

Virtual Communities of Transaction: The Role of Personalization in Electronic Commerce

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Abstract

Bringing communities of buyers and sellers together in the arena of electronic commerce stimulates three major potentials: the building of trust, the collection and effective use of community knowledge and the economic impacts of accumulated buying power. In this context, we introduce the concept of Virtual Communities of Transaction and review important personalization approaches which we may utilize in their design: collaborative filtering, data mining, and techniques to optimize the user interface and the underlying product offerings. The key contributions of this paper are the elaboration of Virtual Communities, the presentation of a categorization scheme for different types of communities, the identification of classes of member profiles, and the innovative concept of community products. We conclude with the case of the Amazon.com Recommendation Center to illustrate key design ideas and discuss an evolutionary application, the Participatory Product Catalog.

1. Introduction

Doing business electronically, more specifically using information technology to support the online processing of purchase- or service-related information, has the potential of being advantageous to all participating parties. Sellers generally aim at reducing their transaction cost and at further linking the customer interface to their internal IT-systems and processes [Bloch/Pigneur/Segev 1996; Benjamin/Wigand 1995; Klein 1997]. Buyers, on the other hand, strive for easy access to product related information (price, availability, terms, etc.) resulting into reduced search cost [Bakos 1997], and – in the case of business customers – for integration into their internal procurement process [Gebauer et al. 1998, Ginsburg et al. 1999]. Meanwhile, middlemen in the form of electronic intermediaries find niches for their own expertise in today's barely transparent E-Commerce markets [Sarkar et al. 1996; Bailey/Bakos 1997; Stohr/Viswanathan 1998]. This list is oriented purely around market microstructure. In the following paper, we go beyond market microstructure to argue that Electronic Commerce encompasses a broader set of potentials revolving around the concept of "Community". Community is a well-known cyberspace metaphor for building social relationships over electronic networks. Besides the social interaction and other "soft factors" such as recommendations, discussions, and reports marketers collect transaction-based data of user behavior in E-Commerce markets.

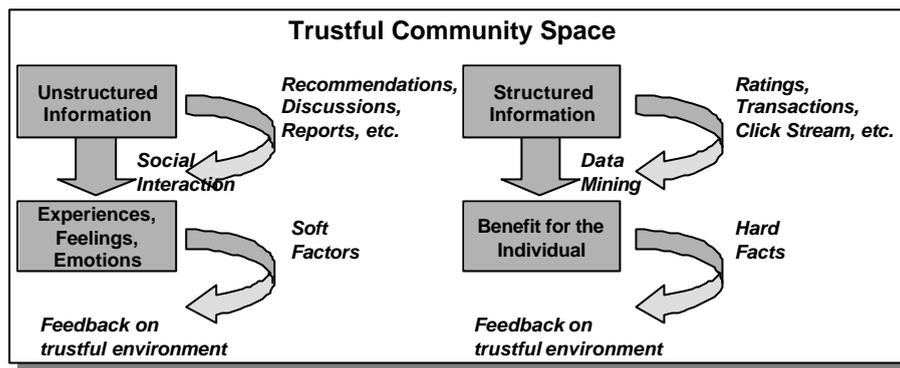


Figure 1: Information in the "Trustful Community Space"

We need to distinguish between two different kinds of information that may result from Communities of Transaction: (1) unstructured information which can be accessed by a human member but is hard to use for automatic processing by an information system (IS) and (2) structured information which can be systematically retrieved, processed and used by software agents. Unstructured information from social interaction encompasses experiences, feelings, and emotions as known from older examples of Virtual Internet Communities such as the WELL, IRC, Tripod and many Usenet Newsgroups. The use of structured information in E-Commerce is still at its beginnings due to a lack of basic standards for Web semantic format and inter-agent communication. Web ventures such as Firefly and Amazon.com are among the first to exploit community-based structured information for the benefit of the individual customer. The prevalence of both unstructured and structured information positively stimulates the Community Space and helps to build and maintain a *trustful* E-Commerce environment. We will return to the key idea of *trust* throughout our discussion.

The paper is structured as follows. We elaborate the concept of Virtual Communities explaining their history, types of Communities, and proposing a working definition. We then expand on the topic of Virtual Communities of *Transaction* analyzing their key strengths which we see in:

- (1) the social consideration of the building of trust,
- (2) the potential for the generation of valuable community knowledge and the effective use of customer profiles and collaborative filtering
- (3) their increased buying power which can lead to innovative concepts such as customized community products.

The paper concludes with the discussion of the Amazon.com Recommendation Center which partially realizes the suggested potentials.

2. Virtual Communities

The term "Virtual Community" can be looked at in several ways. Rheingold [1993] deals with the emergence of socially-motivated communities of interest on the Internet. He describes Virtual Communities as "social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace." Hagel and Armstrong take a business perspective and cast virtual communities as "Virtual Enterprises" [Hagel/Armstrong 1997]. Many social communities on the Internet are opposed to the idea of commercialization but the authors argue that once these communities realize their full market potential they will be willing to engage in purchasing transactions.

In our paper we adopt a third perspective that socially motivated aggregations of people in electronic networks dispose of certain success factors that can be transferred to the concept of a Virtual Community of Transaction. Following Schubert [1999] we will use the following definition of Virtual Communities in this paper:

"Virtual Communities describe the union between individuals or organizations who share common values and interests using electronic media to communicate within a shared semantic space on a regular basis. [Schubert 1999]"

Left open is the question of media choice in the communication; i.e. synchronous or asynchronous, distributed or not distributed according to the well-known 2x2 framework of group communication presented by [Ellis 1991].

However, it is important to note when buyers and sellers are brought together, there may be very little value-sharing between these two communities. Consortia of sellers may share data or knowledge (e.g. bundling practices or marketing insights); likewise for communities of buyers (e.g. product reviews); yet there is little economic incentive for the two sides to align. Although we present shared buyer/seller communities, our comments do not cross the 'great divide' between the two general groups.

