniques. Note that the information layer is similar for both the advertising and the insurance streams while the modeling techniques are different: in the former case they are geared towards managing attention, while in the latter case they result in insurance quotes. In both cases, click-yield management techniques are required to optimize the available “click inventory”.

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