Figure 2 shows a convenient breakdown of the vocabulary and semantics of Virtual Communities. They can be seen from two different points of view: based on the aspect of the underlying medium (in the classic sense of a communication channel) or from the perspective of the purpose they serve. As we state in our definition, communities are motivated by a common interest. In this context, on the first level we speak of "Communities of Interest". Depending on the motivation of their members (social, academic, business, etc.) we distinguish between "Leisure Time Communities", "Research Communities", and "Business Communities". Leisure Time Communities may appear in the form of Hobby Communities, Communities of Relationship, Communities of Fantasy whereas Communities of Commerce, Communities of Transaction, Electronic Malls, and so on are forms of Business Communities. An Internet Community is a Network Community which evolves on the Internet not to be confused with the Internet Community as a whole which is the total number of all Internet users.

The gray-shaded rectangles suggest a "may-also-be" relation between terms on the horizontal level. A Business Community that emerges on the Internet is an Internet Community at the same time – the choice of terms shifts the focus e.g. from the production and exchange of goods and services to the underlying medium. The lower level of the scheme presents examples for instantiations of the suggested categories

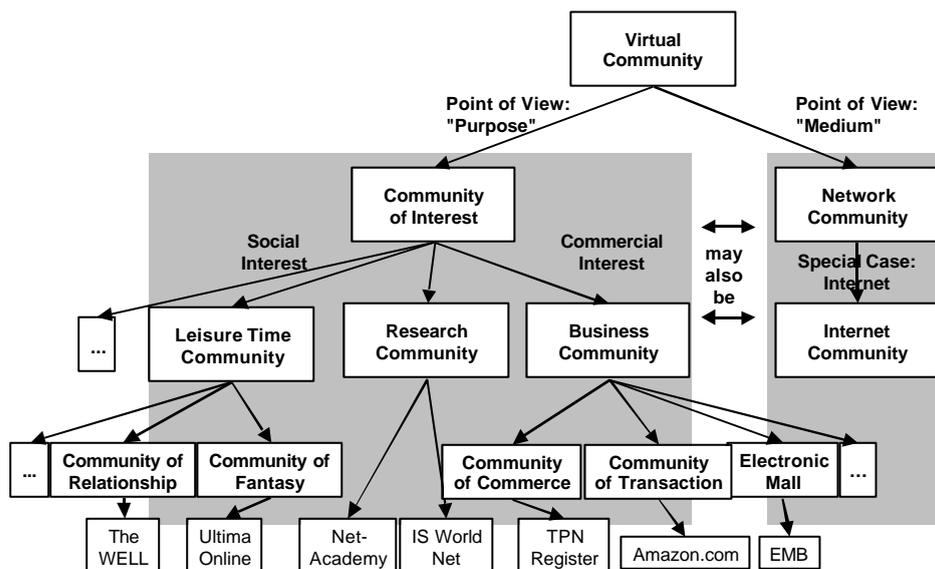


Figure 2: Virtual Communities: Categorization Scheme

The proposed classification scheme extends the approach by Armstrong and Hagel [1996] who, on the basis of the motivation of the members, distinguish only between four different types of Virtual Communities: Communities of Transaction, Interest, Fantasy and Relationship. In this paper we focus on "Business Communities" which emerge within E-Commerce environments. Their members have a commercial interest and seek the relationship with business partners. Communities of Commerce are a special form of Business Communities and describe business-to-business alliances between partners at all levels of the value chain. Their aim is a joint value creation.

Our focus is *Communities of Transaction* which deal with the exchange of goods and services, or more specifically *the purchase transaction* itself. Communities of Transaction can emerge between business-to-business partners as well as between companies and private end consumers. We selected Communities of Transaction for our analysis since there is a great unused potential for effective IT-support for this type of Business Community. Whereas the

development of Interorganizational Systems (IOS) which mainly support Communities of Commerce has been pressed ahead in recent years [Klein 1996], applications for the private end consumer markets are still running short of their potentials. We argue that applications which realize personalization strategies based on members' data represent a key strength of these community. The following section presents some promising characteristics of Communities of Transaction.

3. Communities of Transaction

Optimally, Virtual Communities of Transaction provide three distinctive features:

- (1) a *trustworthy* commercial and social *environment*,
- (2) mutual support and the means for the identification of individual user needs based on *shared community knowledge*, and
- (3) *buying power* to make special group-tailored products attractive for vendors thus extending the existing product base.

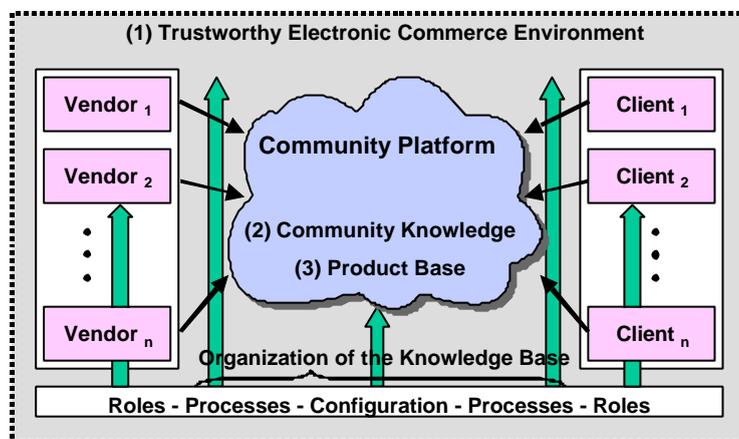


Figure 3: Three Key Characteristics of EC-Communities

- (1) A *trustworthy E-Commerce environment* forms the community space for the social and business interactions. It is a qualitative and broad concept which includes expectations, mind set, shared semantics and beliefs of the participating parties. The axiom is that mutual trust will result if the preconditions are met. It is important to note here that the trust which the buyer implicitly gives to the seller may be abused quite easily in the electronic setting. Thus, covert information sharing (consumer demographics, e-mail sharing which leads to a growth mass-marketing (spam), and so on) may take place without the (potential) buyer's knowledge among a given consortium of seller organizations. This is the motivation behind the "Privacy Statement" which is placed on many E-Commerce Web sites. The Privacy Statement explicitly tells the consumer that demographic and other information will not be shared. The potential for abuse is strong given the inherent tension (business or profit goals versus individual buying optimization) that often exists between seller and buyer groups. Thus, real-life economic factors can corrupt the model and lead to behaviors that are sub-optimal for the buyer group. Industry initiatives such as TRUSTe aim at institutionalizing buyer advocacy. TRUSTe is a joint Venture founded by CommerceNet and the Electronic Frontier Foundation [Cranor/Reagle 1997; Dyson 1997] with the mission to establish trust and confidence in electronic transactions. TRUSTe audits Web sites and allows them to display the TRUSTe logo on their Web pages.
- (2) *Community knowledge* is contributed by the community members. It is collected and stored in databases on the basis of communication and interaction in the electronic medium. The interesting questions here are scalability and degradation. For example, how long should the contributions be kept or should we purge the database every so often to maintain a reasonable signal to noise ratio? How fast does the quality of older contributions degrade?
- (3) The third concept, *buying power*, requires a definition of customer needs and their combination into groups of buyers with matching needs. Innovations in this area must rely heavily on the electronic infrastructure.

Understanding these essential properties will help us understand how community organizers may greatly improve E-Commerce platforms with the help of Virtual Communities of Transaction (c.f. Figure 3).

The general flow is as follows: experts observe a general shift of power towards the end consumer [Hagel/Sacconaghi 1996; Hagel/Rayport 1997]; customers increasingly realize that their transaction profiles are worth money; and the customers aggregate to form communities as they realize they can increase their market potential [Hagel/Armstrong 1997]. An increased number of buyers makes the group attractive to potential vendors and might even lead to new, group-customized products.

However, aggregation is not feasible unless there are low barriers to communicate between the customers. Communities of Transaction enable the communication among the customers and provide intermediation mechanisms for the settlement of purchase transactions. Usually, such community platforms (EC Servers) are operated by electronic merchants or intermediaries. Typical forms of Communities of Transaction are [Berryman et al. 1998]:

- (1) "Seller controlled": Community is being created on the EC-Platform of a single vendor or an aggregator who unites the offers of multiple vendors (e.g. book store, travel agency)
- (2) "Buyer controlled": Multi-vendor catalogs which are tailored to the individual needs of one customer (e.g. procurement systems such as Ariba or CommerceOne) or customer-induced aggregator platforms which combine the purchasing power of many customers (e.g. TPN Register)
- (3) "Neutral": Communities in the form of open electronic markets operated by an intermediary who mediates between multiple merchants/vendors and their respective customers (e.g. auctions, electronic malls, trade exchanges).

Existing example for Communities of Transaction for end consumers are HorseNet and Amazon.com where consumers meet and exchange information on their topics of special interest. HorseNet attracts horse people by facilitating experience reports, specific classifieds and latest news – information supplied by members for members. The Amazon.com recommendation center is completely built upon customer profiles and is discussed in Section 7.

Besides the operation of their core business, vendors in the electronic medium should make use of the advantages of a closer relationship to their customers by means of Virtual Communities. As stated in a recent industry report, "even more important(ly), the successful Web players are not simply replicating existing businesses in the new online medium but are taking full advantage of the unique, interactive nature of the Net. For example, the hottest stores on the Web don't just provide convenience and low prices -- although those are essential ingredients, too. Across the board, successful Web merchants have created virtual "communities." At their sites, like-minded cybersnobs congregate, swap information, buy something, and come back week after week" [Rebello et al. 1996].

4. Trustworthy environment

Internet Communities are as old as the Internet itself. The first forms of Virtual Communities were based on the enthusiasm of users who were able to meet and discuss over long distances [Hauben/Hauben 1997]. At its inception, the Internet was a large community of like-minded people. Popular examples for socially-motivated communities are The WELL, Tripod, GeoCities, or Colony City. In the early communities, the main value often lay in the creation and maintenance of loyalty between the participants. As we have seen already, the increased commercialization on the Internet and the juxtaposition of buyer and seller groups with disparate short-term and long-term goals may confuse the question of loyalty or at least divide it into sub-group loyalties.

In a virtual world where customers and sellers are anonymous, leading to a sense of alienation from each other (absence of face-to-face communication), some traditional business rules are no longer applicable. These circumstances cast new light on the concept of "identity" [Turkle 1995]. Since the partners have no physical contact in the "real world", some of the essential characteristics of face-to-face communication do not take effect [Rheingold 1995, Zuboff 1988, Luhman 1989]. The proof of identity of the contracting party is essential in the case of a dispute. The number of operations of connected networks increases and worldwide IT experts are dealing with security mechanisms for legally binding electronic contracts. Suggested steps are encryption, digital signatures and the deployment of Trusted Third Parties (TTPs) as well as Certification Authorities (CAs). A question of central importance is the creation of "trust" in the business relation.

Spar and Bussang [1996] discuss the absence of established (conventional) rules on the Internet which according to their opinion leads to an uncertainty about the possible behavior of the business partner. They point out that Virtual

Communities can help to develop a system of rules which have favorable effects on trust in the electronic business medium. The prevalence of communities is likely to supply a certain degree of security and trust [Iacono/Weisband 1997, Erickson 1997]. As Figallo states, "Trust is the social lubricant that makes community possible" [Figallo 1998]. We argue that Virtual Communities, with suitable checks and balances in the form of consumer advocacy, represent an alternative or additional means to increase trust in the business relation as well as in the electronic business platform.

Social considerations focus on the awareness of other customers on the community platform which leads to an increased level of trust. Information on products and services help to foster confidence in the purchasing decision since new customers can profit from the experiences of product users. Let us assume some customers contribute their opinions on products they bought and this information is stored in the product catalog. The experiences of one customer thus serves other customers to get a better impression and a likely higher degree of confidence when choosing to buy a product. Think of buying a high-priced product in a store. Would it not be reassuring to add the opinion of a satisfied customer to the salesclerk's high-praising subjective remarks? Usually we consider the recommendations of others before spending a lot of money on products whose quality we are not certain of. On the Internet, however, there are thousands of buyers surfing around each day without knowing about the existence of one another. At the very moment, when customers become aware of each other, it becomes feasible to unite them into a community of common interest leading to an enormous potential of power over vendors. Group awareness, though, is only part of the story. There must also be quality filters to identify in some manner sources more likely to be offering trustworthy comments. In addition, the tension between buying groups and selling groups may manifest itself in the seller attempting to "game" the recommendation system. Conclusions and statistics may be skewed when agents acting in their own self-interest masquerade as legitimate reviewers buyers to skew the recommendation data. This abuse was discussed by Charles Piller in the Los Angeles Times:

Lynn Manning Ross, author of a book about Internet business planning, got a shock when she checked reader reviews of her work posted on Amazon.com, the hugely successful Internet bookstore. None other than Jeff Bezos, Amazon.com's world-renowned chief executive, had posted a vicious pan of her book under the heading: "Stupid Book . . . Don't Waste Your Time!" Or so it seemed. As Ross soon discovered, the pan had actually come from an anonymous individual who had, unbeknownst to Amazon.com officials, appropriated their boss's real e-mail address as a form of cybernetic camouflage. That was only the most embarrassing example of what authors, publishers and other industry insiders say is a growing problem on Amazon.com – and in some cases, on other commercial Web sites that invite the general public to comment on products, artistic works or other items of value. Privacy and free speech may be cornerstones of Internet communications, but the very anonymity of the process, they say, is an invitation to mischief-makers or even professional rivals to besmirch the reputations of authors and their work without fear of being caught [Piller 1999].

In summary, the appearance of a well-intentioned and fair forum such as Amazon's book reviews section does not necessarily mean that it exists. "Many commercial sites view public reviews as sure-fire audience builders or as a way to create the illusion of an online community" [Piller 1999] and it is vital for the customers to consider how the system can be "gamed" or otherwise skewed in a manner that is not in their best interests. Interestingly, book publishers are also relying more heavily on reviews and statistics published by Amazon in their publication decisions: "the site is 'increasingly significant as a measure of what's important out there,' said O'Reilly [CEO of O'Reilly Book Publishers]. Publishers, he said, value the site's reviews because they offer instant consumer feedback" [Piller 1999]. Thus the authors' interests must be weighed as well as the book buying community in this complicated online community. The same argument carries over the online investment community discussion databases where agents who are acting in their own interest skew stock and bond discussions.

Peppers and Rogers speak about "agent objectivity" [Peppers/Roger 1997] when they refer to the trust and confidence that arise from mutual customer recommendation. According to them objectivity is a real selling proposition that can easily be achieved in the electronic medium. Ratings and opinions of other customers are assumed to be objective and make the knowledge base (e.g. the product catalog) more trustworthy. They say: "every customer wants genuinely objective, unbiased advice in a commercial transaction, and every customer knows that sometimes this advice will run counter to the seller's own interests." [Peppers/Roger 1997, 244]. Companies such as Amazon.com make use of this concept supplying customers reviews and ratings on their Websites. The platform becomes an "objective agent", an intermediary among the customers themselves.

5. Community Knowledge

The study of community knowledge requires a brief discussion of the terms "data", "information", and "knowledge". One reasonable approach is to place these terms in a spectrum [Davenport/Prusak 1998]: *data* is "a set of discrete, objective facts about events" and *information* is a message with a sender and a recipient, or "data endowed with relevance and purpose". *Knowledge acquisition is a subjective update of the recipient's value system which requires information flow.* The term knowledge plays an important role in the sense of shared collective knowledge of communities. Community knowledge serves as the basis for the collaborative use of information (e.g. collaborative filtering) and the resulting retention of the bond within Virtual Communities (e.g. by building trust). Keep in mind that the community is likely to be quite information intensive and it is essential to provide metadata clues as to the information's quality. Without a sense of quality, it is very hard to know which messages to apply to the knowledge base.

Marketers in the electronic sphere are increasingly aware of the new potential of the medium. Information Systems and databases can track and store customer information on a mass basis. Furthermore, data mining techniques can be applied to extrapolate to the single customer trends noticed in the (large) database. This information can be used to improve and personalize the individual offer which a company presents to a client [Fischer et al. 1999]. Unfortunately, as above, it can also be used to share customer data without the customer's permission among a community of buyers. Opportunities range from customization of the application interface to the customization of the product bundle itself. Virtually every information-based product can be tailored to the customer's needs.

"Community knowledge comes from the accumulation of information about a whole community of customer tastes and preferences. It is the body of knowledge that a 1:1 enterprise acquires with respect to customers who have similar tastes and needs, enabling the firm actually to anticipate what an individual customer needs, even before the customer knows he needs it." [Peppers/Rogers 1997, 231]

For E-Commerce Web sites, we identify three different levels of personalization as displayed in Figure 4.

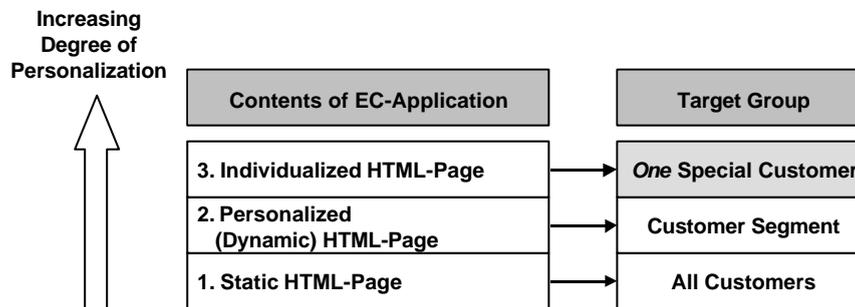


Figure 4: Degrees of Personalization

(1) *Identical presentation to all customers*

The simplest way of Web page design is a collection of static HTML pages. The presentation is the same for every customer for all steps of the transaction. There is no automatic user identification and the system does not make use of an existing user profile.

(2) *Personalization by Categorization*

The personalization of Web sites can be realized in two different ways: *menu-driven* (manual user input) or *tracking-based* (system logs). A first approach towards personalization of Web Applications is the categorization and classification of customers in different groups of interest. This mechanism leads to a mere personalization which is tailored to groups and not to individuals. While assigning people to certain categories, profiles emerge which contain socio-economic, preference or community related information. These profiles serve as the basis for offers tailored to the needs of the respective interest group. Examples for this kind of information are residence, gender, age, interests, etc. A Web system which is known for this kind of profiling is Firefly.

(3) *Individualization*

Individualization goes even one step further. In the beginning, users state their preferences either through a direct input (menu-driven) or indirectly by monitoring their click stream (tracking-based). A personal customer profile stores the information and serves as a basis for the presentation of dynamic Web pages which are speci-

cally tailored to the interest of *one single* client. Over time a Web sites can gather more information about a customer and become increasingly powerful in the choice of the presentation of Web sites or products/services. A customer who visits an information Web sites always looking at exchange rates at first will find this information on the entry page after a while. The compound customer profile can be composed of socio-economic, community or interaction profiles. A software product for the design of E-Commerce Web server which allows for the individualization of Web pages is e.g. Broadvision.

5.1 Community Member Profiles

Customer profiles are at the core of personalization systems. E-Commerce systems track and store compound profiles which contain parts of the profiles shown in Table 1.

Profile	Content
<i>Identification Profile</i>	user name, role, contact information, personal browser settings, address, payment information, IP-address, etc.
<i>System Profile</i>	User-Id, rights and system activities (login times, file access, resources), etc.
<i>Session Profile</i>	session related info (click stream, status, etc.)
<i>Socio-economic Profile</i>	self-categorization in predefined classes (age, gender, hobbies, etc.)
<i>Preference Profile</i>	self-revealed preferences (Science Fiction, politics, etc.)
<i>Interaction Profile</i>	recorded interests (business, stocks, computers, etc.)
<i>Transaction Profile</i>	transaction log (purchases, inquiries, payment, etc.)
<i>Community Profile</i>	template-based categorization (parent, teen, hard rock fan, etc.)

Table 1: Different types of profiles

5.2 Collaborative Filtering

In a brick-and-mortar setting most business customers are not aware of one another. The same applies today in basic Electronic Shopping environments. Clients are carriers of information that could be shared with others for the benefit of all interested parties. Uniting buyers in a virtual community of buyers, harnessing the potentials of the underlying IT-infrastructure, can help to exploit community knowledge. The technical challenge is to declare a strong semantic infrastructure for the product lines and map the semantics to the buying community, in order to achieve:

- (1) accurate *trapping* of historical buying activity, by individual and by (implied) buying group (demographics)
- (2) accurate *predictive models* of future buying behavior, again by individual or by the implied group, and
- (3) iterative mechanisms to correct *semantic* weaknesses within and across product lines.

As discussed above, the concept of Community Knowledge in E-Commerce applications goes one step further than simply customizing product or interface. Electronic merchants can even use information provided by other customers to improve the offer for an individual customer. This procedure as shown in Figure 5 is generally known as "Collaborative Filtering".

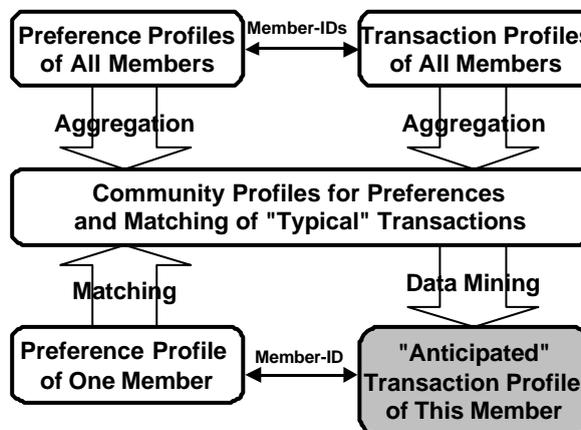


Figure 5: Collaborative Filtering: Building Affinity Groups

Peppers and Rogers [1997] call sub-communities of customers with similar taste "affinity groups". By linking affinity groups with recorded purchase transactions of a big numbers of customers a knowledge bases emerges which can be used for the prognosis of future buying behavior of individuals. The shoe chain "The Custom Foot" uses a similar mechanism for their the shoe sales: customer rate shoes on a scale from one to five. This information is stored in large databases where customers with similar patterns are combined into affinity groups. Based on the buying behavior of the respective peer group, customers receive recommendations for future shoe purchases without even the need to look at a broad range of shoes.

Preference and transaction profiles can also support buyers regarding recurrent purchases. Once individual settings (such as preferred airplane seat, choice of menu, kind of rental car, etc.) have been stored any future transaction can consist of only one "confirmation click" of the compiled product.

6. Customized group products

Unlike the business clients, private customers often have to embark on a laborious trip of finding product information, tariffs or prices. Due to their small purchase amounts vendors usually avoid spending a lot of time in compiling an offer. The community concept might be a possible aid to the small customer: By joining forces customers can aggregate their demand and go for bigger purchase amounts which will make them more worthwhile for vendors. A good community organizer should collect interesting complementary offers (i.e., engage in link collection) and should encourage members to evaluate products. The community thus becomes an intermediary between customers and vendors. There are different business models for the intermediation of customer profiles. A common case today is a single-vendor approach where one merchant collects data from his customers (e.g. Barnes & Noble). Other approaches span multiple companies in the same industry (e.g. travel agencies such as TISS or Expedia). The community could even become its own intermediary selling members' profiles to different vendors in different industries (similar to Cybergold's concept).

Usually, customers like to be treated as individuals. Nevertheless, in physical businesses, 1:1 products are usually not economically feasible. Bringing together a large amount of potential buyers in the electronic medium may be a way to at least realize products tailored *for a group of buyers* with similar or identical needs who could never have met in real life (e.g. due to restrictions to time and distance). This brings us – besides the above described possibility of the individualization of the customer interface – to the second potential inherent to E-Commerce Applications: the creation of *community products*. This is similar to the findings of Kambil and Ginsburg in the US EDGAR database case [Kambil/Ginsburg 1998]: the trend is from a generic interface to a personalized interface to an aggregated, community interface. Note that this trend parallels another trend: from generic data in the back-end to customized data to aggregated data from multiple sources. In both cases, greater intelligence is being applied to the interface and data to suit the customers' needs better.

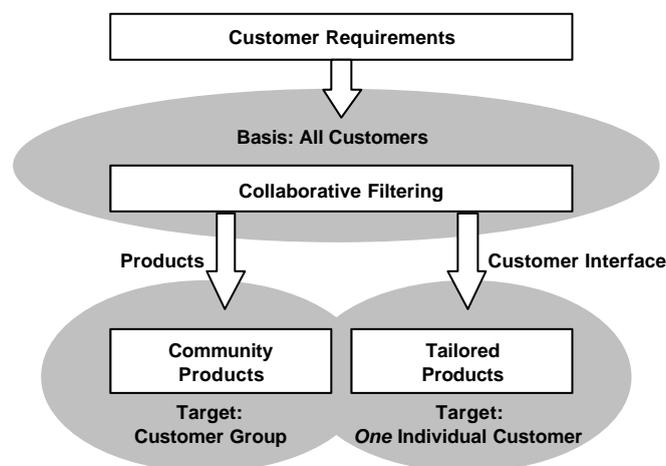


Figure 6: Two different potentials of Collaborative Filtering

Buyers and seller are often characterized by diametrically opposed desires: whereas buyers prefer custom products at commodity prices with no switching cost, suppliers would like to sell mass-produced products at custom prices with prohibitive switching costs [Elofson/Robinson 1998]. In fact, suppliers have incentive to obfuscate their product offering to prohibit direct price comparison. Bakos [1997] reports on evidence of this practice in the Virtual Vineyards case. If semantic reconciliation of heterogeneous products can be performed, then Electronic Commerce supports the customer in this imbalance between buyers and sellers offering lower search cost (for alternative or substitute products) and shifts the balance of powers in favor of the end consumer. In this context, Virtual Communities can play an important role since they cultivate the process of a collective awareness. If the community platform supports it, customers may be able to perceive the presence of other customers which enables them to coordinate their actions and to play off their common strength against the suppliers. The idea of using shared intelligence to aid the subgroup in negotiation is not limited to the buyers. Similarly, sellers might expose certain elements of their strategies in a given consortium to optimize selling strategy to a given buying subgroup. Returning to the case of a buying community, their combined demand for specially-designed products can result in Economies of Scale. Such "personalized community products" represent an additional potential of Collaborative Filtering. Instead of merely individualizing the customer interface (namely the view of an existing product range) it is conceivable – given a sufficient number of buyers – that products are specially produced as desired by the sub-community.

Elofson and Robinson [1998] present examples from the insurance industry where many members might ask for a similar insurance for health services (e.g. members of high risk groups). The aggregation of their demand makes the product attractive for the insurance company. In their example the intermediation takes place in the form of a broker service which uses Collaborative Filtering mechanisms for the identification of customers with similar needs. Such a principle could be applied to a general "exchange platform for community orders " in which a special products is being offered as it is lucrative for the seller. Such alliances of interest groups can today be found in the form of unions, cooperatives and other member-based organizations which aim at the generation of Economies of Scale.

Kambil [1997] suggests a similar idea where customers publicly declare their product needs and suppliers consequently submit their corresponding offers. One example is BidnAsk which accepts inquiries for computers and accessories from potential customers and invites sellers to submit their product offers. This procedure lowers the searching cost for customers. A further example in this area is Priceline.com which allows customers to state prices that they are willing to pay for services, e.g. airline tickets for certain itineraries [Weintraut 1998].

7. Amazon.com: "The Participatory Product Catalog"

Amazon.com's Recommendation Center is a good example for the possibilities and dangers to the consumer that come with the use of a great base of information collected from customers. The Web sites profits from consumers' and authors' input of reviews, recommendations and additional information. Once the customer decides on a book or a CD, the system comes up with suggestions of other books or CDs which belong to the same category and are often complementary to the one chosen. The site features E-Mail broadcast messages to customers who want to be informed about new publications. Input of reviews, ratings or recommendations are on a voluntary basis. The community has become quite large giving economies of scope to the user community.

The Recommendation Center accommodates different recommendation techniques which are displayed in Figure 7.

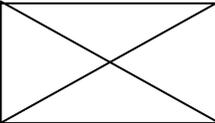
Push	E-Mail-Recommendations	
	"Instant Recommendation" "Book Matcher"	"Customer Buzz" "Mood Matcher" Book Recommend. Reviews/Ratings
Pull		
	Individualized	Browsing-Mode

Figure 7: Amazon.com's Recommendation Center

Amazon.com is a very good example for a successful online community where customers are united in a community of common interests. Amazon.com has done a good job in forming an alliance with its customers employing them as information providers. The fact that its policy of accepting anonymous reviews uncritically has backfired somewhat (see the discussion in Section 4) merely reinforces the important role of buyer advocacy groups.

This brings up an interesting dimension: when a virtual community of buyers meets a single seller or a virtual community of sellers, who should own the medium of interaction? With Amazon.Com, the seller controls the medium (the Amazon.Com web site). The buyers cannot be sure that customer reviews are organized or delivered as they appear, *prima facie*. The case can be made for an intermediary 3rd party architecture that would certify accuracy of buyer and seller common information, and furthermore make guarantees as to privacy policies. Consider another case of business to business procurement. Some intermediary software vendors put the procurement solution on the desktop of the buying firm and expose that buying firm to only a subset of the selling firms, as a pre-selection filter. Thus, the virtual community has been pre-defined by the middleman. If the middleman is disintermediated, then the buying firm may lose the value-added that the middleman provides, such as cleaning up the pooled seller data and organizing it conveniently in the desktop view. We see here the tension between the beliefs and goals of the buyer and the goals of the middleman, an interesting extension to the simpler buyer/seller tension discussed previously.

8. Conclusion

As increasing numbers of people use the Internet as a new medium for interactive, multimedia communication spanning time and distance, new business potentials emerge which need to be harnessed to remain strategically competitive. Worldwide, there is an increasing battle for customer attention (= time which the customer spends on reading a marketing message) and market success dictates a basic knowledge of the requirements of the clientele. These considerations have motivated our discussion of Virtual Communities of Transaction, their trust-building potential, the importance of community knowledge which enables the personalization of Web Commerce Sites and our framework of customer profiles and community products.

Strategically, it is advantageous to design effective personalization schemes for E-Commerce Web sites; the following advantages can be derived:

- (1) Besides the incentive of forming a large customer base, the collection of *customer feedback* is an important aspect for the creation and maintenance of a community. Merchants can derive valuable marketing and service information from discussion among clients. They hear about factors of dissatisfaction, possibilities of improvement, comparisons with the competition, technical flaws, etc. The community might be a source of valuable information that manufacturers usually seek to obtain from expensive customer interviews. Business intelligence engines can be used to give more or less weight to various comments depending on their attributes.
- (2) As demonstrated, there are multiple applications for the Virtual Communities of Transaction. Useful examples can be found in the areas of (1) the *personalization* of Electronic Commerce *interfaces* as well as (2) in the creation of completely *new products* tailored to the needs of an individual or a group of individuals whose revealed preferences can be mass-processed by the electronic platform.
- (3) Examples like Amazon.com, Colony City, Tripod and others illustrate that Internet users are potentially ready to spend time and engagement in a community membership. It is up to the imagination and the creativity of the entrepreneurs to design their business applications in a way that makes full use of this potential for the benefit of all participating parties. It is also up to the selling firms to respect and adhere to good business practices with respect to customer privacy.

In summary, we believe that the perspective of forming Virtual Communities of Transaction is quite useful in the analysis of establishing trust in virtual environments and gaining advantage from customer profiles. As Electronic Markets continue to evolve, along with their infrastructure and communication models, so will the complexity and importance of the social structures which attach themselves to these markets. Advocacy groups must continue to evolve as the underlying data grows and becomes more complex describing buyer and seller behaviors and histories to address the fundamental tensions between buyer, seller, and possibly also middleman. The understanding of these social structures will be key to designing a socially and technically efficient marketplace to best suit the needs of buyers and sellers alike and to meet the challenges of the underlying technical infrastructure.

References

- Armstrong, Arthur; Hagel, John (1996): The Real Value of On-Line Communities, in: *Harvard Business Review*, May-June 1996, pp. 134-141.
- Bailey, Joseph; Bakos, Yannis (1997): An Exploratory Study of the Emerging Role of Electronic Intermediaries, in: *International Journal of Electronic Commerce*, Vol. 1 No. 3, Spring 1997, pp. 7-20.
- Bakos, Yannis (1997): Reducing Buyer Search Costs: Implications for Electronic Marketplaces, in: *Management Science*, Vol. 43, No. 12, Dec. 1997.
- Benjamin, Robert; Wigand, Rolf (1995): Electronic Markets and Virtual Value Chains on the Information Superhighway, in: *Sloan Management Review*, Winter 1995, pp. 62-72.
- Berryman, Kenneth; Layton-Rodin, Dennis; Rerolle, Vincent; Harrington, Lorraine (1998): Electronic Commerce: Three Emerging Strategies, in: *The McKinsey Quarterly*, No. 1, 1998.
- Bloch, Michael; Pigneur, Yves; Segev, Arie (1996): On the Road of Electronic Commerce -- a Business Value Framework, Gaining Competitive Advantage and Some Research Issues, <http://www.stern.nyu.edu/~mbloch/docs/roadtoec/ec.htm>, March 1996. [Accessed: 22.06.98].
- Cranor, Lorrie Faith; Reagle, Joseph (1997): Designing a Social Protocol: Lessons Learned from the Platform for Privacy Preferences Project, in: Proceedings of the Telecommunications Policy Research Conference. Alexandria, VA, 27. - 29. September 1997, <http://www.research.att.com/~lorrie/pubs/dsp/dsp.html>, updated in April 1998. [Access: 31.08.98].
- Davenport, Thomas; Prusak, Laurence (1998): Working Knowledge: How Organizations Manage What They Know, Boston, MA: Harvard Business School Press, 1998.
- Dyson, Esther (1997): Release 2.0 - A Design for Living in the Digital Age, New York: Broadway Books, 1997.
- Ellis, Clarence, Gibbs, S.J. and Rein, G.L. Groupware: Some Issues and Experiences, in Communications of the ACM, Volume 34, No. 1, January 1991, pp. 39-58.
- Elofson, Greg; Robinson, William (1998): Creating a custom mass-production channel on the Internet, in: *Communications of the Association for Computing Machinery (CACM)*, Vol. 41, No. 3, March 1998, pp. 56-62.
- Figallo, Cliff (1998): Hosting Web Communities: Building Relationships, Increasing Customer Loyalty, and Maintaining a Competitive Edge, New York: Wiley Computer Publishing, 1998.
- Fischer, Rudolf; Fisseler, Dirk; Rüeger, Brian (1999): Fünf Faktoren definieren den Erfolg im E-Commerce, in: *ioManagement*, No. 12, 1999, pp. 74-79.
- Gebauer, Judith; Beam, Carrie; Segev, Arie (1998): Impact of the Internet on Procurement, in: *Acquisition Review*, Spring 1998, pp. 167-181.
- Ginsburg, Mark; Segev, Arie; Gebauer, Judith (1999): Multi-Vendor Electronic Catalogs to Support Procurement: Current Practice and Future Directions, in: Proceedings of the 12th International Bled Electronic Commerce Conference, Bled, Slovenia, June 9-11, 1999.
- Hagel, John; Armstrong, Arthur (1997): Net Gain: Expanding markets through virtual communities, Boston, MA: Harvard Business School Press, 1997.
- Hagel, John; Rayport, Jeffrey (1997): The Coming Battle for Customer Information, in: *The McKinsey Quarterly*, No. 3, 1997.
- Hagel, John; Sacconaghi, A.M. (1996): Who Will Benefit From Virtual Information?, in: *The McKinsey Quarterly*, No. 3, 1996.
- Hauben, Michael; Hauben, Ronda (1997): Netizens: On the History and Impact of Usenet and the Internet, IEEE Computer Society Press: Los Alamitos, Ca., 1997.
- Iacono, Suzanne; Weisband, Suzanne (1997): Developing Trust in Virtual Teams, in: *Proceedings of the Thirtieth Annual Hawaii International Conference on System Sciences, Hawaii*, 1997, pp. 412-420.
- Kambil, Ajit (1997): Doing Business in the Wired World, in: *IEEE Computer*, May 1997, pp. 56-61.
- Kambil, Ajit; Ginsburg, Mark (1998): Public access Web information systems: lessons from the Internet EDGAR project, in: *Communications of the Association for Computing Machinery (CACM)*, Vol. 41, No. 7, July 1998, pp. 91-97.
- Klein, Stefan (1996): Interorganisationssysteme und Unternehmensnetzwerke, Wiesbaden: Deutscher Universitäts-Verlag, 1996.
- Klein, Stefan (1997): Kommerzielle elektronische Transaktionen: Sektorale Struktur, Umfang und strategisches Potential, in: Werle; Raymund; Lang; Christa, Modell Internet?, pp. 23-42, Frankfurt/ New York: Campus, 1997.
- Lüdi, Ariel (1997): Personalize or Perish, in: *International Journal of Electronic Markets*, 09/97.
- Luhmann, Niklas (1989): Kommunikationsweisen und Gesellschaft, in: Rammert; Werner; Bechmann; Gotthard (eds.), Technik und Gesellschaft. Jahrbuch 5, pp. 11-18, Frankfurt/Main: Campus, 1989.

-
- McLuhan, Marshall (1964): *Understanding Media: The Extensions of Man*, Toronto: McGraw-Hill, 1964.
- Neumann, Peter; Weinstein, Lauren (1996): Inside Risks: Spam, Spam, Spam!, in: *Communications of the Association for Computing Machinery (CACM)*, Vol. 40, No. 6, June 1997, pp. 112.
- Peppers, Don; Rogers, Martha (1997): *Enterprise One to One: Tools for Competing in the Interactive Age*, New York: Bantam Doubleday Dell, 1997.
- Piller, Charles. Los Angeles Times, June 30, 1999. Available online at:
http://www.seattle-times.com/news/business/html98/altamaz_19990630.html
- Rebello, Kathy; Armstrong, Larry; Cortese, Amy (1996): Making Money on the Net, in: *Business Week*, Sept. 23, 1996, pp. 44-52.
- Rheingold, Howard (1993): *The virtual community: homesteading on the electronic frontier*, Reading, Massachusetts: Addison-Wesley Publishing Company, 1993.
- Sarkar, Mitra; Butler, Brian; Steinfield, Charles (1996): Intermediaries and Cybermediaries: A Continuing Role for Mediating Players in the Electronic Market, in: *Journal of Computer Mediated Communication (JCMC)*, No. 3, 1996.
- Schmid, Beat (1999): Elektronische Märkte - Merkmale, Organisation und Potentiale, in: Hermanns, A.; Sauter, M. (eds.), *Management-Handbuch Electronic Commerce*, München: Vahlen, 1999 (forthcoming).
- Schubert, Petra (1999): *Aufbau und Management Virtueller Geschäftsgemeinschaften in Electronic Commerce Umgebungen*, St. Gallen: Dissertation, 1999 (forthcoming).
- Spar, Debora; Bussgang, Jeffrey (1996): Ruling the Net, in: *Harvard Business Review*, May-June 1996, pp. 125-133.
- Stohr, Edward; Viswanathan, Sivakumar (1998): Emergent Structures in the Information Economy, in: *Proceedings of the 4th Conference of the Association for Information Systems (AIS '98)*, Baltimore, August 1998, pp. 357-359.
- Turkle, Sherry (1995): *Life on the Screen: Identity in the Age of the Internet*, New York: Simon & Schuster, 1995.
- Zuboff, Shoshana (1988): *In the Age of the Smart Machine - The Future of Work and Power*, New York: Basic Books, Inc., 1988.